

3124. E.

# MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, JULY 3, 1886.

VOLUME LIII.  
Number 1.

## Government Engineering Work.

Government engineering work on this coast is just now pretty much at a standstill for want of the necessary appropriations. There is nothing whatever being done with the harbor fortifications, nor has anything been done for several years, though our present defenses are acknowledged to be inadequate and antiquated. At Mare Island there is no shipbuilding being done, and the drydock is not completed. On Oakland harbor the dredging has been stopped, there being no more available money. At the San Pedro harbor improvement, work is dragging slowly on, also hampered by insufficient appropriations. The lighthouse department also finds itself delayed on important work for similar reasons. All the parties of the Coast and Geodetic Survey have been called in from field work, because no appropriation has yet been made, and even the expected amount is far short of what is needed, so that many assistants will be dropped.

This is a very unsatisfactory state of affairs, indeed. In the matter of rivers and harbors the Pacific Coast is badly off, there being very few good ones; but in improving what few there are the Government engineers have had very difficult work in getting the necessary money. Work that should be completed in three years takes 10 or 15, owing to delays in appropriations. This makes the cost excessive and discourages those in charge.

The present system of appropriations for public works is fatal to their efficient conduct, and is productive of disaster and extravagance. By this system engineering considerations are entirely disregarded.

Appropriations are made by the contending influence of private interests, and in amounts which have no relation to the importance or cost of proposed works, but result simply from mutual concessions among these interests, to the end that the total of an appropriation bill may not become insupportable.

Appropriations for new work are made in spite of adverse recommendation from the Chief of Engineers and his subordinates; and works begun are in subsequent years left wholly unprovided for or starved by insufficient grants of money.

It results that exact preliminary estimates are impossible, and that, with one exception, there has not been an important river and harbor work undertaken in this country during the last 20 years which has not been made extravagant in cost or jeopardized in success by the financial uncertainties of the present irrational and improper system. The one exception is the case of the Eads jetties, at the mouth of the Mississippi, and for these Congress made a radical departure from its usual course, and in one act made provision for the entire work.

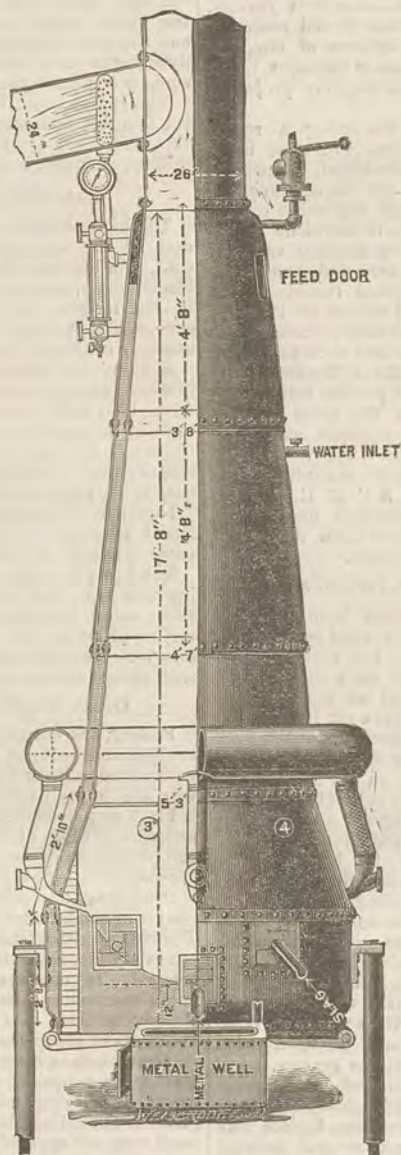
There seems to be no ground of hope for remedy of these regulative abuses until the evils of the present system have become so grave and plain to the public mind as to force the abandonment of the present indiscriminate efforts at river and harbor improvements of the General Government. That the present system is lamentably imperfect is readily admitted by the officers at present charged with the execution of the improvements. They could do much less costly and more satisfactory work were money available at the times when it is necessary, and so that work could be continuously carried on.

## The Improved Hartsfeld Furnace.

The accompanying engraving represents the Hartsfeld improved desulphurizing, roasting and smelting furnace. It is especially adapted for the economical treatment of low-grade rebellious ores containing much sulphur, arsenic, etc., which generally require a previous roasting. The improved furnace has a wet metal-dust con-

saves 10 per cent of the original weight of the ore, and there is no drawback to any portion of the machinery." The result of the test run banishes all doubt as to the success of the enterprise, and we heartily congratulate Mr. Brile and the company on their success.

These furnaces are manufactured in four sizes, by Lane & Bodley, of Cincinnati, Ohio; W. T. Garratt & Co., San Francisco; Imray &



IMPROVED HARTSFELD DESULPHURIZING SMELTING FURNACE.

denser attached to it. The engraving shows the construction of the furnace quite clearly.

The following paragraph, from the *Coeur d'Alene Record*, gives the result of work with one of these furnaces. Through the courtesy of Alfred Brile, superintendent of the Kentucky Mining and Smelting Company, we have the following report of the test made by his company at Milo, Idaho: "We started at 8 A. M. May 26th, and tapped the first slag 30 minutes later. The ore run came from different mines. The furnace was started without lead in the lead well, and after a run of four hours, seven bars of bullion, weighing 700 pounds, were drawn. The average amount of ore run while test was being made was 2500 pounds per hour, equal to 30 tons per day in a No. 20 furnace. The slag run like water. After smelting 60 tons of ore, the bottom was dropped, with the furnace thoroughly cleaned. The condenser

Co., London, England; McIlvain & Spiegel, Cincinnati, and the Hartsfeld Portable Smelting Furnace and Mining Co., Newport, Ky. The latter-named company will forward catalogue, etc., on application.

**NEW SILVER VAULT.**—The House evidently has no thought of the suspension of silver coinage within the next four years, as an appropriation of about \$112,000 for making additional storage room in the Philadelphia Mint building has been voted without opposition. The additional space will be sufficient to store \$60,000,000.

**THE Young America quartz mine** of Sierra City has become a solid dividend payer, the aggregate of the seven monthly dividends paid being \$85,000. The last dividend, recently paid, amounted to \$15,000.

## To Work by the Elevator Process.

We note in the *North San Juan Times*, of Nevada county, that a hydraulic gravel elevator is soon to be placed in operation on the property of the well-known North Bloomfield Gravel Mining Company, at North Bloomfield, Nevada county, this State. We have interviewed the manager of the "Joshua Hendy Machine Works" of Nos. 39 to 51 Fremont street, this city, and learn from him that this report is true, and that they have now in process of construction at their works a No. 3, 20-inch gravel elevator, which will be in operation on that property in about two weeks.

L. L. Robinson, Esq., the president of the famous North Bloomfield Company, has thoroughly investigated the principles governing the operation of these elevators, has practically experimented with one of crude form, has had reports by experienced hydraulic mining engineers furnished him of the actual work done by these mining devices at Mammoth Bar, Placer county, and on the ground of the Miocene Mining Company, in Butte county, and upon the strength of the information which he has gathered, the knowledge he has acquired and the representations made to him of their practical utility, has entered into an arrangement with the above-named "Joshua Hendy Machine Works" whereby those works agree to place an elevator of the largest size yet constructed, and of an improved form, upon the ground of this company. Being supplied with a sufficient volume of water, acting under a vertical pressure of 425 feet, they propose to raise earth, sand, gravel, water, etc., through this elevator into an outer line of sluice-boxes, at a height of 80 feet above the lower or entrance section of the pipe. An attempt will also be made, under the same conditions of volume and pressure of water, to raise earth, sand, gravel, etc., to an elevation of 100 feet, and it is believed that this can and will be accomplished.

We shall watch with great interest the course of these operations, and shall present the result of our observations to our readers, and full information of the progress and accomplishments of this interesting and important work.

In the present condition of the hydraulic mining industry of our State, a solution of the vexatious problems involved in the "debris question" is one of vast importance. If, as is expected by this system of mining, all debris can be impounded within the limits of the ground that has already been mined and exhausted, then many of the valuable properties which now lie virtually abandoned, by reason of adverse legal decisions and legislation, may again be successfully worked, and a golden stream will pour into the channels of commerce, and the honest miner will then be made happy, and the useful granger cease his complaints. These hydraulic gravel elevators are in successful use in numerous mines in this State and Colorado. The North Bloomfield is the most extensive hydraulic mine in the world, and the adoption of the "elevator system" there will doubtless lead to a more general knowledge of its advantages under certain conditions.

**THE Mechanics' Institute Fair** will open on August 24th. It has been decided to appoint 16 jurors to pass upon all the classes except agriculture, county exhibits and fruits and cereals. They are to be assisted by a competent secretary.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

## The Great Central Plateau of the Southwest.

Its Natural Wealth and Resources.

[Written for the Press by J. G. LEMMON.]

If the reader will examine a late map of the southwestern Territories he will, at a glance, notice a long line of railway running nearly straight across the northern part of Arizona, and extending eastward nearly to the center of New Mexico.

On close inspection this line will be seen to follow along the 35th parallel of north latitude, varying only a few miles north and south of this parallel at any point.

Also it will be seen to span the whole distance between the two great rivers that flow southwardly out of the Rocky Mountains—the Colorado and Rio Grande—separated on this parallel by just eight degrees of longitude, equaling at this latitude about 50 miles each, making an air-line distance of about 400 miles.

The Railway Guide-book will inform you that the 35th parallel road, despite the sinuosities a railway must make to find the easiest grades, spans this distance by a course of only 560 miles.

The guide-book will also show the newly established town of Needles, on the Colorado river, as the western terminus of this road; also that this town is connected with the farther West by a continuance of the line to Mohave, on the Southern Pacific Railroad from San Francisco to Los Angeles and the southwest.

Also the guide-book will inform you that the larger, more important town of Albuquerque, on the Rio Grande, enjoys the double advantage of being both the eastern terminus of the road described and also of being a central depot of the Atchison, Topeka & Santa Fe road, coming from the northeast on its way down to El Paso and the southwest.

## The Great Central Plateau.

This much the map and guide-book will show, but the most prominent feature of the country is not readily conveyed to the eye by a flat surface like a map. This feature is a high, long and broad plateau occupying this interspace, and over which the railway climbs and descends.

The great plateau is somewhat quadrangular and oblong in shape, the longer diameter being east and west. Its high center remains convex, like a broad sugar loaf, but its sides all around have been abraded and carried away by ages of weathering, the debris conveyed to Southern Arizona and New Mexico and spread over their valleys by the affluents of three great rivers, which almost entirely inclose the plateau.

The Colorado and Rio Grande form the nearly straight west and east boundaries of the plateau respectively, while the grand canyon of the Colorado river, turning abruptly eastward near the northwest corner of Arizona, together with its principal and also deeply-canyonized branch, the San Juan river, bound the irregular northern side. Similarly, but not so deeply, the Gila river, with its affluents, drain the still more irregular southern side.

This plateau is so large and diversified that characteristic names have been applied to the several mesas or benches composing it.

## Mesas and Mountains.

Hualapais and Chino valleys, with the Aubrey and Prescott mesas and a large diversified plain south of them, comprise the western end of the plateau; the San Francisco mesa comprises the great forest on the Arizona divide; east of it, stretching to the continental divide, is the large Colorado mesa with the Mogui and Navajo reservations north and the White mountain reservation south of it; lastly, in Northwestern New Mexico, is the broad continental divide with the Zuni and Mogollon mesa south of that.

The most conspicuous mountain groups rising out of the mesas along the north side of the plateau are, first on the west, the several Hualapais ranges, the Prescott ranges, the Bill Williams group, the San Francisco group with its mountains Agassiz and Humphry over 13,000 feet high—the highest peaks in Arizona—the Sierra Madre on Zuni range on the continental divide, and the San Meteo group, with its Mount Taylor, over 13,000 feet altitude, the loftiest peak in New Mexico.

Another line of groups are the Granite, Superstition, Manizeta, Pinal, White—with its Mounts Thomas and Ord, over 11,000 feet altitude, and the rugged Mogollon mountains remain prominent on the southern slope of the plateau.

## Principal Rivers.

Chief of the rivers originating on this plateau is the Little Colorado, a considerable stream some 250 miles long, which, with its many branches, alternately drains and irrigates the broad central portion between the two divides, cutting for itself at last a deep gorge on the north side through which it debouches into the main Colorado just at the head of the Grand canyon.

Similarly, but on a smaller scale, the Salt river disports itself on the south-central part of the plateau and then empties into the Gila above the Big Bend. Bill Williams and Rio Puerco

are minor streams on the western and eastern ends respectively, each contributing largely to the wealth of the plateau.

## Towns and Settlements.

Several important towns, including the capital, Prescott, are situated on this plateau. The capital and Mineral Park are on the western slope, the former about 50 miles south of the A. & P. R. R., the latter 20 miles north of it.

Similarly situated, on the eastern slope, are St. Johns and the other Mormon settlements, all on the Little Colorado and its branches.

A dozen new and promising towns have sprung up along the line of the railway. Beginning at the west, Kingman is the depot for Mineral Park, Peach Spring for tourists, to the Grand canyon of the Colorado, Ash Fork for Prescott. Williams is an important mountain town. Flagstaff is at a higher elevation than any other town on the plateau, 7000 feet in the great pine forest near the base of the lofty Mt. Agassiz. Winslow is the depot for some of the Mormon settlements, Holbrook for St. Johns and other Mormon settlements, together with several other important and growing towns; Wingate, for the port of that name, and the ancient Indian town of Zuni, while McCarty's station is the radiating point to several Indian pueblos and Mexican towns near the Rio Grande.

A half-dozen military posts have long been established on the plateau, including Fort Whipple near Prescott, the headquarters of the department commander.

## Atlantic &amp; Pacific Railway.

The long, nearly straight thoroughfare described as traversing this plateau from end to end, is the lately-constructed and superbly-equipped middle division of the Atlantic & Pacific or Thirty-fifth Parallel railway, in praise of which, and the scenery it reveals, together with the natural wealth and resources it unfolds, much has been written of late, and deservedly, too, for it is one of the most interesting and important routes thus far projected on this continent.

This results from its traversing a region studded with more extreme, diverse, beautiful, grand, curious, wonderful, important and valuable objects than can be combined by a road of like extent through any other part of the globe. And this region is not alone to be penetrated by this road, for already two important feeders have been surveyed, one across the western end of the plateau reaching down southward to Prescott, and thence to Phoenix, in the rich valley of the Salt river, continuing on across the Gila river to connect with the grand trunk of the Southern Pacific at Maricopa; the other traversing the middle portion from Flagstaff through the length of the great forest to Globe City, and making another connection with the Southern Pacific at Wilcox.

Each of the foregoing adjectives applied to the region traversed by the A. & P. R. R. could be substantiated by pages of detailed description, but the requirements of journalism demand of the note-taker brevity and point.

## Extremes and Diversities.

Exceeding diversity results from the great difference of altitude of the several parts of this plateau. Taken as a whole the plateau is inclined on its bed so that its western end is depressed to nearly sea level at the Colorado river, while its center rises to over 7000 feet at two points—the Arizona summit and the Continental divide—descending to about 5000 feet at the eastern end resting on the Rio Grande; and all this extreme of elevation is under the semi-tropic parallel of 35 degrees, thus insuring the widest diversity of flora and fauna.

The low Colorado valley, the hottest region within the limits of the United States, with its burning desert sands yielding their peculiar thorny flora of cacti, yucca and agave, under which lurk noxious reptiles and above which swarm stinging insects, contrasts very strongly with the elevated and delightfully cool great central crown with its gently undulating valleys and hills, all clothed with a wealth of pine, oak and juniper forests and carpeted with beautiful flowers and nutritious grasses, upon which feed graceful quadrupeds and above which float lovely song-birds; while rising here and there from out the evergreen forests like icebergs on the billowy sea, several isolated groups of bald peaks ascend from 12,000 to 13,000 feet in height, so lofty, indeed, as to retain perpetual snow in their northern canyons, once the track of grinding glaciers.

## Beautiful and Grand Scenery.

Most beautiful are the flowers, shrubs and trees; the canyons, water-courses and valleys; the groves, meadows and vistas revealed by this road; while the extensive forests, noble mountains and bristling peaks attain the magnitude of grandeur. Awe-inspiring sublimity reaches its climax on this continent in the Grand canyon of the Colorado, near the great southern bend of which, at Peach Spring, this railroad fortunately passes. This canyon is over 200 miles long. Its walls are from 4000 to 6000 feet high, and irregularly cleft from top to bottom by side canyons that leave segments of rock between them, fashioned into magnificent pyramidal, castellated mountains, zoned about with horizontal, parti-colored strata, from river-washed base to cloud-wreathed summit.

## Curious and Wonderful Objects.

Very wonderful are the roomy, white-furnished limestone caves recently discovered near

Peach Spring and Ash Fork, while still larger and more wonderful ones have been found in the White mountains; the latter abounding in ancient pottery, burial urns, weapons and utensils of curious design and unknown origin.

On the plateau near Chiquita, Colorado, the former traveler over the plains suddenly found himself, without warning, on the very verge of the famous Canyon Diablo, a deep rift in the earth's surface 30 miles long, 222 deep and only 540 feet across, channeled by a deep stream ages ago. This frightful gorge is now spanned by a much-admired iron bridge, over which all trains pass slowly to allow passengers time to gaze into its awful depths.

Most wonderful and puzzling is the petrified forest near Holbrook, trees of which have been measured that were three to four feet in diameter. The cracks and cavities of these trees are filled with masses of lovely polygonal crystals of many hues, being the residue of the silica which was taken up in solution by these trees during a series of dry seasons, ages ago, and thus deposited, after which the celluloid tissue of the heart-wood was filled to repletion, and the trees became solid stone. A company has been incorporated in San Francisco to obtain and manufacture tons of these petrifications into jewelry and all sorts of fancy as well as useful articles.

## Interesting Aborigines.

Most interesting to tourists and important to naturalists are the persons, habits, occupations, surroundings and traditions of the aborigines, many tribes of which are located on this plateau.

These Indian tribes present all degrees of physical condition and mental culture, from the squalid, beggarly Hualapais, huddled under the junipers of the western slope, who hesitate at nothing degrading and criminal, to the high-spirited, stock-raising Navaho, roaming over the upper mesas; or the still more advanced and Christianized, agricultural Pueblo Indians, dwelling in excellent stone houses of extremely ancient origin on the eastern slope.

The Indian topic is so very interesting that the temptation is strong to enlarge upon it at this time, but such amplification may be indulged, perhaps, in a subsequent paper.

## Salubrity of the Climate.

The high elevation of the plateau, the mildness of the summer's heat and the winter's cold, the absence of hot winds and piercing blasts, the presence of balsam-producing trees in the forests, the purity of the mountain springs and streams, all combine to make the sanitary conditions exceedingly good.

Already the region has become a resort for invalids seeking health, and persons afflicted with chills and fever elsewhere lose all symptoms of the malady soon after arriving on the plateau. No malarial districts, even of small extent, have been detected on it, and their presence is believed to be impossible.

Rheumatic and nervous disorders are infrequent, while pulmonary and bilious complaints never originate on the plateau.

The few physicians that strive to make a living here have very large circuits and each has some other business—the sale of drugs, the raising of stock, etc.—connected with his profession. They declare that their practice consists almost entirely of surgery and obstetrics.

## Great Wealth of the Plateau.

Finally, the economic values of the objects developed and brought into commercial relations with other parts of the Union by this new railway are simply past computation.

First may be mentioned the saving of time—and time is often of more worth than money to the tradesman or traveler—insured by a direct thoroughfare between the East and West which is absolutely unmenaced by snow-blockades in winter or sandstorms and washouts in summer. The real wealth of this Mesopotamia region is but fairly discoverable now, not yet fully developed. It consists mainly of several rich mines comprising nearly all the precious metals, already putting out carloads of bullion and hundreds of prospects more or less developed in all the mountain ranges of the plateau; of vast coal fields supposed to be the largest in the world, underlying the north-central part of the plateau, extending also into Utah, while southward they are crossed by the railway at Gallup, where five thick strata crop out and are extensively worked; of wide forests of pine, cedar, fir, juniper, oak, ash and other timber trees, among which already many saw-mills and factories are established, using improved machinery and employing hundreds of workmen; lastly, and perhaps chiefly, of stock-raising, beef-producing and wool-growing facilities, prosecuted for hundreds of years by the pastoral Indians and now being seized upon and improved by the dominant white races.

## Unexcelled Grazing Lands.

It is believed that no other country in the world is possessed of such wealth of grazing lands as are found on this plateau. Nutritious grasses, thick, and often two and three feet high, abound in the valleys and amid the trees of the great forest, while shorter and more tufted, but just as rich and abundant, clothe all the other portions of the plateau at lower levels, especially in the broad juniper belt, which entirely surrounds the great forest, and which, in fact, composes the greater part of the plateau.

## Seeming Drawbacks.

To the traveler on the railway or the thoughtless observer anywhere, there seem to be two

serious drawbacks to the superior excellence of this plateau as a grazing country. One is the presence of *Malpais* rock over large portions; the other is the scarcity of water over most of it. Both these facts, however, are found to be really great advantages to stock-raising and fattening.

*Malpais*—"bad land" or "bad country" in Spanish—is a black or various colored lava, hard and porous, which is found shattered at the surface, and strewn over large areas of the plateau, especially at the center, where, perhaps, it originated in the San Francisco and neighboring mountains. Its presence prevents animals from stampeding or running great distances, but does not hinder slower progress anywhere, especially in the numerous valleys, where it is partially or wholly covered with alluvium.

Large stock-raisers of many years' experience declare that they would not have the *malpais* removed from their ranges for any consideration, for it keeps their animals quietly at home, thus greatly favoring fattening and increase.

The wild, long-bodied and long-legged animals from Texas and similar smooth plains have been made so by the habit of running and stampeding to which they have been subjected all their lives. Brought upon this plateau, their offspring in a few generations become tame and gentle, with short legs, thick bodies and deep chests, while every circumstance favors milk-yielding and fattening processes.

## The Water Supply.

While it is well known that springs and so-called "tanks" or sink-holes in stream-beds are everywhere dispersed at convenient intervals—and of these more can be readily developed by intelligent effort in many places—yet there is at present a comparative scarcity of water.

This scarcity serves a similar purpose as the *malpais*, in keeping animals quietly at home, and hence it greatly diminishes, or entirely obviates, the expenses of herding. An instance was cited to the writer where a stock-raiser in the region easily cares for over 1000 head without assistance.

Stockmen find that one herder can care for five times as many animals in such regions as where water is so abundantly and equally distributed, for the herder has only to visit the watering places for his stock instead of searching over the whole country.

Still, there are certain districts lying idle because they are entirely destitute of water except in winter and midsummer. In these localities enterprising natives are boring artesian wells, and the day is not far distant when the construction of reservoirs in favorable gulches, or the converting of certain canyons and valleys into lakes, will be found a profitable investment of capital.

## The Mild Winters.

As a climax to this matchless array of stock-raising and fattening facilities it only remains to mention the highly favoring, mild, open winters.

All the domestic animals, including sheep, require no special care or provision in winter as regards either food or shelter. At the approach of the first storms the animals not already favorably located roam off into the juniper belt, to feed upon the hitherto untouched grasses, coming back or being driven back in the spring, fat and ready for market, with seldom the loss of over one per cent.

Let Eastern farmers who have to build barns and then toll three or four months of each year to fill them with hay, then toll another three or four months to feed the hay out to stock, in a freezing atmosphere, let them learn of this glorious outlook on the great central plateau of the Southwest, where millions upon millions of acres of these grazing lands lie all unoccupied and inviting Anglo-saxon enterprise.

Flagstaff, Arizona, June 2, 1886.

## Comparative Value of Quartz Mills.

EDITORS PRESS:—An article appeared in your issue of June 12th, written by some party in this place, bearing the signature of "The Old Man of the Mountains," and the attempt is made to reply to a late communication of my own over my name, entitled "Comparative Trials of Quartz Mills."

I propose to be brief in what I here say and not to deal in loose generalities that have neither weight, point nor brilliancy. This is an easy thing to do, but to give the true figures and facts as I did, and which he did not, is quite another thing. He makes ducks and drakes of the whole matter, misses the true point and is evidently of the old and probably of the foreign and unprogressive school.

He is certainly unaware of the advance made in the many different modes of crushing quartz in America, and especially in California, and is politic enough to shield himself under a non de plume, a circumstance indicative of timidity and consciousness of weakness. He has one advantage of fighting behind a fence. This is safe but not brave, and is not the usual manner of men knowing what they are writing about and having the courage of their convictions. Let him give, over his proper name, his experience in the matters whereof he writes, stating descriptions of different mills he has used, if any, and names of places and persons and the results obtained. I am prepared to give mine dating back to 1865. Otherwise, his bare assertions about primitive mills, etc., are the



veriest stuff and will carry no weight among men of practical experience.

I recognize as well as "Old Man" does the true value of stamp mills, and know thoroughly well the improvements made in them in late days, and have suggested several myself, of which "Old Man" never heard, and have used both gold and silver stamp mills of the largest size. He must be blind to the spirit of this progressive age and utterly inexperienced with other forms of mills, and therefore incompetent to make statements as to their comparative values. Does he pretend to say that stamp mills have exhausted invention? If so, the statement is simply reckless and the offspring of prejudice or ignorance, or both, for prejudice always comes from ignorance. The facts tell directly and exactly the reverse of his position, for mills of various kinds, other than stamps, like the Huntington and Tustin & Kendall, and now the Frisbee & Lucop mill in operation at the Pacific Iron Works, are running successfully in many places on the Pacific Coast.

"Old Man," as he styles himself—rather appropriately, I fancy; old and therefore prejudiced in favor of old things—may be ignorant of the fact, but it is nevertheless a fact known and admitted by men of intelligence and information, who keep abreast of the times.

Allow me to quote poetry for a moment. It is applicable to the point:

A little knowledge is a dangerous thing;  
Drink deep, or touch not the Pierian spring.

He alludes to me personally by name. Let him state his. He may be a fairly good assayer, or may run a little thumping five-stamp mill. When I know who he is, I may not say as much for him as he has said for me. *Nous verrons.*

It happens that a small object placed near the eye will conceal the largest at a distance. I judge his mental vision has been thus affected.

I know by actual practical use the principle and the comparative value of the different kinds of quartz mills, old and new, operating on this coast, and am informed by competent and experienced men as to those in the East; and when I made the comparison as to the value of different forms of mills, I felt confidence in stating my belief, based on facts and figures derived from such personal use and close and prolonged observation, and now feel that your readers will not be misled by general and loose statements, for they hold men strictly to proof, and the reasons for the faith that is in them as to all matters of scientific interest and practical value; and I know of no paper that has been so instrumental in educating men in this inductive system as the MINING AND SCIENTIFIC PRESS.

LOUIS BLANDING.

Sonora, Tuolumne Co.

### Gold Yield of British Columbia.

The following summary of mining operations and statement of the gold product of British Columbia is taken from the reports of the minister of mines for the province, for the year 1885. Every indication now is that the yield for the current year will be a much larger one than that of last season. There have been new finds in some districts, and at Cassiar some of the tunnels which have been worked during the winter have now run into rich leads:

CARIBOO.	
Bakerville division.....	\$120,700
Lightning creek division.....	76,500
Quesnelmouth ".....	62,400
Keithley creek ".....	63,100
CASSIAR.	
Laketon division.....	31,000
McDane creek.....	19,000
LILLOOET.	
Bridge river and its tributaries and branches of Fraser river.....	94,700
YALE.	
Similkameen division.....	117,500
Hope, Yale and Lytton.....	29,000
KOOTENAI.	
Wild Horse and other divisions in district.....	76,050
OMINECA.	
Vitalle creek and other divisions.....	10,500
SKEENA.	
Lorne creek.....	15,000
Total for year.....	\$730,650

The average number of miners employed during the year were 1056 whites and 1846 Chinese. The average wages realized by whites ranged from \$3.50 to \$6 per day, and for Chinese from \$2.50 to \$4 per day. The total estimated value of the yield of gold from 1858 to 1885, 27 years, is \$49,385,866. The highest yearly yield was in 1864, the total for that year being \$3,735,850, followed the following year with an output of \$3,491,205. The number of miners employed being 4400 and 4294 respectively, averaging in wages \$849 and \$813. The greatest average yearly earnings were in 1875, the approximate being \$1222 per man, and in 1868, \$902. The fewest number employed was in 1882, the total being 1838. The lowest average earnings was last year, showing only \$246 per man. The value of gold exported for the year 1885 was \$594,782.

TIN IN WASHINGTON TERRITORY.—The discovery of tin was made this spring by a rancher living on Oyster Bay, about 12 miles west of Olympia. In his prospecting tours he struck some ore in the foothills back of his ranch, which he had assayed. The assayer reported that the ore contained a sufficient percentage of tin to warrant further investigation of the find. The discoverer proposes to ascertain the extent of the ore.—*Seattle Times.*

### Stamp Mills and Chlorination Works.

The following paper, lately read before the American Institute of Mining Engineers, is entitled "Notes on the Stamp Mills and Chlorination Works of the Plymouth Consolidated Gold Mining Company, Amador County, Cal.," and was read by Geo. W. Small, E. M., of Oconomowoc, Wis.:

The ore, as it is raised from the mine, has an average assay value of \$11 per ton, chiefly in the form of free gold. All the ore goes directly to the stamp mills, of which there are two. The older and larger mill contains 16 batteries of 5 stamps each, with one Frue vanner to each battery. The new mill has 8 batteries of 5 stamps and two Frues to each battery. The large mill is driven by Leffel turbine wheels, with a pressure of 80 feet and a consumption of 600 miner's inches of water. The smaller mill is driven by "hardy-gurdy" wheels, with a pressure of about 550 feet and a consumption of 150 inches of water.

At both mills the tailings from the stamps pass over about 20 feet of plates on their way to the Frues. In each set of plates the first or upper one is copper; the rest are so-called silver plates.

The bullion from the stamps is about 800 fine in gold and 200 in silver.

#### The Concentrates

From the Frues average from  $1\frac{1}{2}$  to  $1\frac{1}{4}$  per cent of the ore stamped. They very rarely exceed two per cent. I was unable to get the exact assay value of the concentrates, but it is said to vary between \$100 and \$200 per ton.

The concentrates are treated at the chlorination works at the rate of 160 tons per month. The capacity of the works is somewhat greater than this, but as the supply of concentrates is limited it is not deemed advisable to work them up any faster.

Care is taken to keep the concentrates always damp until they are put into the roasting furnace. If this is not done, a decomposition of the pyrites begins, forming lumps which do not roast, and which consequently cause a loss of gold in the residues from leaching.

A *Fortsehaufungs-ofen* is used for roasting. Its dimensions, including fire-box, are 12' x 80'. The hearth is one continuous plane, but the charges, of which there are three in the furnace at one time, are kept entirely separate. The furnace-men call the three compartments the "drying," the "burning" and the "cooking" compartments. In the middle, or "burning," compartment the ore is spread out very thin and occupies about double the space of either of the other compartments.

#### The Furnace

Is worked by eight-hour shifts, one man on each shift, and one charge is drawn and a new one added in each shift. The charges weigh 2400 pounds and carry about 10 per cent of moisture. The ore averages about 20 per cent in sulphur, and just before the sulphur ceases flaming (in the second division of the furnace) 18 pounds, or three-fourths per cent, of salt is added to the charge.

The roasted ore from each shift is kept by itself on the cooling floor until a tankful (about four tons) has accumulated from a single man's shift; then that lot is worked by itself. This enables the person in charge the better to control the roasting; for, if only one lot out of the three is bad, it is presumable that the fault lies with the workman, but if all three are bad the probabilities are that there has been a material change in the character of the ore, and the roasting process must be altered accordingly.

#### The Vats for Chloridizing

The roasted ore are nine feet in diameter by three feet in height, and are four in number. They are slightly inclined, so that they will drain completely. The bottom of each tank is occupied by a filter about six inches thick, composed as follows: Light strips of three-quarter-inch wood are first laid in the bottom of the tank at intervals of about one foot. Across these strips are laid six-inch boards, leaving cracks of an inch or more between the boards. On top of this loose floor are placed coarse lumps of quartz, and on top of this again finer quartz material, until a total depth of about five or six inches is obtained. Finally, this "sand-filter" is covered by another loose floor, the boards lying crosswise to the loose floor beneath, and pretty close together. This upper floor is intended merely to furnish a shoveling surface, so as to permit the removal of the leached ore from the tanks without disturbing the filter.

The ore to be chloridized must be damp (about six per cent moisture). The working test is to take a handful of the ore and squeeze it, then open the hand, and if the lump immediately begins to crumble and fall apart (not run) the ore has the requisite amount of moisture.

#### The Leaching.

The damp ore is screened into the tanks, so that it will lie as loosely as possible, and facilitate the penetration of the chlorine gas. A coarse screen of one-half inch mesh is used for this purpose.

The tanks are only filled up to within about three inches of the top. This is to insure that the entire contents of the tank are covered by water in the subsequent leaching, otherwise there will be great difficulty in washing out all the soluble gold.

As soon as the tanks are filled as stated, they are ready for the introduction of the chlorine gas. This is introduced into the bottom of the tank from two opposite sides, and is continued until ammonia held over the ore gives off dense fumes of ammonium chloride. This usually takes about four hours. When this point is reached, covers are placed on the tanks and the cracks are luted with a mixture of leached ore, bran and water. The gas-generators, of which there are two employed at one time in charging a tank, are allowed to work on until they are exhausted; then they are disconnected and the holes in the tank are plugged.

The tank is usually charged with gas in the morning, and is left standing for two days. On the third day the ore is leached. The tank is first filled with water and allowed to stand a few minutes, so that the water may penetrate all the ore. If no more water is absorbed, the liquor is drawn off at the bottom, care being taken to keep the tank full of water during the entire operation, which takes from four to five hours.

In charging the tank, a gunny-sack is laid on top of the ore, where the wash-water is afterward to be introduced, in order to better distribute the water in the tank and prevent its washing and packing the ore.

#### The Liquor from the Leaching-Vats

Is conducted to settling or storage tanks, and about 40 pounds of sulphuric acid (66° B.) is added. (Experience has shown this addition of acid to be advantageous in obtaining a clean product in the subsequent precipitation. The chemical reaction is, however, by no means clear.) It is usually allowed to stand for 24 hours, but two hours are quite sufficient. It is then run into precipitating tanks, and the gold is precipitated by a solution of sulphate of iron. The iron solution is added until, after stirring, a further addition produces no purple color. After the gold is precipitated it is allowed to stand two or, if convenient, three days to settle; then the supernatant liquor is drawn off with siphons into a second settling-tank, where any gold that may have been drawn off by the siphons has a second opportunity to settle. The liquor stands in this tank until it is necessary to run it off to make room for another charge. Very little gold is found in this tank, and it is therefore only cleaned out once during the year. In the meantime, fresh liquor has been run into the precipitating-tanks upon the gold already precipitated there. In this way the gold is allowed to accumulate until the semi-monthly cleanup. Except when it is necessary to have them open, the precipitating-tanks are kept covered and locked.

#### In Making the Cleanup

The supernatant liquor is siphoned off, the gold gathered up and placed in a filter of punched iron, lined with a sheet of ordinary filter-paper, and washed with water until all the acid and iron salts are removed. It is then dried, melted in crucibles and cast into bars.

The works extract from 95 to 96 per cent of the assay value of the concentrated sulphides. Two men, on day shift, attend to all the work of handling the ore after it is washed (the leaching, etc.). The head man receives \$3, the other \$2.50 per day. Owing to the limited amount of ore allotted to the works, only three tankfuls are leached every four days. The men, however, are employed steadily.

The sulphate of iron is manufactured on the spot. For this purpose, an ordinary wooden tank about 4 feet by 4 feet, standing outside the building, in the open air, is used. The tank is kept full of water and supplied with old scrap-iron *ad libitum*, and for each charge to be precipitated about 40 pounds of acid is added to the tank.

The precipitating-tanks, which are of wood, are protected from the action of the acids by a coating of "paraffine paint."

#### Cost.

I append an itemized statement of the cost of handling the ore. The basis of figuring is 100 tons of ore per month of 30 days. Consumption of chemicals in the leaching department, 24 days in each month:

ROASTING.	
Three men, at \$2 50 per day for 30 days.....	\$225 00
12 cords wood at \$4.25 ".....	223 13
54 lbs. salt at $\frac{1}{2}$ cent, ".....	12 15
	\$460 28
GENERATOR.	
The charge is manganese, 30 lbs.; salt, 84 lbs.; sulphuric acid, 60 lbs.; therefore, for two gen. rators:	
Manganese, 60 lbs. per day, 24 days, at \$47 per ton.....	\$33 84
Salt, 68 lbs. per day, 24 days, at \$15 per ton.....	12 24
Acid, 120 lbs. per day, 24 days, at \$60 per ton.....	86 40
	132 48
Acid for settling-tanks (40 lbs.), and for sulphate of iron manufacture (40 lbs.), 24 days.....	57 60
Wages of leachers, at \$5.50, for 30 days.....	165 00
Salary of foreman.....	125 00
Total.....	\$940 36
Or, per ton of concentrates, \$9.40 3-10.	

PROSPECTORS IN ALASKA.—A report coming from Juneau that a number of mining men and others who have recently flocked to that town from the lower coast, intended returning to their homes by the *Mexico*, having been unable to obtain employment, and not having the means themselves to remain in Alaska without it, reminds us to repeat, what has been hereto-

fore stated in the *Alaskan's* answers to inquiries that no man should come to this country without the means to sustain himself for some time. There is work here to do, and a good deal of it, but there is no great demand for labor, outside of that which is already employed. The companies and individuals doing business are generally supplied with all the help they need, and in most cases have supernumeraries from whom to draw their extra labor when required. Prospecting is laborious and expensive, and a man should come with a sure situation, or the means to invest in something that will pay if successful.—*Alaskan.*

### Optimism of Miners.

In remarking upon certain objectionable practices in connection with mining, the *Chronicle* says: First, there is the habit of exaggeration so prevalent with the miner. He loves to deal in hyperbole. He sees things, if sometimes a little dim and shadowy, always large. If it is a silver-bearing lode, he has discovered it is invariably a second Comstock. If a vein of auriferous quartz, it is the greatest gold mine in the world, a veritable bonanza, the biggest thing out. The ledge, in either case, is of monster proportions—is, in fact, the dominating vein, the mother lode of the district. The ore goes into the thousands and pays from the grass-roots down. In short, the deposit is simply a mint and there's millions in it. Such is the manner of speech the professional prospector employs in describing his latest discovery, and he expects you will give him patient audience and believe all he tells you!

It is to little purpose you reason with this man of the big finds, reminding him how many "second Comstocks" and "greatest gold mines in the world" he has already discovered and reported to his friends. He is not to be rebuffed by this kind of talk, nor can you work his discomfiture by recalling his former mistakes or even convicting him of inconsistencies and fraud, and this for the reason that he does not believe he has been guilty of either. He has thought over these things within himself, and talked them over with his companions, until he is persuaded they are true, and having so deceived himself, he is now in the prime condition for proceeding with the work of deceiving others. Nor is this a mere fancy sketch or an exceptional thing. It frequently happens that the veteran miner, in his eagerness and haste, falls into honest yet wholly inexcusable errors, mistaking gangue for ore, pyrites for gold and copper stains for the chloride of silver.

Then there is another particular in which the explorer for mines is apt to show himself careless and inaccurate, to say the least. Ask one of these men about the wood and water supply of any district he has discovered or may have visited, and what is his answer? Always, "Plenty of these." If only he has found there water enough for his mustang or mule and wood enough to make a camp-fire, he assures you that the supply of both is all-sufficient. Now, when it is considered that, outside of California, there is hardly a mining district west of the Rocky mountains which is not deficient in these essential aids to mining, the impropriety of a statement so grossly misleading becomes amply apparent. Equally positive is he as to the excellence of the climate, the abundance of grass and the other natural resources of the district, all of which he is ready to asseverate are first-class, way up, and the like. It is statements and blunders like these, so barren of profit to the miner himself, yet so misleading to others, that have tended to bring both him and his calling into disrepute.

It is in the nature of mining to inspire loose and extravagant ideas, out of which has grown an equally loose and extravagant style of language. There is, however, for these idiosyncrasies of the miner some excuse. Being naturally hopeful and sanguine, he is apt to be credulous and hasty. Then, he has to grope much in the dark and deal largely with uncertainties. The outline of his facts, because of the obscurity that surrounds them, assumes often gigantic proportions. Things seen through the mist are apt to be magnified. But for all this, how can such a standing disappointment—a man who is so often wrong and so seldom right—hope to retain either the confidence or respect of others? It is the miners and the mining men themselves who have done the most to repel investments and scandalize the business.

And now that this industry is working its way once more to the front and likely soon to regain much of its former importance, the people and the press should exert themselves to prevent a repetition of the abuses that have so long been practiced in its name. The improvements lately made in mining pervade every branch of the business—they relate to its morale, its mechanism and its metallurgy. Work is being done better and cheaper now than ever before, ores that only a few years since were rejected as being too rebellious or too low grade to be handled being now worked with profit. There is less extravagance, less overstocking of properties and less speculation in shares now than formerly. Mines that for years had been neglected and fallen into decay are being rehabilitated, and even whole districts that had been partially abandoned are receiving increased attention. On every hand are to be seen such evidences of awakened interest as bespeak for this industry a more rapid growth and a better future.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 13 Front St.

W. B. EWER.....SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.  
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, July 3, 1886.

## TABLE OF CONTENTS.

**EDITORIALS.**—Government Engineering Work; The Improved Hartsfeld Furnace; The Work by the Elevator Process, 1. Passing Events; An Electrical Sluice-Box Amalgamator; Metallurgical Works; Quartz Mining and Debris; New Hand-Power Rock Drill; Occurrence of Gold; 4. Mining Accidents; Crystal Alum; Foundry Notes; Banded Structure in a Gold Vein; Assaying With the Horn Spoon—No 1, 5.

**ILLUSTRATIONS.**—Improved Hartsfeld Desulphurizing Smelting Furnace, 1. Gold-Bearing Vein in Honduras. Showing Banded Structure, 5.

**CORRESPONDENCE.**—The Great Central Plateau of the Southwest; Comparative Value of Quartz Mills, 2.

**MECHANICAL PROGRESS.**—Reductions in the Cost of Steel Making; An Immense Forging Press; Rolling Out Iron Chains; Experiments in Iron and Steel Identification; A New Gun; B. D. Effects of Cement on Iron; Tempering Brass; Wear of Rails; Preventing Anvil Noise, 6.

**SCIENTIFIC PROGRESS.**—Saccharine—The New Coal-Tar Sugar; Luminous Concrete; Development of the Leaf of the Eucalyptus; Microscopic Metallurgy; Beautiful White Alloys; Markings of Animals; Thunder, Lightning and Rain; The Water of Trees; Vegetable Life and Temperature; Electricity for Light-houses, 6.

**USEFUL INFORMATION.**—Pine Leaf Carpets or Mattings; The Tar, Etc., Yield of Different Woods; The Use of Natural as Fuel; Wood Oil as an Illuminant; A Big Raise; Cremation; Beat Your Carpets Often; How to Make Wax in a Liquid, 7.

**GOOD HEALTH.**—Rabies and Yellow Fever; The East Wind; Sun-stroke or Thermic Fever; Poison Oak; The Venom of a Bee; Scarlet Fever, 7.

**MISCELLANEOUS.**—Gold Yield of British Columbia; Stamp Mills and Information of Miners; Optimism of Miners, 3. Notices of Recent Patents, 7.

**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 8-9.

**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 12.

## Business Announcements.

Perry Seminary—Oakland, Cal.  
Quartz Breker and Pulverizer—C. G. Y.  
Artificial Limbs—Menzon Spring.  
Haywards Hotel—F. A. Wilder, Haywards, Cal.

See Advertising Columns

## Passing Events.

The decision of the North Bloomfield Gravel Mining Company to make thorough experiments toward working their mine by the "elevator process" shows that they are in earnest in the matter of continuing work on their immense property, which has been closed down by reason of adverse decisions of the courts with regard to the debris. Should they succeed—as seems probable—in raising the gravel to the great height proposed by the hydraulic elevators, their success will go far toward furnishing a solution to the debris question, since they will only work bottom gravel and can impound the comparatively small amount of tailings they will make.

The fact that the Douglas Island mine is sending down from \$75,000 to \$95,000 per month in gold is attracting attention to the low-grade ore propositions in Alaska. D. O. Mills, the capitalist, is now examining the mine personally.

This number commences Volume LIII of the MINING AND SCIENTIFIC PRESS, and affords a very good opportunity for new subscribers to send in their names. The paper is necessary for any one engaged in mining or mechanical work on this coast, and all such should be among its readers.

WM. H. CLARK, an old resident of Austin, and who was owner of valuable mining interests on Lander Hill, died last week.

## An Electrical Sluice-Box Amalgamator.

Edward Pike, of Salt Lake City, has devised certain attachments to an ordinary sluice-box or flume for saving fine gold, amalgam, etc., in which he claims that the amalgamation is not dependent on the mere specific gravity of the precious metals, but is a forced one, so as to save all the float gold as well as the coarser particles.

In any ordinary sluice-box or flume, at any suitable distance apart, say six feet or so, more or less, according to the fall of the box, riffles of upper rounded configuration are arranged across the bottom. Immediately below each of these riffles the bottom of the sluice-box is cut out for a distance of from one to about three feet in length, and a quicksilver-tight box projecting from and below the bottom of the sluice, and open above, is substituted for the cut-out portion. These boxes are of a reverse inclination to that of the sluice-box, varying in degree as the character of the ore changes, but in every instance being deeper at what may be termed their upper end, relatively to the sluice-box. Above each of these "false boxes," at the bottom of the riffles, and resting on cleats, secured to the sides of the sluice, is a double perforated plate, composed of duplicate plates of iron or copper, insulated from each other. This double plate is set inclining upward in the downward direction of the sluice, leaving a mouth opening at its raised end between the sluice and false box. The perforations in the double plate are preferably of increasing size below, to give a ready clearance and prevent clogging by clay, etc.

In the bottom of each false box is an insulated amalgamated copper plate. In these boxes the quicksilver is placed, and their upper and lower plates are insulated as described, when it is desired to use an electrical current to expedite and improve the work, the two plates being connected with the different parts of a battery. The riffles—of hollow plates or solid—have a rounded shape, and will give a force of fall that it is claimed will effectually secure the amalgamation of free gold by bringing it in contact with the quicksilver.

The boxes in the bottom of the sluice or flume are fixed ones, and the upper perforated plate and lower inclined one, with the quicksilver resting on the latter, will secure the necessary amalgamation, give a proper distribution of the sand over the surface of the amalgamating chambers, so as to save fine flour gold and amalgam. The inclined plate in the bottom of these false boxes may be used for concentrating the ores, and the mouths and position or arrangement of said fixed boxes with their inclined bottoms will serve to provide for the apparatus clearing itself of dirt falling through into it. The succession of amalgamating chambers and plates is intended to be specially serviceable where the stream is a heavy one, as any precious metal that failed to go through the first perforated plate would go through the next succeeding ones. Instead of the upper perforated plate being set to incline reversely to the general bottom of the sluice, it may be set parallel if desired.

When electricity is applied to promote the amalgamation, the double plate, by being made a compound one, as described, and connected, as regards its lower insulated plate, directly or indirectly with the positive pole of the battery and the bottom amalgamated plate with the negative pole, the electric current will be confined to the stream passing through the fixed boxes and not be scattered or have its force impaired by passing through the water in the entire box. When the stream is passing through the fixed boxes, and the lower plate is charged with negative electricity and the lower one of the upper double plates with positive electricity, the precious metals are attracted to the negative, the bottom plate, and the base, etc., are attracted by the lower upper one of the plates, and the water falling through completes the circuit. Only certain of the boxes may be charged, or the whole of them, as may be desired.

E. N. RIOTTE, the well-known mining man, formerly of San Francisco, but now of New York, has made a flying trip to this coast, examining some Nevada mines. He was in this city a few days.

A NUGGET worth \$216 has been picked up at Green Valley, El Dorado county.

## Metallurgical Works.

One of the principal reasons Colorado has made such rapid strides in its mining development is that there are so many reduction works all over the State. Some of these are on a very large scale and complete in all their appointments. Miners have been able to work their own properties and sell their ore to these works to good advantage. Most of the other States and Territories have suffered from lack of these facilities. It is only of late in this State that the Selby Smelting and Lead Co. have commenced to purchase all classes of ores. Arizona is entirely without any central metallurgical point. New Mexico and Oregon are no better off. Idaho and Montana ship more or less to Salt Lake and to Colorado. Nevada outlying districts ship to Denver, to Salt Lake or to Port Costa.

Nevada is particularly unfortunate in this respect. There are many districts without any facilities for working ores; and there are other districts with private mills, but outside miners cannot get their ore worked. The great need of that State is metallurgical works where all grades of ore can be sold and worked.

Probably the best point in Nevada to establish large metallurgical works to treat all classes of ores is Reno. The railroads center there, and there is abundance of water power, the Truckee river running through the town. Reno is now the center of the educational interests of the State, and its prosperity and that of the surrounding country would be greatly enhanced if metallurgical works on a large scale were established. Peavine, Pyramid, Paradise and many other districts would ship their ore, concentrates, etc., there, if they could get them worked. The many districts down along the line of the Carson & Colorado Railroad would doubtless ship there if facilities were offered. No mining country has any larger extent of low-grade ore propositions than Nevada, and it is these ores that the miners want worked. There is no point between the Rocky and Sierra Nevada ranges that offers better facilities for reduction works than Reno. It will be the commercial town of the great country between these two ranges and should be the metallurgical center as well.

## Quartz Mining and Debris.

The fear among some quartz miners that court decisions and legislation on the mining debris question would seriously affect them, was never very well grounded. Whatever extremists may have urged on this point would hardly have been verified when it came to the test. The muddying of a stream from the tailings of a quartz mill would be of such small importance that it would be difficult to obtain injunctions against them. The largest quartz mill in the State could impound its tailings in a few acres of land. Still some of the quartz miners of California thought it worth while to send a man to Washington in their interests, to prevent any clause going in the River and Harbor Bill which might interfere with quartz mining.

The bill, making appropriations for the improvements of rivers and harbors (including spring branches) in the United States, as it passed the House of Representatives, provided that no rock, dirt, sand, debris or anything else should run from mineral lands into any position or place from which such rock, sand, etc., might eventually be washed into any navigable river. This provision, literally construed, would prevent any kind of work whatever being done on mineral land. There was also a provision inserted that the war power of the United States should prosecute the people working on mineral lands.

The bill went to the Senate and was referred to the Committee on Commerce, where it was changed so that no reference to quartz mining was made. The Senate Committee on Commerce has also struck out of the bill the clause making it the duty of the Secretary of War to prosecute those who violate the slickens provision.

WILLIAM PATTERSON, one of the oldest miners in Tuolumne county, died suddenly at Tuttletown, last week. He was one of the very few old-time prospectors left in Tuolumne. He worked and toiled meeting all the vicissitudes of the prospector and miner. His life has closed at 76 years.

## New Hand-Power Rock-Drill.

Wm. Brady and Daniel Fitzpatrick, of Virginia City, Nevada, have just obtained, through the MINING AND SCIENTIFIC PRESS Patent Agency, a patent on a new hand-power rock-drill of that class in which the drill is carried by a sliding carriage, and is actuated by means of cams and a spring. A frame is made, in the sides of which is mounted the sliding carriage. The supporting pillar or bar is pivoted in a suitable clamping device which is itself pivoted to the frame, whereby the drill may be turned in any direction or to any angle. This supporting pillar is adapted to be tightened against the walls of the drift by a screw.

Mounted longitudinally on the carriage is the drill spindle, the center of which is provided with two collars and passes loosely through a crossbar, the ends of which bar extend within and are guided by grooves made in the sides of the carriage. There is a strong spiral spring by which the spindle is thrown forward. Upon the forward end of the spindle is a chuck, consisting of a chambered barrel, in the center of which are seated two jaws, between which the shank of the drill bit is fitted. A set screw sets up the jaws to clamp the drill bit. This chuck is adapted to receive the drill bits just as they are, without the expense of turning or dressing them.

Mounted on the sides of the carriage, forward of the grooves in said carriage, are short shafts connected by a link whereby they are strengthened. Pivoted or jointed to ears upon the shafts are the operating cams, which are so pivoted to their bearings as to have a motion on their pivots but in one direction. One of these cams is simply a gravitating one, adapted to fall to its position, while the other is provided with an arm and a spring whereby it is raised positively to its position. The gravitating cam is located in such a position that when below the shaft, against the anti-friction roller or sleeve on which it bears, it is adapted as its shaft is lowered to force the crossbar back, thus throwing the drill-spindle backward against its spring. While this movement is taking place, the spring-cam on the other side is rising to a vertical position. When the crossbar is released from the gravitating cam, the drill is thrown forward to deliver its blow. The movement of the short shafts in the reverse direction causes the spring-cam to bear backward against the sleeve on its side of the crossbar, thus forcing it back and allowing, just before it releases it, the gravitating cam to drop by the crossbar to its original position. Then the spring-cam releases the crossbar and the drill springs forward to deliver its blow.

The movement in the first direction causes the gravitating cam to operate as described in the first instance while the spring-cam is pressing under the crossbar, until just before the gravitating cam releases its impingement the spring can be released, when it springs to its upright position. In this way, by the oscillation of the shafts, the drill is forced back and is thrown forward to its work. There are long hand-levers, or two men work the drill together, one on each side. Means are provided to rotate the drill, and the carriage, with its drill mechanism, is easily advanced by a screw and crank.

## Occurrence of Gold.

Many persons have an idea that gold, being the "King of Metals," and scarce, is found in but few places in the world. The United States, Australia and Russia are the principal producers, but it is widely disseminated in many parts of the world. The following are localities in which gold is found in workable quantities:

Africa.—Northern, Southern and Western.  
North America.—Alaska, British America, Costa Rica, Guatemala, Honduras, Mexico, Nicaragua, United States, West Indies.  
South America.—Argentina Republic, Bolivia, Brazil, Chili, United States of Colombia, Ecuador, British Guiana, Dutch Guiana, French Guiana, Paraguay, Patagonia, Peru, Uruguay, Venezuela.  
Australasia.—New Caledonia, New Guinea, New South Wales, New Zealand, Queensland, South Australia, Tasmania, Timor, Victoria, Western Australia.  
Asia.—Afghanistan, Anam, Cambodia, Cochinchina and Siam, Arabia, Assam, Banca, Borneo, Burma, Celebes, Ceylon, China, Corea,



India, Japan, Kashmir, Ladak, Malay Peninsula, Persia, Philippines, Russia in Asia, Sumatra, Thibet, Trans-Caucasus, Turkistan, Turkey in Asia.

Europe.—Austria-Hungary, France, Germany, Great Britain, Greece, Iceland, Italy, Norway, Portugal, Roumania, Russia in Europe, Servia, Spain, Sweden, Switzerland, Turkey in Europe.

### Mining Accidents.

The dead body of John Bohm was found at the head of the incline of the Hamilton Consolidated mine, north of the Lady Bryan, in Howery district, Nev. One hand grasped a miner's candlestick and the other held a tobacco pipe. It is supposed that death ensued from asphyxiation caused by inhaling the fumes of powder from a blast that had been recently fired in the breast of the drift. The mine is in an isolated locality, and Bohm's life is supposed to have been extinct several days before the discovery of the remains.

On Friday last another accident occurred at the Idaho mine, Grass Valley, in which one man lost his life and another received severe injuries. Three men, Enoch Holland, Harry Bennett and Joseph Batten, had a contract for sinking the shaft on the 1700-foot level of the mine. Holland was not able to go to work and Bennett took his place at the drill. Bennett and Batten were alone in the bottom of the shaft. They had prepared three blasts and had gone off some distance to be out of the way of the flying rock. Two of the three shots exploded, and after waiting fully three-quarters of an hour for the third one to explode, they went back to see what the trouble was. They found that some large pieces of quartz had fallen over the top of that charge, and while removing the last piece with a gouge, tipped with a piece of clay, the explosion occurred. Bennett, who was right over it, was hurled against the side of the shaft with great force, crushing in the back of his head and otherwise bruising his back. He was killed instantly, never uttering a sound. Batten was thrown into a pool of water. His left eye was torn out and his left arm fearfully bruised. With great difficulty he was able to drag himself to the air pipe, where he gave the signal of distress, which was responded to by his fellow-workmen, whom he told to go and find Bennett, who was found partly covered by debris and dead.

### Crystal Alum.

A new method of obtaining crystal alum from kaolin, bauxite or other aluminous material has recently been patented. A commercial alum, free from iron and fit for dyeing, calico-printing, etc., is obtained.

The kaolin, bauxite, or other aluminous material employed is first treated with sulphuric acid according to any of the usual methods for producing from such raw materials a ferruginous solution of alumina. This solution of sulphate of alumina and iron is allowed to settle, or otherwise cleared. The cleared solution is removed into a suitable vessel, and is treated with an oxidizing agent, to transform ferrous oxide into ferric oxide. The quantity of oxidizing agent is governed by the quantity of protosulphate in solution being treated. The oxidizing process is to be carried on to the point at which no protoxide of iron can be detected in the solution. In carrying out this method the inventor preferably, though not necessarily, employs solution in a hot condition. After the iron has been brought to the state of a peroxide, and the impurities settled out, the clear liquor is drawn off. In this clear liquor there is now added such a quantity of sulphate of potash, or sulphate of ammonia, or sulphate of soda, as is required to form a compound consisting of sulphate of alumina, and a sulphate of one or more of said alkalis. This solution, if necessary, is boiled down to the required density to form crystals, is allowed to cool, and left to crystallize. The persulphate of iron which has been formed by this method, being more soluble than the protosulphate of iron, remains in the mother liquor, with the result that crystal alum free, or nearly free, from iron is produced.

ROSS E. BROWNE has resigned his position in the University of California, and will hereafter follow his profession of civil and mining engineer.

### Foundry Notes.

The condition of the strike at the Union Iron Works is best explained by the following correspondence:

THE REPRESENTATIVE COUNCIL OF  
IRON TRADES,  
SAN FRANCISCO, June 26, 1886.

To the Managers of the Union Iron Works—GENTLEMEN: At a meeting of the council, held last evening, the following preamble was adopted:

It being for the interest of employer and employee alike that all difficulties and disagreements between them should be as speedily settled as possible, so that work may be continued with as little friction as is consistent with their joint interests, to that end we therefore propose that a committee of five from this council shall meet a similar committee from the Union Iron Works Company, and that the 10 meet and choose one member who is not interested on either side, and that the committee of 11 arbitrate the present difficulty. The committee appointed at the previous meeting was also instructed, and after one day's notice of time and place are willing to meet representatives of your firm for the purpose of carrying into effect the spirit of the above preamble. Respectfully submitted,

S. MCKEE,  
Sec'y pro tem. Ex. Com.

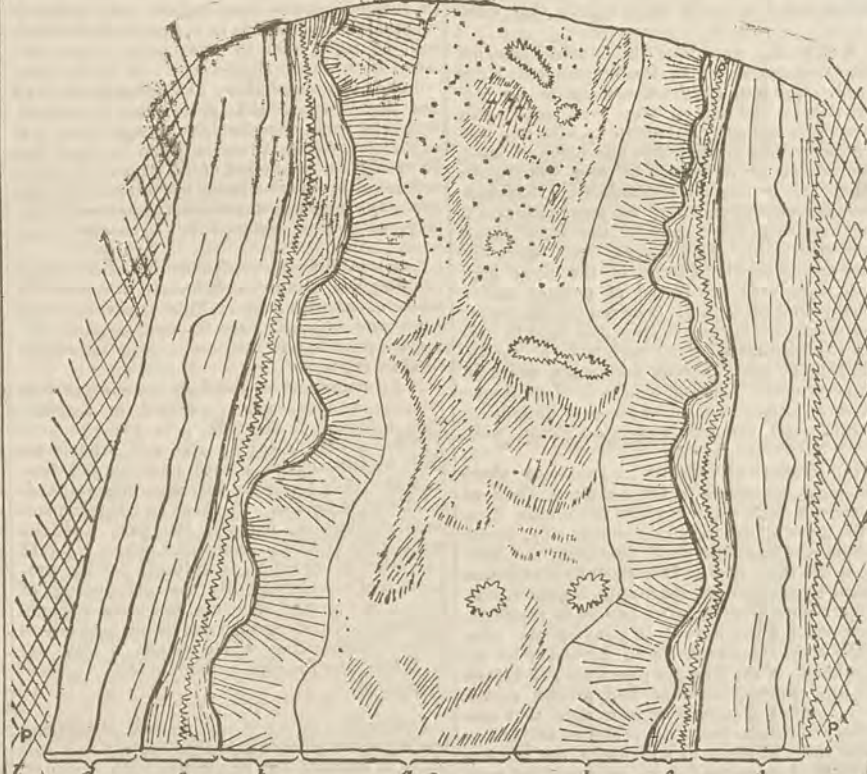
Yesterday the answer was returned as follows:

UNION IRON WORKS,  
OFFICE, 401 MARKET STREET,  
SAN FRANCISCO, June 28, 1886.

Samuel McKee, Esq., Secretary pro tem.  
Executive Committee—DEAR SIR: We acknowl-

### Banded Structure in a Gold Vein.

Mr. Charles M. Rolker puts on record before the American Institute of Mining Engineers a sketch of a vein examined by him in Honduras, Central America, which exhibits a well-marked banded structure. The illustration is of natural size. The vein traverses trachytic porphyry; it is from three to four inches wide. The central band, *a*, is of white quartz one inch wide. It is full of cavities and vugs, lined with quartz crystals, and its mass is largely stained with hydrated oxide of iron, in which is a heavy sprinkling of coarse gold, indicated by dots and shading in the section. On each side of *a* is a band of pure white crystalline quartz, *b*, three-eighths to one-half inch wide, showing incomplete crystals in radial forms. This band contains no gold. Next follows a band, *c*, on each side of *b*, from three-eighths to one-half inch wide. Through its center runs a fine fissure, lined with interlocking quartz crystals, on each side of which is bluish "ribbon-quartz," containing very finely impregnated gold. The outside band, *d*, also varies from one-half to three-eighths inch in width, and is made up of compact but columnar quartz, the outside face of which (toward the wall-rock) is frequently lined with fine quartz crystals. The columnar quartz is more or less frequently stained yellow by hydrated oxide of iron, and it contains some very fine but light gold. *P, P*, are



GOLD-BEARING VEIN IN HONDURAS, SHOWING BANDED STRUCTURE

edge the receipt of your communication informing us that a Committee of Arbitration had been appointed to meet the representatives of this company to arbitrate on the difference between us. We fail to see how it would be possible to arbitrate on the issue you have raised in demanding the discharge of certain of our workmen because they do not belong to your federation. If it were a question of wages or hours, workshop rules or practice, we would be most ready to meet you and endeavor to arrive at a just settlement, but what you demand is not ours to give. The right of every man to honestly earn his living is his own right, and is secured to him by a higher power than either yours or ours. Suppose we could arbitrate on such a question and the arbitrators should allow that you had the right to demand the discharge of any number of men from our works because they might be obnoxious to some union in your federation, and that you had the right to withdraw all of your men from our works. Should the demand not be complied with, then the same process of arbitration would of necessity grant us the same rights, by which we could demand the expulsion of any member of your federation who might from any cause be obnoxious to us, and that we should have the right to lock out all union men in our employ if our demands were not complied with.

The demand you have made is unjust, and a compliance with it, either in whole or in part, would be a criminal act on our part. A wrong could never be arbitrated into a right. We can therefore see no way to a settlement, except by a frank withdrawal of your demand.

Yours truly,  
G. W. DICKIE, Manager.

THE electric fire alarm system in Napa is entirely completed now, and is found to work perfectly. The system cost nearly \$1000.

walls of trachytic porphyry. The whole vein matter has a tendency to split off in slabs, in a vertical direction, the full width of the vein. The section illustrated represents, of course, an exceptionally rich piece from one of the bonanzas which occur as nests and isolated, irregular bodies in the vein. A slab similar to the one illustrated, weighing two and a half pounds, panned out over one and one-fourth ounces of gold.

**PNEUMATIC LIGHTING.**—A new method of lighting, called the pneumatic system, has been described by a Frenchman, M. Bender. He employs the fatty residues obtained from the rectification of crude mineral oils, through which he passes a current of air. The air takes up a definite quantity of this hydro-carbon and the flame produced is very brilliant, giving off no smoke. Cheapness and immunity from explosions are the advantages claimed.

**AN AEROLITE HOAX.**—The reported finding of the great meteorite in Washington county, Pa., turns out to be a fiction, and must be relegated to the same shelf with the famous moon hoax which the N. Y. Sun perpetrated some 50 years ago.

THE annual financial statement of the North Star mine, Grass Valley, for the fiscal year ending April 30th, shows receipts amounting to \$129,996.69 and disbursements of \$115,220, leaving a cash balance on hand of \$14,766.69.

### Assaying With the Horn Spoon—No. 1.

[Written for the Press by ELBERT C. VAN BLARCOM.]

The sample should first be ground to a fine powder—the finer the grinding the more accurate will be the result. If there is no mortar at hand, in which to grind the ore, select a flat rock with a surface about 18 inches square, and another smaller rock weighing about 10 pounds, of convenient shape, so that it can be firmly grasped with both hands. Where they can be had these rocks should be of a hard silicious character; softer rock may be used, but the grinding will take a longer time. It is not advisable to use as grinding rocks any that contain mineral, as they are liable to enrich the sample.

Place the sample on the large flat rock and reduce it to fragments by a few quick blows from the smaller stone. Now take the smaller stone firmly in both hands and grind the fragments to a powder, grinding a small portion of about one ounce at a time.

Any one who has never tried this method will be surprised at the rapidity with which the grinding is effected. Transfer the sample to the horn, taking care to clean the grinding rocks thoroughly. If the sample contains sulphurets these will break up more readily than the gangue and fill up the small cracks and interstices in the grinding rocks. A small stiff brush serves well to clean the grinding rocks.

The sample for assay should not fill the horn to within more than an inch of the rim. Take the horn containing the sample in the right hand, and gently submerge it in a vessel of water, or stream; with the fingers of the left hand thoroughly mix the sample with the water. When the sample has been thoroughly wet carefully withdraw the horn from the water, bringing the left-hand end of the horn out of the water last. During this operation the light earthy particles contained in the sample will rise to the top, and as the horn is withdrawn from the water they will flow off. This operation should be repeated two or three times, until nothing but the clean sand remains in the horn.

When the light matter has all been removed take the horn (having the sample covered with about half an inch of water) in the right hand, letting the weight bear on the third finger and balancing it with the thumb. After mixing the contents of the horn thoroughly with the fingers of the left hand, oscillate the horn in a right and left direction, at the same time giving it a slight up and down (a sort of shivering) motion with the third finger of the right hand. During this operation the left-hand end of the horn may be supported on the fingers of the left hand; the motion should all come from the right hand, the left hand simply serving as a support. By continuing this motion a few moments gravity will take the mineral particles to the bottom, while the lighter particles of gangue will remain on top. The sample should now be brought to the left-hand end of the horn, inclining the horn slightly to the left; allow the water to run off, after which remove with the left hand the upper portion of the sample from which the minerals will all have become separated.

The concentrating and removing of the barren particles should be continued until the amount of mineral can easily be seen. From the amount of mineral left, after concentrating, one can readily judge the approximate value of the ore.

A "horn" may be made by sawing in two, obliquely, any good-sized cow's horn. This will give an elliptical shaped vessel about two and a half inches deep, flaring off at either end.

Where the available horns are small, select the straightest one, split it lengthwise on the inside of the curve, lay it in hot ashes, and when it is thoroughly heated it can be molded into the desired shape.

To make one's self an expert in this method of assaying one should have fire assays of the sample made; knowing the fire assay and observing the yield from a given amount of ore, one will soon be able to judge very closely the values of ores.

In Mexico the horn is used almost exclusively, even as a test for value when the ore is to be purchased. Of our own knowledge we can say that we have known the assay by the horn, given us by a Mexican, to have been within one dollar of the same sample afterward assayed by the fire method.



## MECHANICAL PROGRESS.

## Reductions in the Cost of Steel Making.

A century ago or thereabouts all the steel used in England for the finest work, such as watch springs, the best swords, etc., was imported from India at a cost of from \$400 to \$500 per ton. English metallurgists, however, gradually improved in their manufacture and the cost of production until its cost was brought within reasonable limits and its quality equal to the best imported. In 1872 steel rails were sold at from \$80 to \$90 per ton. German, Italian and Belgian manufacturers are now competing in the markets of the world as low as \$17 to \$18 per ton for the same quality of steel. The wages for ingot-making in 1872, in England, were \$5.25; they are now as low as 75 cents. The wages then paid for rail-making were about \$5 per day; they are now about \$1.50 and less.

It will thus be seen that the workmen have contributed quite largely in the reduction of their wages to bring about this cheapening process. Of course, however, the reduction in cost is mainly due to improved machinery and furnace processes. Yet the English iron-master is still telling his workmen that they must submit to still lower wages if they would hope to successfully compete with the Belgians. They say that the workmen must accept lower wages and live more economically and masters must use better science and turn out better work, in order that the worker may live more cheaply.

In the fierce competition for the world's market for iron and steel the English manufacturers are evidently losing ground and the trade is gradually passing into the hands of the Belgians and Romans. Some of the leading iron-masters, Mr. Snell for example, seem to think that the English are getting behind in technical knowledge and machinery improvements. The gentleman named does not hesitate to say that "the Americans and Germans are more successful than we are." Still he is hopeful that England will yet gain her lost ground, and beat all other nations as she has ever heretofore done. But just how this is to be done does not appear to be very clear in his mind. One thing is certain: labor cannot submit to any further reduction without utter demoralization, and protection cannot avail to serve the foreign market. What then?

## An Immense Forging Press.

It has been increasingly evident for some years past that the large forgings required by modern engineers and artillerymen demand something better than the steam hammer for their manufacture. The requirements in this direction have advanced more rapidly than the means of production, and in only a few instances have manufacturers erected steam hammers of sufficient size to deal with steel ingots weighing upward of 50 tons. The great cost of installation of such large hammers has perhaps deterred steel-makers from making much advance, and, beside this, they have felt that the hydraulic press was more suitable for the production of large forgings. Except in two instances, however, the efforts made to substitute the hydraulic press for the steam hammer have met with only very partial success, owing to its slowness of action and want of adaptability to the variety of work which can be executed under a hammer. Seeing that the press has been proved to make the best forgings, further efforts are now being made, and there will shortly be three presses put to work in England.

The question of the quality of work, of course, outweighs every other consideration, but there are other reasons for the transition now in progress. The cost of installation is less in proportion to the weight of forgings made. The moderate height of a press permits the use of overhead traveling cranes, so that the furnaces, six or eight in number, can be arranged along the sides of the forge with one press to serve them all; whereas four furnaces with a swing crane to each are the practical limit in the case of a large hammer whose great height forbids the use of overhead travelers.

**ROLLING OUT IRON CHAINS.**—A firm in Chicago is getting ready to roll out a chain from a solid bar without having the pleasure of welding a single link, by passing the bar through a set of four rollers that squeeze it into a series of links all linked together into a chain. By this means a uniformity of strength is obtained without requiring any particular skill of the operator. The principle of forming the rollers and the process of rolling out a chain is similar in some respects to the method employed in casting the links and having them come out together in a chain from a mold. In the latter operation the flask is made to part equally in four ways, and the chain molded while the links are separated so as to divide the spaces equally between them, giving as little clearance as possible, which will not change their appearance perceptibly. The flask is divided, the chain removed, and one is cast in the mold. With this explanation an expert can understand how a piece of chain can be swaged out of a bar of iron in an analogous manner by means of four converging dies without difficulty. To produce a continuous chain in this way the dies must be made continuous by having them formed on the circumference of four rollers arranged with the dies distributed in equal di-

visions and the rollers driven by gear wheels so that the four parts of a link will meet accurately in place. Proper clearance must be given to the dies so as to allow the material to leave the matrix freely as the roll revolves. The manner of making the rolls for different sizes and shapes of chains are matters that present but very little difficulty to mechanical ingenuity. As the blank is carried forward between the rollers the dies partially press or swedge out the links at right angles to each other, breaking the fin or feather edge that is left on the inside of the links, which, after a thorough shuffling in a tumble barrel, come out highly finished and polished for the market.

**EXPERIMENTS IN IRON AND STEEL OXIDIZATION.**—A French metallurgist has recently made a series of experiments as to the comparative oxidizability of cast iron, steel and soft iron under the influences of moist air, sea water and acidulated water. It was found that with moist air the steel plates lost from three to four grammes weight in 20 days for every two square decimeters of surface. Chrome steel had a tendency to rust more, and tungstated steel less, than the ordinary carburized steel; cast iron lost only about half as much as the steel, and spiegeleisen less than gray iron. Sea water dissolves iron rapidly, and acts upon it more powerfully than on steel; most powerfully of all upon spiegeleisen. In nine days the steel plates with two square decimeters of surface lost from one gramme to two grammes, while phosphorized iron lost five grammes and spiegeleisen seven. Tempered steel was less affected than the same steel twice annealed; soft steel less than chrome steel, and tungstated steel less than the ordinary steel with the same proportion of carbon. Acidulated water dissolves cast iron much more rapidly than steel.

**A NEW GUN,** known as the Mefford gun, has recently been tested at the Washington Navy Yard. The gun is quite a novelty in its construction. The one on trial was small—only three-inch caliber. It is built up with two concentric cylinders, the inside one being of steel, the outside or re-enforce of cast iron, and a space for a non-compressible fluid between. The aggregate strength of the two cylinders is only about one-third that of the navy three-inch steel gun. The charges fired were the same as the regular charge of the navy gun, there being used one pound of powder and a seven-pound projectile. Between the discharges a stopcock was sprung to allow the fluid to flow out, to compensate for the expansion of the inside tube by heat, thereby taking the strain off the re-enforce. The last charge fired contained double the amount of powder—two pounds of powder—and the gun stood the strain well.

**BAD EFFECTS OF CEMENT ON IRON.**—A short time since, according to the *Sanitary News* of Chicago, a large water pipe on the fourth floor of the government building, in that city, burst, flooding the floor and badly damaging the ceiling of the third floor. It is thought that it was caused by the cement hardening, together with the jars caused by the workmen while repairing other parts of the work. In relaying the tiles on the floor it has been found necessary to replace much of the iron gas pipe with galvanized iron pipe, as the iron pipe had almost rusted away, while the galvanized iron pipe that was put in about nine years ago is almost as good as it was then, showing to advantage the lasting qualities of galvanized iron as compared with iron pipe when imbedded in cement. As the cement is so injurious, the pipe is being either incased in boxes or laid in gravel.

**TEMPERING BRASS.**—The assertion that "brass cannot be tempered" is met by a writer in *Mechanical Progress* with the following reply: "This differs with my daily experience. Brass, not hard by mixture but by compression, either rolling, hammering, wire-drawing or any other process which compresses the particles of metal, can be and is tempered regularly, just as easily and in the same manner as you would temper an equalized piece of hardened steel, viz., by heat. By placing a small piece of polished steel on the brass object to be tempered and applying the heat so as to affect equally the brass and steel, you will know by the color of the steel the temper of the brass, which by this process may be tempered in exact proportion to every shade of color of the steel."

**WEAR OF RAILS.**—The opinion has been expressed that newly-rolled rails wear more rapidly than old rails, and that all rails wear more rapidly when first laid down than they do after having been in use for a short time. The statement has not only not been established but cannot be established, for the direct contrary is true, says a competent authority. No doubt it is true enough, however, of many rails which get put in the track, for "after having been in use for a short time" they do not wear at all—being put away to rest in the scrap-heap.

**PREVENTING ANVIL NOISE.**—A correspondent of the *Scientific American*, referring to the several methods adopted for deadening the sound of anvils, suggests the following: It is advisable to set in lead or sand. I find by setting the anvil on a piece of plank, say two feet square, and hanging that by the corners to the wall above with small ropes, you will get scarcely any noise and no jar, and the anvil is as solid as if placed upon a block.

## SCIENTIFIC PROGRESS.

## Saccharine—The New Coal-Tar Sugar.

We have already made brief mention in this column of the discovery of a new sweet principle which has been obtained from coal-tar, and which is said to be 230 times sweeter than cane sugar. This new principle has been named saccharine. It was discovered by C. Fahlberg, a German chemist, but for a long time past a resident of this country. Its chemical name is benzoyl sulphonic imide. It presents the appearance of a white powder, and crystallizes from its aqueous solutions in short, thick prisms. Unlike sugar, it dissolves readily in alcohol. It melts at 200 degrees Centigrade. Its taste in largely diluted solutions is intensely sweet. One part will give a very sweet taste to 10,000 parts of water. When taken into the stomach in quantities in which it is added to produce the ordinary sweetness of sugar, it has no injurious effect whatever on the human system. It has been given to dogs in quantities equal to two and a quarter pounds of sugar a day, without producing any perceptible ill effect on the animal.

It has been given to patients suffering from diabetes without their feeling any inconvenience from its use. Physicians will no doubt be pleased to find a sweetening substance by means of which diabetic persons may enjoy food that has heretofore not been admissible in their case.

Saccharine does not belong to the class of carbohydrates, and does not possess nutritious properties. Dr. Fahlberg combines glucose with starch sugar, and thus obtains a compound which he calls "dextro-saccharine," which, as far as the taste is concerned, is scarcely distinguishable from the best sugar. The quantity of "saccharine" used is in the proportion of one part to from 1000 to 2000 parts of glucose. Now, if we look at the price of saccharine, which is at present about \$12 a pound, we shall find that even at this price such a mixture would be very considerably cheaper than real sugar; but we must bear in mind the fact that there is great likelihood of the process of manufacture of saccharine being considerably cheapened; the expensive phosphorus-pentachloride may probably be replaced by a cheaper compound, etc.

The solubility of saccharine in ether might probably be useful in detecting its presence when mixed with sugar. This discovery offers a new and important use for coal-tar, and saccharine promises to become a very important rival to sugar.

In its manufacture, Fahlberg commences with toluene, a hydrocarbon, present in coal-tar. This toluene,  $C_6H_5(CH_3)$ , he converts into its two monosulphonic acids, and transforms these by treating them with phosphorus-pentachloride ( $PCl_5$ ) into the corresponding toluene-sulphonic chlorides. Of these two toluene-sulphonic chlorides, namely, the para and the ortho, only the ortho compound, which is liquid (the other being solid), is suitable for the production of saccharine. By the introduction of the amido group of ammonia, this ortho-toluene-sulphonic-chloride is then converted into ortho-toluene-sulphamide, which finally yields, by oxidation, the benzoyl sulphonic imide or saccharine.

**LUMINOUS CONCRETE.**—A method of utilizing the luminous powder prepared mainly as a sulphide of calcium for admixture with cements, plaster of Paris, and concrete has been recently invented by E. Ormerod and W. C. Horne, of London, the object being to prepare the articles with a self-contained phosphorescent property instead of coating them with luminous paint. The patentees take of cement, Keen's Portland or other suitable make, in varying proportions, as, for instance, two pounds to five pounds to one pound of the luminous powder; mix the same with water, then mold to required shape, or lay it on to ceilings or walls by means of a trowel. The patentees attach importance to placing the molded articles, as soon as they have been dried, in a bath of paraffine wax and benzoline or other suitable weather or water proofing substance. In the case of using the luminous cement upon a wall or ceiling, they sponge or brush the surface over with a solution of paraffine wax and benzoline or other suitable damp-proofing solution. The uses of a luminous cement are manifold: e. g., for the garden, as edging to paths and carriage drives, for guides at the entrance gates of drives, insides of stables, the base of balustrades, or their entirety. For roads—as luminous beacons at corners of country lanes, and at the ends of bridges, walls, and curbs of footpaths. For docks—for edging of piers and wharves. In short, for any places where the light of day will sufficiently excite the phosphorescent property as to render the cement or concrete work luminous by night.

**DEVELOPMENT OF THE LEAF OF THE EUCALYPTUS.**—Some instructive experiments have been made by Mr. S. Groszlik on the development of the leaf of *Eucalyptus globulus*. He finds that in the youngest stage the tissue of the leaf between the epidermis, with the exception of the vascular bundles, consists of a uniform tissue composed of cells equal in diameter in each direction, which the author calls primitive mesophyll. If the leaves are forced to remain in the horizontal position, they develop the usual leaf structure of palisade cells on the upper and spongy tissue on the lower side of the leaf; but

if the leaves assume the vertical position, palisade cells are developed on both sides of the leaf next to the epidermis. He therefore arrives at the conclusion that there is in leaves a tissue which is capable of differentiation, and that under the influence of light there is a tendency to form palisade tissue, while shade favors the formation of spongy tissue.

**MICROSCOPIC METALLURGY.**—It is claimed that, under a powerful microscope, the relative conditions of the iron and carbon particles in steel may be definitely determined. The fine granular appearance of steel, so well known when closely examined under the microscope, is found to consist of a multitude of minute cells, the nucleus of each cell being formed of iron, and carbon forming the outer skin. The statement is, that the investigators who have made this interesting discovery expect to be able, in the course of further researches, to demonstrate the position that impurities, such as phosphorus, sulphur and silicon, held in the structure of steel, and which has been so long the subject of experiment. It is thought that this line of inquiry will be likely to produce important results, in showing exactly the structural changes that take place in steel, under conditions approximate to what it has to endure in ordinary service—there being at present but little real knowledge respecting the changes that take place in the internal arrangement of metals under such circumstances.

**BEAUTIFUL WHITE ALLOYS.**—The beautiful white alloys now made of aluminum and silver are said to be much harder than those from pure aluminum, and, on this account, they take a much higher polish, and at the same time are preferable to the silver copper alloys, for the reason that they are unchangeable in air and retain their white color. It was some time ago proposed, therefore, no longer to alloy the world's coin with copper, but with aluminum, thus rendering them far more durable, and their white color being retained after long-continued use. It appears that according to the quantities of aluminum added, the alloys possess very varying physical characteristics. Thus, an alloy consisting of 100 parts aluminum and five parts silver differs but little from the pure aluminum, yet it is much harder and assumes a higher polish; an alloy consisting of 169 parts aluminum and five of silver possesses a very remarkable degree of elasticity, and an alloy of equal parts of aluminum and silver rivals bronze in hardness.

**MARKINGS OF ANIMALS.**—Eimer advances the view that the markings on animals were primitively longitudinal stripes that have subsequently broken up to form dots, and these fusing to form transverse rings. This view is supported by the ontogeny of many animals. Dr. Haacke controverts this view from the study of an Australian fish *Helotes Scotus*. In this species the adult is marked with eight longitudinal black bands. Young specimens have, in addition, a row of clear, transverse bands, which disappear when the fish attains maturity.

**THUNDER, LIGHTNING AND RAIN.**—Meteorologists have found that there can be no thunder and lightning without rain. When thunder is heard beneath a clear sky, the reports must either come from distant clouds or be the result of some other cause than a discharge of electricity. Harvest or heat lightning is produced by a distant storm. Thunder seldom ever accompanies heat lightning, the sound reaches only 12 miles, while lightning is often seen by reflection upon nearer clouds, at a much greater distance.

**THE WATER OF TREES.**—In the latitude of New York, Prof. P. D. Penhallow has found the proportion of water in trees and shrubs to vary according to these general laws: 1. The water in woody plants is not constant for all seasons, and depends upon conditions of growth. 2. It is in greatest amount late in May or early in June, and least in January. 3. It is in greatest proportion in the sap wood; least in that which is older. 4. When plants grow most rapidly they have most water.

The cause of single and double rainbows is due to the combined reflection and refraction of the sun's rays from drops of rain. The rain must be on the side away from the observer. The position of the rainbow depends on the height of the sun, and raindrops at different definite elevations can produce the effect, so that double or triple rainbows are possible.

**VEGETABLE LIFE AND TEMPERATURE.**—It appears from observations made in France that the development of vegetable life is retarded by an average of nearly four days for each additional 100 yards of altitude. The arrival of the chimney swallow is delayed about two days for each increase of 100 yards in height.

**ELECTRICITY FOR LIGHTHOUSES.**—The British experiments to test the relative merits of oil, gas and electricity for lighthouse illumination have resulted in demonstrating the superiority of electricity over all other lights, even, as has been generally doubted, in dense fogs.

The velocity of light is so tremendous that it moves round the earth's surface, a distance of nearly 25,000 miles, in one-eighth part of a second.



## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

**STOP COCK.**—Wm. Swabel, S. F. No. 343,283. Dated June 8, 1886. This invention consists in a novel expanding-plug for stop-cocks, and in the means by which the plug is expanded. The object of the invention is to provide a stop-cock in which the plug can be tightly adjusted to its seat and relieved when desired.

**CARTRIDGE-LOADING MACHINE.**—Geo. J. Foster, Alameda. No. 343,706. Dated June 15, 1886. This invention relates to a machine for loading cartridges, and it consists of a novel arrangement and mechanism whereby the work is carried out. There are too many motions and details of construction to describe intelligently without the aid of engravings.

**SPRING HARROWS.**—L. A. Manchester, Merced. No. 343,717. Dated June 15, 1886. This invention consists in the combination of the peculiar curved spring-bars, the securing or uniting bands, and the teeth acting as wedges and tightening all the parts together. The object of the invention is to provide a single strong and effective harrow, the frame of which is of a springy character, the whole being secured together without bolts, screws or rivets, and having no separate cross-bars.

**FEED MECHANISM FOR DRILLS.**—Martin Schwarzler, S. F. No. 343,734. Dated June 15, 1886. This is an improved feed motion for drills, such as are used in factories, machine-shops, agricultural works, or for purposes where an upright drill is used. It consists in a bracket secured upon a drill frame, and having mounted on it a ratchet-wheel, which is actuated by a pawl operated by a cam on the driving shaft of the machine, a vertically-moving rack-bar, to the lower end of which the drill spindle is coupled, and gearing, by which the power of the ratchet is transmitted to the rack-bar. It consists, further, in details of construction relating to the means for coupling and uncoupling the ratchet-wheel from the shaft, the means for guiding, limiting and raising rapidly the rack-bar to which the drill spindle is coupled, and a lever for regulating the work of the actuating pawl.

**SAW TOOTH.**—Simon Kinney, Brownville, Yuba Co., assignor of one-half to S. H. Pratt, same place. No. 343,713. Dated June 15, 1886. This bit or cutter to be used in circular saws consists of a curved bit having its front and rear grooved to fit corresponding tongues in the socket of the saw-plate into which it fits, the bit having a slot made longitudinally in it from the base outward, so that one side forms an elastic tongue. The base or inner portion of the bit is wider than the outer portion, and when introduced into the slot or channel in the saw-plate the elastic tongue allows it to be compressed until it reaches its final position, when an enlargement or catch at the lower end falls into a corresponding place in the socket of the saw-plate and locks it firmly. By the peculiar construction the inventor is enabled to place more bits in the saw-plate than by other means. The throat for the escape of sawdust is a natural one. The points of the bits are presented at a greater angle than by ordinary styles of construction, and thus provide an easy-cutting edge.

**NATURAL GAS.**—The following from the Oil City, Pa., *Derrick*, was recently reprinted in the *Fresno Examiner*: "Messrs. E. J. Beane and J. R. White, officers of the Standard Gaslight and Fuel Company, of Merced, California, are in this city for the purpose of procuring outfits to drill a number of oil and gas wells in the San Joaquin valley, California. The company represents a capital stock of \$10,000,000, made up of private capital on both sides of the Rockies. The company proposes to pipe gas from San Joaquin valley to San Francisco, a distance of 80 miles. The Standard Gaslight and Fuel Company located 150,000 acres in the counties of Stanislaus, San Joaquin, Merced, Fresno, Tulare and Kern. In the San Joaquin valley there are upward of 50 artesian wells, all of which produce more or less gas. Some of these have struck pockets of gas at 800 feet and less, with enough gas pressure to lift the tools out of the well. It is the purpose of the fuel company to drift 2000 or 3000 feet, if necessary, to find an ample supply of vapor. It will start four wells at once. Mr. Beane, who is general manager of the concern, wants to place himself in correspondence with some first-class drillers and contractors with a view to letting the work. He authorizes us to say that the best wages will be paid good men. At the same time he will satisfy whom it may concern that he means business. Contractors and drillers will do well to call on the gentleman or address Collins house, this city. The headquarters of the gaslight and fuel company are permanently located at Merced, California. A number of practical oil men, we understand, are mixed up more or less prominently in this concern."

**MASSACHUSETTS** land-owners are planting worn pastures with chestnuts, both for timber and nuts.

**ALASKA** is said to have in its forests, at the lowest estimate, 5,000,000,000 feet of lumber.

## USEFUL INFORMATION.

## Pine Leaf Carpets or Matting.

We have already made brief reference to the production of a new kind of carpeting or matting, and some other coarse goods, from pine leaves. The Charleston, S. C., *News and Courier* gives the following description of the process of this new and curious manufacture as carried on at Cronly, which is a village close to that city. It should be said that the fiber mill referred to prepares the pine leaves for use as a substitute for jute, cocoa or flax.

"The carpet mill, which is situated some distance from the fiber mill, is a large two-story structure which is, however, as yet in its infancy, as the company has but recently commenced the weaving of carpets and matting. The appliances and machinery are about the same as those in use in establishments of like nature, the machinery of course being adapted to the spinning and weaving of the new fiber. This is brought over from the fiber mill after being dried, and is first put through a carder and cleaner, all the impurities being removed, and after being carded emerges in the shape of slivers about three inches in width. The fiber now assumes the first appearance of yarn. These slivers are caught in cars and then go through a drawing frame where four slivers are converted into one. A second drawing frame converts two of these into one, the sliver growing smaller and more condensed all the time. Next it is taken to the roving frame, whence it emerges in the shape of coarse yarn and is wound upon spools. It next goes to the spinning frame and finally to the twister, where two, three or four strands are twisted into one. It is then ready for the loom. To make colored carpets the yarn is either dyed or bleached, the yarn being wound into hanks for the purpose.

"At present, the company is running but one loom, which was made for experiments. These have proved so satisfactory, however, that orders have already been given for 30 additional looms, while a contract has been made with a well-known New York house to handle all the products of the mills. The carpets are made up in rolls, and in various patterns. The natural color of the pine straw yarn is a rich dark brown, which when bleached becomes a creamy yellow. Stripes of blue, red, green and yellow are woven into the patterns. The matting is made to imitate the finer grades of cocoa so perfectly that were it not for the aromatic odor, which is one of the best qualities of the pine carpet, an expert would find it difficult to tell one from the other."

**SPRUCE** is fast taking the place of poplar and other woods for making paper pulp. When the first paper was made from wood pulp it was thought that poplar was the best and perhaps the only wood which could be used, but during the last few years it has been found that spruce wood made better and stronger pulp than poplar. It is claimed by some that spruce wood does not make so white pulp as poplar, and that the chemicals for bleaching are somewhat more expensive in the case of the spruce, but it is much sought for on account of the strength of its fiber and the better character of the wood. Lumbermen are quite ready to get out a certain percentage of spruce for the wood-pulp grinders, because they will take some seamy trees, where reasonably clear and of good growth. Such seamy trees are not profitable for sawing into any kind of lumber. There is a great difference in the color of spruce, that which is very white being much more desirable for the wood-pulp people. Trees of the same variety seem to differ in whiteness or color, probably owing to the soil upon which they grow. Hence some lots are really worth a dollar a cord more to manufacture into wood pulp than other lots, while both might be worth equal prices for manufacturing into ordinary lumber. The pulp business is destined to grow more rapidly in the future even than in the past, for the users of pulp and paper and cardboard are becoming multiplied every year. The inventive genius of the Yankee discovers many new applications for a product like this almost every day, and the time is rapidly drawing near when a large quantity of spruce and poplar will be required to meet the demands of wood-pulp grinders.

**THE TAR, ETC., YIELD OF DIFFERENT WOODS.** According to experiments by M. Senff, the yield of crude pyroligneous acid, tar, charcoal and gas is almost the same with the most different woods. But the richness of the acid waters in acetic acid, and consequently the yield of dehydrated acid, vary greatly. In this respect the wood of coniferous trees is the least valuable. The wood of the trunk furnishes more acid than that of the branches. The wood yields more acid than the bark, and sound wood more than dead wood. Rapid calcination yields more gas at the expense of the condensed products and of the charcoal; it yields also the weakest acid waters and the charcoal is more hygroscopic than that furnished by a gradual action.

**THE USE OF NATURAL GAS FUEL** has led to the manufacture of mirrors in Pittsburgh. Up to this time all mirrors manufactured in the United States have been from imported glass. The quality of the glass, to retain the silvering and give a perfect production of the object, must be of the best. This quality Pittsburgh had never been able to produce until natural gas

came into use. Now, by its aid, the fineness of the glass produced rivals that of the imported article. The entire absence of impurity, the perfect fusing of the ingredients, the rapidity of the melting, and the pure, intense flame for reheating or working, are the principal advantages.

**WOOD OIL AS AN ILLUMINANT.**—Wood oil is made on a large scale in Sweden from the refuse of timber cuttings and forest clearings, and from stumps and roots. Although it cannot well be burned in common lamps on account of the heavy proportions of carbon it contains, it furnishes a satisfactory light in lamps especially made for it, and in its natural state is the cheapest of all illuminating oils. Thirty factories produce about 40,000 liters of the oil daily. Turpentine, creosote, acetic acid, charcoal, coal tar oils and other useful substances, are also obtained from the same materials as is the wood oil.

**A BIG RAISE.**—A Chicago firm has undertaken to raise the Robinson house, in Pittsburgh, to a height of seven feet greater than it is now without in any way disturbing its inmates. The house has a frontage of 130 feet on Seventh street and 110 feet on Duquesne way, and is four stories high. The walls are of massive thickness, the foundation stones of great weight. The work of raising will require six weeks, and cost \$9000. The necessity of raising the house arose from the elevation of the street to get a proper roadway approach to a bridge.

**CREMATION BY GAS.**—The first cremation in Pittsburgh, and the first in the world where natural gas was the fuel used, occurred last month. The furnace attained a heat of 2500° F. before the body was placed in it. In one hour and 30 minutes the body, weighing 160 pounds, had been reduced to lumps weighing six pounds. A draft of air admitted to the gas flame assisted in developing a greater degree of heat. No odor was observed and no smoke arose from the stack.

**BEAT YOUR CARPETS OFTEN.**—The oftener carpets are shaken the longer they wear. The dirt that collects under them grinds out the threads. Do not sweep carpets oftener than is necessary. A broom wears them very much. When a carpet is faded, strong salt and water will often restore the brightness of the color.

**HOW TO MAKE WAX INTO A LIQUID.**—Wax may be made into a liquid to be used in writing by dissolving it in alcohol, ether, or some essential oil. After written with, evaporation will leave the characters present in wax.

## GOOD HEALTH.

## Rabies and Yellow Fever.

M. Pasteur has just received a gift of 10,000 francs from Havre, to be employed in the furthering of his experiments in inoculation against hydrophobia. That scientific men claim that Pasteur's claim to prevent rabies has merit enough in it to invite a thorough investigation, is evidenced by the above and many other facts. Commissions are now being sent to Paris from different governments to examine into and study his method. The English government has appointed such a commission, consisting of some of the most eminent men in the kingdom. One of New York's most distinguished physicians has visited Pasteur, looked thoroughly into what he has done, studied his system, and is now putting up a hospital in New York to treat patients after that method. Germany, by the selection of Virchow and Koch, has shown her interest in the matter. The Academy of Medicine, of Rome, has sent delegates for the same purpose, while the Archduke Charles Theodore, of Bavaria, a physician, has started for Paris to make an investigation on his own account. It would seem from the above that some decided results may be reached from these investigations, and that the truth or falsity of his claim is in a fair way to be established beyond peradventure. All reports thus far have been highly favorable.

The latest published summary of his work is up to April 14th, up to which date he had inoculated 688 persons, presumably bitten by mad dogs, with only one death. He had also inoculated 19 Russians bitten by a mad wolf. Of these 19, 3 have died from hydrophobia—about 16 per cent. The usual per cent of deaths from the bites of mad wolves is said to be about 67. Since April 14th, Pasteur has treated other Russians bitten by mad wolves and mad dogs. One of the former recently died from the effects of his wounds; one of the latter from hydrophobia, after having been submitted to treatment. This makes in all 720 cases treated, with a total of five deaths from rabies, despite treatment. Pasteur has found that the rabies resulting from wolf bites is the same as that of dogs, and only more dangerous because the bites of wolves are more numerous and severe.

## Yellow Fever Prevented by a Similar Method.

Reports even more remarkable come from South America relative to a successful process of inoculation for yellow fever by a physician in Rio Janeiro, and a bill is now pending before Congress for the appointment of an American commission to visit that city and inquire into the merits of the claim. It is to be hoped

that Congress will not fail to pass the bill. It was introduced at the instance of Dr. Joseph Holt, of New Orleans, and has received the endorsement of the American Public Health Association. From the daily press we learn that the physicians of the military garrison at Vera Cruz have already commenced inoculations for the prevention of yellow fever. The material employed is injected hypodermically at intervals of eight days. Such a commission as could be selected from this country could establish the value of this method of prevention of yellow fever, so strongly advocated by Freire and Carmona.

The name of the physician who has introduced this practice is Domingos Freire, M. D., of Rio Janeiro. In a recent letter to Dr. Holt, above named, Dr. Freire says: I have performed over 7000 inoculations with full success; the immunity was almost absolute, notwithstanding the intensity of the epidemic this year. More than 3000 persons who were not inoculated, died of yellow fever; while among the 7000 inoculated, inhabiting the same infected localities, subjected to the same morbid condition, but seven or eight individuals, whose disease was diagnosed as yellow fever, died.

**THE EAST WIND.**—"Hang the east wind," said a physician in Boston to me one day; "it seems to drive all my delicate women patients wild." And what is there in the east wind that is so distressing? The *Lancet* says: That the east wind has, from the earliest time, been credited with evil influence, is apparent in the fact that Ephraim was described in one of the most ancient Jewish traditions as feeding upon it. What a repast! Modern science has determined that what we call the east wind is really a current of air from the north, its direction being modified by the rotatory movement of the earth. This is not difficult to understand. The avidity with which the dry cold wind from the north takes moisture, and particularly the secretion of the mucous membrane lining the air-passages, inspissating the mucus, and as it were, gluing together the cilia of the epithelium, is the real cause of its malignancy. We have repeatedly explained this fact, and pointed to the use of a succulent jujube, or something which will give off moisture in the mouth to be carried into the air passages with the inspired air, as the best of practical measures of protection. We believe that if only the habit of keeping a morsel that gives off aqueous vapor—not one that dissolves by taking up moisture—in the mouth during the time of exposure to the east wind were formed, there would be very few colds from that cause.

**SUNSTROKE OR THERMIC FEVER.**—As sunstroke, or thermic fever, is a very rare occurrence in this State, but does occasionally occur, a few words in regard to its treatment may not be amiss. Generally, the first symptoms observed are headache, ringing in the ears, rapid beating of the heart and vomiting; the skin ceases perspiring and unconsciousness quickly supervenes. The person so attacked should be at once laid down in the shade; all clothing but one thin garment removed; ice applied to the head and body, or where ice cannot be obtained cold water should be dashed on the body, or the person wrapped in a wet sheet and cold water applied. If he can swallow, and the pulse is weak and rapid, a little wine and water may be administered, or a little cold milk or beef tea, until a physician is summoned. Avoid giving whisky or brandy, as they are more apt to kill than to cure.—*Salinas Index.*

**POISON OAK.**—The *Contra Costa Gazette* of a recent date gives the following: A singular case of poisoning from poison oak occurred here during the early part of the week, the victim being Mr. A. P. Nelson. Mr. Nelson has been in contact with poison oak on numerous occasions while out hunting, but this is the first time that it ever affected him. It appears that a resident of Morgan Territory sent him a pair of boots to mend. The owner had evidently been walking through poison oak, for the boots not only poisoned Mr. Nelson's hands, but he also absorbed the poison into his face, which in a short time swelled to an enormous size. Remedies were applied and he has since recovered from the effect.

**THE VENOM OF A BEE** being acid, its effects may be neutralized by the application of an alkali, such as a very small quantity of liquor potassae. Another remedy generally at hand is a solution of tobacco; a pinch finely cut, should be laid in the hand and moistened, then worked with the thumb and finger till the liquid is quite dark colored. The entire mass should be applied; the finely-divided tobacco acts as though it were a sponge. As soon as the tobacco gets dry a little more may be added and the juice pressed out upon the inflamed spot for five or ten minutes. Road mud, wet, is good where nothing better can be readily obtained.

**SCARLET FEVER.**—Another case showing the communicability of contagious diseases by clothing is reported from Bath, Me., where a girl had scarlet fever at a boarding-school. After recovery she returned home, and a trunk containing the clothing she wore while sick was put away in the garret. Six months later two little girls were playing in the garret, and, opening the trunk, took out some of the clothing. In a week both were taken very ill with the disease and one died. There were no other persons ill with scarlet fever in the community,



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**THE NEW KENNEDY MILL.**—*Dispatch*, June 26: Grading was commenced for the contemplated 40-stamp quartz mill at the Kennedy mine last Wednesday, and a force of 30 or 40 men are employed thereon. Contracts for the iron works have been effected with a San Francisco firm, and it is understood that the mill is to be completed by the 1st of September.

**NEW MILL.**—*Amador Ledger*, June 26: We learn that grading has been commenced for a new 40-stamp mill for the Kennedy mine. It is not probable that this important step would have been taken unless the underground developments were of a decidedly satisfactory character. The Zeile mill was started again Thursday evening, after several days' idleness caused by repairing and cleaning out the reservoir.

**SUTTER CREEK.**—The Amador Consolidated mine was the scene of an accident last week, which may cause some delay in the regular prosecution of work. In hoisting water from the sump, the rope broke when the skip had reached a point about 100 feet from the water level. Only a short time previous to this mishap seven men had ascended to the top in the skip without accident. The skip and most of the wire cable is in the sump. E. Pritchard, the foreman, started for San Francisco the next morning to consult with the directors as to what shall be done in this emergency. In all probability a new rope will be sent up shortly, as the old one is badly worn, and has been spliced several times. The new air compressor is in running order, but has not worked very satisfactorily so far, owing to the inability of the nozzle to carry enough water to run the machine at the necessary speed. A new nozzle has been put in, and the compressor has been working in good shape ever since. The South Spring Hill Company has let a contract for building 10 additional stamps to its mill, which will give a capacity of 50 stamps. Knight & Co. have secured the job, and will commence work thereon immediately.

## Calaveras.

**SEARCHING FOR THE VEIN.**—*Calaveras Citizen*, June 24: Last week it was currently reported upon our streets that some exceedingly rich float quartz had been found on Indian creek by James Bean. The day following the discovery a corps of prospectors went down to the locality and began search for the vein. Their efforts were rewarded by finding one small lode carrying gold, but not in sufficient quantity to impress them that the object of their search had been found. More prospecting will soon be done in the vicinity. The parties are in hopes of finding the original vein that casts out the float ore, and if they do, they will undoubtedly report a discovery startling to the natives in its exceeding richness.

**INDIAN CREEK MINING.**—*Mt. Echo*, June 23: Indian Creek, as a mining center, is rapidly winning a reputation second to none in the State. Considerable activity prevails in this favored section at present, and judging from the recent valuable discoveries made, not only upon the new locations, but in the more developed mines that have been in constant operation for many past years, bids fair for a revival of the olden times when mining was the sole industry and dependence of the Calaveras laborer. The celebrated Wood mine is making a wonderfully brilliant showing. Stopping is being carried on vigorously in the eastern and western stopes, at the upper tunnel, where a ledge two feet in width of "ribbon-rock" immensely rich in galena and free gold is being mined. Rapid strides are now being made to place the mill in working order, and the transportation of the ore to the mill will be commenced at once. The Crothers mine, situated south of the Wood mine, is pushing ahead with considerable vim. The tunnel at present penetrates the hill 180 feet, where a well-defined ledge presents itself. Some very good deposits have been found in this mine. At the Bean mine developments are going steadily on. The tunnel, now 100 feet in length, will, it is expected, tap the main body of ore within 20 feet further. Some very good ore extracted from a shaft 40 feet in depth can be seen on the dump, and it is the intention of the company to tap this body of ore at a depth of about 200 feet. At the Calaveras mine everything is "booming." The mill is running daily and is receiving some of the richest rock extracted from this mine for a number of years. The Schillotte mine, owned by Louis Schillotte, is worked regularly and the tunnel now 100 feet in length is rapidly approaching the ore body in the shaft which it is intended to tap upon arriving at the point of destination. The vein, although quite narrow at the end of the tunnel, shows signs of an increase in width and prospects largely. In former days some very rich rock was taken from this mine. At the Kelley mine extensive preparations are being made both at the mine and upon the mill site. Part of the new mill to be erected has arrived upon the ground and the work of placing it in position will be commenced at once.

## Fresno.

**BONDED.**—*Tulare Times*, June 24: Dave Douglass, J. S. Johnson and Mark Lavelle, who went last week to inspect the newly-discovered mines at Temperance Flat, Fresno county, returned to Visalia Tuesday afternoon. They are well pleased with the outlook in that district and have bonded two mines, the Yellow Jacket and the Scorpion, and will begin work on them as soon as their tools can be moved there from Mineral King. Mr. Johnson has some fine specimens of gold quartz from the Yellow Jacket, a few tons of which would enable him and his partners to retire from the scenes of labor for a few years at least. The Georgia, another rich mine in that district, is being developed by Frank Hammack, of Fresno. The vein is 18 inches wide and the ore assays \$1000 to the ton. The gold mines of Fresno county are attracting considerable attention at this time.

## Inyo.

**MODOC.**—*Inyo Independent*, June 26: In the

Modoc mine, at Lookout, there is now a larger body of ore in sight than ever before. Mr. Fitzgerald is sending ore to the furnace and shipping to San Francisco at the same time. A large part of the ore is so high grade that it pays better to ship it than to smelt it at home.

**THE YGNACIO.**—*Register*, June 26: The dumps of this Cerro Gordo mine continue to turn out quantities of good milling ore. About 200 tons are now sorted out, making but very little impression on the unsorted piles.

**THE COLDWATER MILL.**—Mr. Melvin has sold his interest in this property, and left by Tuesday's train for Terre Haute, Indiana. The owners of the Casey mine are the purchasers. The mill will undergo some changes, and be set to work shortly.

## Kern.

**GREEN HORN DISTRICT.**—*Calico Print*: We have received some good-looking ore from a mine in Green Horn district, Kern county, owned by O. H. F. Hansen, situated about 40 miles from Bakersfield, on the county road. An assay from the croppings went \$310 per ton in gold and silver, but the rock has improved since sinking was begun, the shaft being down 12 feet, from the bottom of which the ore that we received was taken. The ledge is from 14 to 16 inches wide and in granite formation. The ore improves as depth progresses. There is an abundance of wood and water about the mine, and plenty of feed for stock. This mining prospect would be a paying proposition to parties with sufficient capital. The ore is free milling and it can be mined at a nominal expense.

## Mariposa.

**BUILT A MILL HIMSELF.**—*Mariposa Gazette-Herald*, June 24: George Chittenden has, after a siege of hard work, all by himself completed his five-stamp, water-power quartz mill on Bear creek. We learn from one who has visited the spot that it is about as perfect a job of the kind as ever has been done in the county. The mill commenced crushing ore last Monday. Chittenden for his industry and genius ought to succeed, and we think he will. He has had a long experience in mining.

**GOOD ENOUGH.**—M. M. Rumley, the lucky miner, appeared in town on Thursday evening of last week from his mine. He brought in some \$800 or \$900, the product of his labor since his last visit here, about a month or six weeks ago. All the machinery he uses at his mine is a pick, shovel and pan, driven by self-motive power. This is about \$10,000 he has taken out since he discovered the mine, some time last winter. Upon being asked if there was any more left, he said, "Yes, bushels of it. It sort o' looks that way."

## Nevada.

**THE CROWN POINT MINE.**—*Grass Valley Union*, June 25: Last week some very rich rock was taken from the 180 level of the Crown Point mine, and the ore now being extracted is of a high grade. The ledge in the 180 level is about six feet in width, with smooth walls. An air and escape shaft has just been completed from this level to the surface, giving good ventilation to the mine, and insuring the miners a way of escape in case of an accident. The work of drifting on the 300 level is going on, and a contract has been let to extend the drift a distance of 100 feet or more. On this level the ledge is full 11 feet in width, all good milling ore, and it is expected that the rich pay chute will be struck in the course of two or three weeks. Several improvements are contemplated and will be made in a short time if the mine is not sold, among which will be the putting up of a 20-foot Pelton wheel, and an addition of ten more stamps. The new wheel will be used exclusively for running the stamps. The pump handles the water in the mine very easily, and in fact has to be run quite slowly, as the water is "in fork" most of the time. The Crown Point is destined to be one of the best mining properties in the State.

## Plumas.

**GRANITE BASIN.**—*Cor. Plumas National*, June 26: Mr. J. A. Hall is running his mine and mill to their full capacity. He has made arrangements to buy the Jenny Lind mine and has hired ten Chinamen to go to work immediately. Mr. Rockefeller and company are running the mill night and day on rock from the Granite mine, which shows up well on the plates, showing it is a good investment to the owner. See & Jolly are driving their tunnel on the Specimen mine with great vim, in fair-milling ore. Swan & Frethy have finished their quartz contract on the Siebert mine, and Mr. Frethy intends to start for his home in Trinity county in a few days. Mr. Swan has sold his engine to Mr. Stampfli, of Indian valley. He will replace the engine with an overshot water-wheel, which will greatly reduce the cost of crushing his quartz.

## San Luis Obispo.

**GOLD MINES.**—*San Luis Obispo Tribune*, June 20: Mr. Horace Pullen, locally known as "Lord Pullen," is engaged with Charles Spurgeon in mining for gold on Navajo creek, on the eastern slope of the San Jose range, in this county. The mines of Navajo are among those commonly known as the La Panza mines, gold being found in greater or less quantities throughout the range, some 20 miles in extent. The locality where Pullen, Spurgeon and others are working is about five miles north of the La Panza postoffice. Mr. Pullen brought to the *Tribune* office several packages of gold-dust, aggregating about \$100, which he had washed out of his mines. The method of washing is by shoveling the dirt into sluices. Water is obtained from Navajo creek, where a dam makes a small reservoir, accumulating water in four or five hours to give a wash of three-quarters of an hour, and by such work the miners make about \$5 a day to the hand. Mr. Pullen and his partner will now prepare for the winter by running a bedrock channel in which to lay a flume. They have sunk a shaft 12 feet deep in the upper part of their claim, which is 3000 feet long by 400 feet wide, and find five feet of dirt that prospects four cents to the pan, and the color can generally be found in top dirt. By hydraulicking this Pullen is confident he can make over \$100 a day. There are now 30 or 40 men mining in that region, and all feel elated over the prospects. He says there is a party of Englishmen and a Spaniard mining above him who have taken out quite a large amount of gold.

## Santa Cruz.

**COAL.**—*Santa Cruz Sentinel*, June 24: Mrs. Reigart, who lives near Corralitos, brought into town

recently specimens of a coal formation found on her ranch. It is something like the Lincoln coal, being in the first stages of coal formation, and is strongly charged with gas. When ignited it gives out a strong flow of gas.

## Shasta.

**MILL RUNNING.**—*Shasta Co. Democrat*, June 24: Andy Fife keeps his Huntington mill on Spring creek constantly running on custom ore. Billy Groves of this place, and his partner Banks, are working a fine prospect on Dog creek. We are informed that the Iron Mountain Mining Co. has sold its eight concentrators. Jack Conant has the plans and specifications of his ten-stamp quartz mill in hand, and is making preparations to put the mill up. All the machinery will be driven by water power. DeForest, Reid and Hi. Bemis are prospecting a mine at Lower Springs on widow Myers' place, and are taking out some rich ore which they are working in DeForest's arastra. Oliver Sunderhaus, of the mining company, Sunderhaus, Busch & Co., who lately purchased several mines on Squaw creek, returned from Frisco Sunday evening. He is superintending the purchases and making things lively in that camp. It was reported in a Red Bluff paper that the Cressus mine on Squaw creek was sold for \$100,000. We are reliably informed that that is an error. The price paid for the mine was much less. The Texas and Georgia Mining Company's mill in the Old Diggings was completely destroyed by fire last Saturday night. The fire is supposed to have originated in the roof by sparks from the smoke-stack. This was one of the finest five-stamp quartz mills in the county, the whole plant, buildings, etc., costing about \$10,000. We are informed that the company have already set about to rebuild, and put up a new mill. R. T. Taylor and A. Alexander recently discovered a small vein of rich quartz on Squaw creek south of Rieley & Mathews' mines. Alexander came to town and reported the find to his partner Taylor and appeared to be highly elated over the discovery. The next day he disappeared, and a few days after was heard of at Millville. He had become so excited over his find that he lost his reason. Officers took charge of him and placed him in charge of the sheriff at Shasta.

## Sierra.

**RICH STRIKE.**—*Mt. Messenger*, June 26: Last week R. Sutherland and Mr. Moon came up from San Francisco to visit the quartz mine at Poker Flat, of which the former is a heavy owner. Mr. Moon is an expert, and he desired to see for himself what the mine could do. During his stay some 8 or 10 tons of the rock, from the lower tunnel, was worked in a Huntington mill, and the return was \$950, estimating the gold to be worth \$18 per ounce. We saw a number of specimens of the quartz, and it was very rich, being fairly seamed with gold. The ledge is from 3 to 7 feet wide at the lowest point where it has been opened.

## Slakiyou.

**CLEANED UP.**—*Yreka Union*, June 26: Louis Scheld, who operated the Scheld & Pellet claim, one mile west of Yreka, this season, finished cleaning up last week and realized \$1563. The claim may now be considered fairly opened, and next season there is every reason to believe that \$5000 will be hydraulicked out of the main channel, which is known to be extremely rich.

**SCOTT BAR.**—The Scott Bar quartz discoveries are holding out well and are being rapidly developed. Locations still continue to be made in that rich district. Magoffey & Ingram have completed their over-shot wheel above Scott Bar, and will soon be able to start work in the gravel, where they expect to find good pay. We hope they will meet with success. The quartz claims still continue to pay well, especially that of Classen & Robinson's. Henry Tompkins' also gives promise of making the owner a bonanza king. Henry Preckel is still working on Hooper hill. He has made a very good run this year.

## Trinity.

**TUNNEL.**—*Trinity Journal*, June 26: Sheridan Bros., of Junction City, are engaged in running a bedrock tunnel of 463 feet for a new opening to their mine on Simpson gulch. They expect to complete the job and be ready for sluicing before water comes again.

## Yuba.

**BONANZA AT SMARTSVILLE.**—*Marysville Appeal*, June 26: About 18 months ago James Landis and Merwin Loveridge, of Trinity county, went to Smartsville to prospect for quartz, during which time they have worked steadily to uncover a bonanza, and have sunk on the ledge 125 feet. Quartz experts pronounce it a very fine ledge. It is learned that several tons of the rock milled \$7 per ton gold, the sulphurets going \$63. When it is considered that the rock can be milled for \$1.50 per ton it must appear that there are indications that this great quartz belt will be shown up and that Yuba, at no distant day, will stand in the front as a quartz-mining county. With that class of mining the prosperity of the neighboring town of Smartsville is assured, and will add materially to the wealth of the entire county.

## NEVADA.

## Washoe District.

**CHOLLAR.**—*Enterprise*, June 26: The station for the 3200 level is being cut out on the west side of the Combination shaft, and it has already attained a westward distance of three sets of timbers or a dozen or 15 feet. The ground works admirably, and even better progress will be made as adequate distance out of the way from the shaft is attained. As soon as feasible, some time next week, a lateral drift north will be started to meet and connect with the main lateral drift coming south from the bottom of the Hale and Norcross deep winze on the 3200 level—only about 150 feet or less intervening. This station is being cut out directly in the eastern portion of the regular vein or channel, and the material being of as promising vein matter as ever was found in the Comstock—quartz, porphyry and clay, with even a little ore—it is not at all impossible to cut into a paying ore body directly from this shaft station.

**HALE AND NORCROSS.**—The lateral drift south on the 3200 level from the bottom of the deep winze is steadily progressing as fast as circumstances will allow, and there remains less than 140 feet to drift in order to connect with the 3200 station of the

Combination shaft. The diamond drill from the face of the north lateral drift on the 2900 level penetrated a distance of about 100 feet, reaching into the Savage ground. It passed through low-grade ore, and drew out an amount of sulphurets which seems to justify the belief that a paying body of ore will be cut into in advancing the drift. The drill has been withdrawn, and the water met with is being allowed to drain out. The drift will be advanced some time next week.

**SAVAGE.**—Work in the face of the lateral drift south on the 600 level has been suspended during the week, owing to the swelling nature of the ground, causing the timbering to crush in badly, necessitating much retimbering and easing of the lagging. The east crosscut has passed through several more good little stringers of ore, which show best to the southward, and another crosscut in that direction is very liable to find a good concentration of those veins in the ore body to which they evidently belong. Good ore is also liable to be found at the south end of the mine on the 2900 level from Hale and Norcross, as can be seen by reference to the Norcross portion of this summary.

**POTOSI.**—The diamond drill started a few days ago, about 200 feet back north from the face of the main south lateral drift on the 3000 level, to explore the heavy ore vein known to lie along the east side of the drift, has penetrated a distance of 150 feet, over 150 feet of it being in solid quartz without reaching the east side of the vein. It all assays a little, but gives no rich returns from this drill hole. Such an immense body of quartz calls for a bonanza. It was just such a huge vein or body of quartz that led to and held the great Crown Point bonanza, and a similar one led to and revealed the still greater bonanza in Consolidated Virginia and California.

**CROWN POINT AND BELCHER.**—About 60 men are employed extracting ore and at development work, using the single hoist engine at the shaft. Owing to the heavy shaft of the main hoisting engine being found to be badly sprung, necessitating its having to be taken to the foundry for strengthening, etc., work with the full mining force has to be deferred until next week, and perhaps until the first of the month.

**CON. CALIFORNIA AND VIRGINIA.**—The usual abundant supply of low-grade ore—about 400 tons per day—continues to come from this seemingly inexhaustible mine, but the average value, according to the mill battery samples, is less than \$10 per ton. Improvement in quality is desirable to stave off assessments. On the 1400 and 1600 levels the exploration drifts northwest and southwest are making good, steady advancement.

**GOULD AND CURRY.**—The next crosscut from the upraise incline, 50 feet above the 500 level, is now in 84 feet in vein matter which gives low assays. The east crosscut at this same point is in 45 feet—same material. A north lateral drift has been started from the west crosscut above mentioned, which is in 22 feet; material, principally porphyry and clay, with little quartz.

**OPHIR.**—The west crosscut on the 300 level is making good progress. On the 1300 level a station has been opened from the shaft and a drift west started therefrom. The repairs and overhauling of the surface machinery are about completed, and the works will be started into operation again to-morrow or next day.

**ALTA.**—Connection is established with the old Lady Washington shaft on the 700 level, giving a splendid and much-needed circulation of air. The drift is now being straightened up and timbered where found necessary, and crosscutting west will be commenced shortly.

**SIERRA NEVADA.**—On the 520 level the north lateral drift from crosscut No. 2 was advanced 41 feet, making a total length of 170 feet. Material, vein porphyry and quartz; no water.

**BEST AND BELCHER.**—Only six feet more water remains to be pumped out in order to reach the track floor of the 2319 or bottom level. Superintendent Lyman expects to have the water all out by the 4th of July, raise the flag and fire a gun.

**MONTE CRISTO.**—The west drift on the 150 level from the shaft is evidently getting into the old vein formation, as the material is becoming much softer.

**YELLOW JACKET.**—Daily yield 140 tons from the old stopes and breasts above the 1500 level. No new features of development to report.

**KENTUCK.**—Daily yield 60 tons from the old upper workings, keeping the Rock Point mill steadily supplied.

## Columbus District.

**HOLMES.**—*Candelaria True Picture*, June 26: In the raise that is now up to a level with the 10th we have a fine body of ore. It is the best development so far as we have run in it that we have ever had in the mine. It is a foot-wall ore body and looks like the old chloride bodies that were taken from the hill. About 600 feet west of this last-mentioned ore body, on the 11th level, we also have a good prospect. We have run on this ledge about 25 feet and it looks well. The ore is good milling. The sulphuret winze looks well, but is not as large as it has been. The ore from this stope is high grade. The hot stope is not quite as large, but the ore that comes from it is high grade. The stope 60 feet east of last turntable, first shaft level, is looking well. We have taken a large amount of ore from this stope and it still looks and produces well. It is in the same ore channel as the raise above the 11th, 9th and 8th level ore bodies. They are all east of all work done by the Belle Company and in new ground. We have great confidence in this section of the mine. The stope 50 feet below first shaft level, and directly under the last-mentioned ore body, is still producing well. Sixty feet west of Cross development we have a good stope of ore. The Creer looks well. Mill No. 1 is running half time on Mount Diablo ore. Mill No. 2 is running half time on Holmes ore. We ship by this day's express six bars of bullion, assaying \$8688.

**MOUNT DIABLO.**—The south crosscut in the intermediate between the second and third levels has advanced 10 feet during the week. The intermediate between the third and fourth levels, near the No. 2 winze, shows two feet of \$80 ore. The east stope on the second level is giving some ore of good grade. We are getting a small amount of ore of high grade from between the first and second levels, near the bonanza winze. The stopes on the first level show no change. Bullion shipment, \$8786.43.



**Hawthorne District.**

**GOOD YIELD.**—*Inyo Independent*, June 26: Fifty-four tons of ore from the Lapanta mine, near Hawthorne, recently worked at the Cat Creek mill, yielded \$4000, or a little more than \$74 per ton.

**Jackson District.**

**STRUCK IT RICH.**—*Silver State*, June 26: Charley Wright reports that they have struck very rich ore in the Pennsylvania mine in Jackson district. The ore body was cut in the lower tunnel, where it intersects the vein. This has given the mine a decided boom, and encouraged everybody who has claims in the district.

**Mt. Hope District.**

**A PROMISING DISTRICT.**—*Eureka Sentinel*, June 15: A party consisting of Messrs. H. Donnelly, superintendent of the Eureka Con. mine; S. J. Beebe, superintendent of the Silver Conno; John McAulay, superintendent of the Bowman; B. Gilman, superintendent of the E. & P. railroad; District Attorney Cheney, Sheriff Stinson, J. P. Dunkle, Paul Roux, Lew Dunkle and a reporter of the *Sentinel*, went down to Mt. Hope yesterday on a special train to visit and inspect the several mining properties there belonging to Hon. Thomas Wren. The camp is distant some 24 miles from Eureka, and the run was made in 48 minutes, no count being made for the time consumed in taking on water at one of the stations. Upon the arrival of the party at the mines every one was surprised at the great showing of mineral. Mr. Wren took pleasure in pointing out to the party, first, the development work he had accomplished during the past two months with his force of ten miners, and the showing of mineral he had been able to make. After sinking an 8x5½-foot shaft from a tunnel to a depth of 60 feet, and cutting through several good prospects, he decided to run a drift and cut the ledge at that depth. There is no telling how large the ledge is, but it is highly probable it is over 200 feet wide. As far as cut and developed there is no portion of it but what is mineral-bearing. That near the surface assays from \$6 to \$10 a ton on an average. As depth is attained the assays increase, until now quite a lot of \$30 ore is in sight. Assays running as high as \$1500 to the ton have been obtained. The mining men of the party manifested considerable astonishment at the showing, and a couple of them predicted that when operations reached a depth where the ore was not so leached it would be found not only very rich but in large quantities. Superintendent Donnelly was especially pleased with the showing, and evinced no little interest in the several characters of ores of the district.

**Railroad District.**

**BULLION.**—*Elko Free Press*, June 23: At one time in years gone by, there were other camps in the district, but now Bullion and Highland are the only ones left. The former is well supplied with water from numerous springs, and several pretty gardens are to be found in the town. The furnace belonging to the Blue Bell Copper Mining Company is now closed down on account of the low price of copper, but there is some talk of its being leased by one of the other mining companies and started up on lead and silver ores. A few hundred dollars would put it in good shape for work. The Reilly furnace is being put in shape to begin work about the 24th of this month. Some 400 tons of ore are now piled in the ore-house ready for reduction. This is being added to daily at the rate of 25 tons. By the time of starting there will be between 500 and 600 tons of ore at the furnace. It is of 40-ton capacity, and is now in splendid order for working the ore to a high percentage. There are in the district something like 100 claims, many of which have been worked for several years past. Probably 20 of these are now being worked. Of course the majority of these claims are not opened out to any extent; still they have been operated enough to give an idea of their worth. The A. & A. mine, recently purchased from Charley White by Messrs. Ainley & Adams, has a tunnel 400 feet long penetrating it. The first chimney of ore was struck 235 feet from the mouth of the tunnel. Here an upraise leads to the upper tunnel 100 feet above. At the tunnel level this chimney of ore measures 8x16 feet, and at the upper tunnel 5x7—all carbonate. A shaft 250 feet from entrance of main tunnel is now down 70 feet, all in ore. This will be sunk 100 feet and a level started. The richest ore in the mine comes from this shaft. Fourteen samples, taken from different parts of the mine, averaged 40 ounces in silver and 25 ounces in lead. There is a large quantity of high-grade ore in sight—sufficient to keep a smelter running steadily for some time. Last year the output from the Standing Elk mine was close on to \$100,000, and from all appearances it is going to do better by \$50,000 this year. There are 28 men on the payroll of the mine, and by the first of the month it will be increased to 40, including the hands at the furnace. Considerable work has been done on the Tripola property, and extensive and rich bodies of ore uncovered. In fact, the ore from this mine is said to be the richest in the camp, assays going as high as 692 ounces in silver—saying nothing about the lead intermixed with the other metal.

**COLORADO.**

**THE SMELTER.**—*Elk Mt. Pilot*, June 26: The Tomichi Valley smelter, in Gunnison, the construction of which has been eagerly watched by our miners, fired up last Monday. The furnace runs successfully and everything works like a charm, as was expected from the practical manner in which it was built. The smelter has two furnaces, but only one was completed to start last Monday, which has a capacity of 50 tons of ore per day. The first 24 hours about 40 tons of ore was run, from which 192 bars of bullion was taken, which will assay 318 ounces in silver and 60 dollars in gold. The slag from this bullion contained very little or no mineral. Thus we might say that the smelter is practically a success, and at present have over 1200 tons of ore on hand with plenty more in transit. Surely we can see a brighter day dawning for the entire Gunnison country. The Domingo mine is turning out to be one of the best in Dark Canyon. It has been worked all winter under a lease by James Welton and others, and the boys have driven a tunnel 270 feet long, also a raise on the vein 60 feet long, sunk 30 feet of a shaft and drifted from the bottom of the shaft 65 feet, altogether making about 430 feet of rock removed, which we consider a very good winter's work. They have about 70 tons of ore to ship, 20 of which has already been shipped to the Gunnison sampler, and

the balance will be as soon as it can be packed out by jacks. The ore will probably average \$250 to the ton, which is far above the average of most mines. The ore is native and brittle silver, gray copper and sulphurets, and the rich streak is from one to two feet wide. A contract has been let on the claim in Redwell Basin, owned by Al Jacobs and J. H. Curtis, to Vic Anderson and Hugh Burns, to run a tunnel 50 feet for a half interest. Two carloads of ore was shipped from the Domingo mine to the Gunnison sampler this week.

**IDAHO.**

**THE BADGER CLAIM.**—*Coeur d'Alene Record*, June 14: Through the kindness of W. A. Parker, who has been superintending the work on the Badger claim, which has just shut down for want of water, we can give a few facts of general interest. At a cost of about \$1850, some \$600 of which would have contributed to future operations if work had been kept up, gold to the value of \$7698.60 was taken out. This is a profit or net value of a full \$1000 per week. A strip of 144 feet wide of the channel wash is stripped, and evidences are pretty clearly established that the entire width of the channel is about 250 feet. The depth to bedrock is now 35 feet. We frequently hear the theory advanced that this is an exceptionally rich claim, but Mr. Parker has made several tests, and for nearly three years has studiously observed all the developments which have been made along this channel for a distance of nine miles, and he unhesitatingly expresses the opinion that it is not likely that there is a marked variation in the quantity of gold along the entire line. The width and depth of the channel will vary, and the distribution of gold will vary accordingly, and so will the cost of working. Mr. Parker is supported in his opinion by nearly, if not every, practical experienced miner who has taken pains to study the subject carefully. We have no doubt that as a mining proposition it is reasonably safe to invest money upon this actual knowledge and theoretical conclusions. Tommy Davis showed us this evening the products of a small cleanup from the Tip Top claim, in which he is an owner. It was very fine gold and valued at about \$100. Work has been resumed on several of the principal placer claims in Prichard gulch since the water got low. The owners of the Mother lode have commenced excavating and getting out timber for an arastra.

**FROM THE GOLD BELT.**—*Wood River Times*, June 19: Our townsmen, S. J. Friedman and B. Schwartz, are owners of the Laura Benson mine in the Gold Belt district. They recently purchased it for \$4500, and at once set a force of men at work developing it in real earnest. The result is so perfectly satisfactory that these gentlemen will probably at an early day put in a mill to realize the "shining stuff" at once.

**PIONEER.**—*Idaho World*, June 9: M. Nelson, who has been at work in the Pioneer mine at Quartzburg and owned by the Gold Hill Company, informs us that the ledge is 30 feet wide—all pay ore. The Gold Hill Company began work on this mine, at the surface, less than a year ago. This mine is good at the depth of 400 feet. It was tapped with a crosscut run from the 400-foot level of the Gold Hill, and the amount of ore between where work is now carried on and that depth must be immense. There is no doubt that the Pioneer will turn out a far greater amount of gold than did the Gold Hill when it is worked to the same depth. The Gold Hill has yielded millions. The company now employs 21 or 22 men in the mill and mine.

**FROM BIG CREEK.**—*Coeur d'Alene Record*, June 20: B. Presley and E. G. Pond came in from Big creek yesterday. They had been prospecting in that vicinity the last five weeks, spending most of the time on the upper right hand fork which empties into the main creek about three miles up from the south fork of the Coeur d'Alene. They have been following up the mountain as fast as the snow disappeared, which is not yet all gone; have located several veins showing galena, which they will develop as fast as their means will permit. They report new finds along Big creek, especially in the upper region. Not a great amount of active mining is going on, but a slow, persistent progress is maintained which finds abundant encouragement. Wherever surface indications have been fair the prospect has not failed to improve as work has progressed. They venture the opinion that the Big creek mines will very soon command as much attention as those around Wardner.

**MONTANA.**

**THE ELKHORN.**—This famous property is now one of the most completely equipped in the Territory, though, of course, on not so large a scale as many others. It has a new hoist capable of working to a depth of 2000 feet, the power being supplied by two engines of 12x16 cylinders. Three 50-horse power boilers furnish steam for the pumps and for the Ingersoll drills that are now used throughout the mine. The shaft is now at a depth of 670 feet and is going down at the rate of three feet per day toward the 750, where a station will be cut and a level run. The lowest level is now at 650 feet. The ore is now being mostly taken out of the upper levels. The vein is from 6 to 16 feet wide in all the levels. The 15-stamp mill is now handling about 19 tons per day of ore that samples 54 ounces of silver. The daily saving is about \$950, or over \$25,000 per month. For months past regular dividends of \$5000 have been paid every 15 days—\$10,000 per month. The net profit in working the mine is about \$12,500, the balance over the dividends being applied to the improvement fund. The company now has five additional stamps on the way which will increase the output of the mine fully 25 per cent. The new plant will be in position about August 1st. C. L. Vawter is manager of the Elkhorn, one of the best conducted and equipped as well as one of the most profitable properties in the Territory.

**NOTES.**—Mr. F. M. Chadbourne came in yesterday from a trip to Marysville and through the Stemple district, with which he is much pleased. About 15 men are at work on the Jay Gould mine. The mine shows a vein of ore 7 feet wide and the owners are much encouraged with their prospects. The Homestake stamps are steadily dropping on rich ore. The vein is very narrow, but the ore is very rich and it is one of the best little mines in the Territory. The vein is traceable a distance of about three miles, though so narrow, and it is regarded as one of the curiosities in mining. Great numbers of very prom-

ising prospects are being developed in the Stemple district—a wide stretch of country—and prospectors are rushing in there this summer in a crowd. The directors of the James R. Keene mine have given authority to the manager to run levels on the vein until further notice. It is probable that within a few weeks a decision will be reached to immediately begin the erection of reduction plant. The mine is now developed by a tunnel of nearly 300 feet and a shaft of about 80 feet, and work will proceed very rapidly. Ore is being taken out worth over \$300 per ton. The Empire company have their assaying outfit on the ground, and in the future will carefully assort all ore that is mined.

**NEW MEXICO.**

**PYRAMID.**—*Cor. Clifton Courier*, June 19: At Pyramid, times have livened somewhat, and the usual sleepy appearance of the camp is gradually giving way to one of activity. The machinery for the Gypsy Queen mill is all on the ground, and the erection of the mill is now under way. The mill will be in running order probably about the middle of July. A small force of men are employed on the mines, and no additional hands will be put on until the mill is completed. The Gypsy Queen is the leading mine in the camp, and is attracting considerable attention. The mine is in shape to produce ore in unlimited quantities. At the 150-foot level ore was first found in quantity, which gradually increased until the 180-foot level was reached, where the vein is 21 feet between the walls. Five feet of this is high grade, while the entire ledge will average \$40 per ton. Four separate veins exist, which are uncovered by as many different drifts. The supply of ore need only be limited by the demand. An air compressor is among the improvements contemplated, and steam drills will be introduced. The mill is a ten-stamp with a capacity for increase. Duncan concentrators will be used, and gold as well as silver will be treated. The mill will also do custom work, which will prove a blessing to mine-owners in surrounding camps. The mines in the camp generally are looking well and the owners are confident of making a fortune.

**CONCENTRATING.**—*Socorro Bulletin*, June 25: The Eaton concentrator is running successfully in Magdalena district on Juanita ore. The Willis mine, of Silver City, is steadily shipping its rich carbonate ore to the Billing Works at the rate of 10 tons a day. Col. Donan is running a tunnel in the White Fawn, Pueblo district, and dumping the high-grade silver mineral, characteristic of this district. Graham and Stewart shipped a carload of their high-grade argentiferous copper to Denver on Wednesday from the Gutierrez mine in Pueblo district. Fluor spar in immense quantities exists within six miles of this city. The time is not distant when it will be anxiously sought after for fluxing purposes. The Iron King, in Gallinas district, continues to ship its iron flux to the Billing Works. The report that native silver has recently been found in this property is not confirmed. The main tunnel of the Grayhound is entering the mountain at the rate of four feet per day. The course of this working is in the direction of the Graphic mine, and the latter property will soon be exploited through this channel. The Eliza mine at 25 feet on incline No. 1 has an 18-inch streak of ore which upon determination is found to contain 38 per cent copper. The property is owned by the Oscura Mining Company, of New York, and is located in the Oscura district. The Brittenstine M. & M. Co., of Pueblo district, is shooting pay rock out of its Metzgar mine. It will next week open up in the Carnero. Its concentrating and milling plant blew out last week, owing to an insufficiency of teams to haul ore.

**OREGON.**

**ANOTHER MILL.**—*Sentinel*, June 26: C. K. Baeumle yesterday bought the quartz machinery owned by Messrs. Beekman and Klippel, and Mr. Klippel will go to San Francisco in a few days to get the balance of the machinery required to make it a first-class ten-stamp mill to be placed in position and ready for work in three months. The site selected for the mill is where the old Bauten mill formerly stood, Mr. Baeumle having purchased the ground and water right of Messrs. Curtis and Pape yesterday. He has an excellent prospect from his mines close by, and by the time the mill is running will have enough rock on the dump to run right along. Mr. B.'s father and brother will arrive in a few days and will assist in the management of the mill and mine.

**UTAH.**

**REVIEW.**—*Salt Lake Tribune*, June 28: The week has been sultry, the thermometer running up to 95 degrees at the Conservative signal station. The ores are coming down the canyons freely. No special mining event has marked the week. The shipments of ore and bullion out from this city during the week ending Saturday, June 19th, inclusive, were 1,643,544 lbs. The receipts of ore, as per the above of shipments, added to those held in the valley, are very large for the week. The ores received as per current reports for the week ending June 23d, inclusive, were valued at \$95,789.41; the bullion receipts were \$109,001.47, a total of \$204,790.88. The total receipts for the previous week were \$202,194.29, of which \$85,380.47 was ore and \$116,813.82 was bullion. The Ontario has sent down no bullion since the mill started after the cleanup. Ore sales for the week, two lots, \$16,166.83. No sales of Ontario stock are reported in New York for the week. The 121st Ontario dividend, of 50 cents a share, aggregating \$75,000, has been declared, payable in New York, making six regular monthly dividends aggregating \$450,000 this year, or \$3 per share. The Daly sent down during the week two shipments of bullion of seven bars each, valued at \$16,408.53; its ore sales were \$6364.90, a total output for the week of \$22,773.43. The base bullion receipts for the week were \$17,000; fine bars, \$16,400. The Hanauer smelter product for the week was \$33,390; the Germania, ten bars, \$21,130.25; the Pascoe, \$3800. The Stormont sent up on the 21st silver bars worth \$3270. The Alice sent in, on the 19th, 16 bars of bullion, \$14,011.21. Ore receipts were: By Wells, Fargo & Co. \$30,890; by McCornick & Co. (including \$8850 Crescent and \$3250 Queen of the Hills), \$50,430; by T. R. Jones & Co., \$14,469.41.

**List of U. S. Patents for Pacific Coast Inventors.**

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING JUNE 22, 1886.

- 344,076.—ROCK DRILL—Brady & Fitzpatrick, Virginia City, Nev.
- 343,981.—CABLE RAILWAY—R. F. Bridewell, S. F.
- 344,243.—BUREAU—S. J. Bryant, Reno, Nev.
- 344,040.—ADVERTISING PUZZLE—L. O. Granger, S. F.
- 344,180.—ADDING MACHINE—Edward Halsey, San Jose, Cal.
- 344,181.—ARITHMETICAL APPARATUS—Edward Halsey, San Jose, Cal.
- 344,182.—TAX CALCULATOR—Edward Halsey, San Jose, Cal.
- 343,998.—BOILER TUBE CLEANER—W. H. Keep, Stockton, Cal.
- 344,051.—LINIMENT—J. W. Lauer, Mountain View, Cal.
- 344,121.—WATER LEVEL INDICATOR—W. S. Mayers, Ft. Apache, A. T.
- 344,129.—TWO-WHEELED VEHICLE—Newell & Litten, Fresno, Cal.
- 344,004.—QUARTZ BREAKER AND PULVERIZER—E. I. Nichols, S. F.
- 344,199.—DEVICE FOR TAPPING CANS—C. E. Quigley, Oakland, Cal.
- 344,215.—HOPPLE—J. T. Stoll, Sacramento, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

**Mining Share Market.**

Mining stocks have been rather stronger this week than for some time past. Although there is nothing very decisive in sight on the Comstock, the situation is regarded as rather promising. The diamond drill sent out to the eastward from the Potosi south lateral drift on the 3100 level has within the last week demonstrated the ore vein known to lie along that side of the drift to be over 150 feet wide, of pure, solid quartz, carrying more or less of the precious metals. This cannot even be classed up to low-grade ore in the line of practical milling operations, yet it is very suggestive of the fact that all good ore bonanzas on the Comstock lode have invariably been found in large accumulations or concentrations of quartz, which is the matrix, the gangue, the mother of the desired ore.

The 3200 station of the Combination shaft is being cut out in good style and the work progressing faster naturally the further it gets out of the way of the shaft. When it has reached an adequate distance west, the proposed lateral drift north will be started to meet and connect with the main lateral drift south coming from the deep winze of the Hale and Norcross. This drift connection is of greater importance than any other point in the mines of the Comstock to-day, as it will not only open up the new 3200 level at that point, but give excellent facilities for running into the lowest attained depths of the mines in either direction. The bottom of the shaft itself, at the perpendicular depth of 3250 feet, including the sump, is in as favorable a formation for gold or silver as was ever found or utilized in the Comstock section. The material is quartz, vein porphyry and clay, with occasional small spots and streaks of ore giving good assays, and although sinking deeper would be a very important proposition in the way of practically crosscutting and deeper prospecting the vein at the same time, it is deemed better at present to explore the 3200 level first.

**Bullion Shipments.**

We quote shipments since our last, and shall be pleased to receive further reports:

Moulton, June 23, \$24,000; Germania, 23, \$4,408; Hanauer, 23, \$8660; Pascoe, 23, \$1675; Germania, 24, \$8733; Hanauer, 24, \$5920; Queen of the Hills, 24, \$1270; Germania, 22, \$4357; Hanauer, 22, \$9260; Stormont, 24, \$3270; Queen of the Hills, 24, \$1550; Germania, 25, \$6645; Hanauer, 29, \$14,980; Stormont, 24, \$3224; Germania, 29, \$4248. For last week, Wells, Fargo & Co., of Salt Lake, received \$64,290; McCornick & Co., \$90,890; J. R. Jones & Co., \$35,599; and Union National Bank, \$14,011.

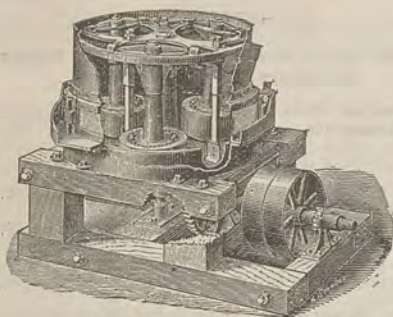
**Our Agents.**

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
J. J. BARTLETT—San Joaquin Co.  
G. W. INGALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
R. G. HUSTON—Idaho and Montana.  
GEO. McDOWELL—Santa Clara and Santa Cruz Co's  
J. B. PATCH, Nevada and Utah.  
M. S. PRIME—Shasta Co.  
FRANK W. SMITH—Oregon and Wash. Ter.  
A. CALDERWOOD—Napa Co.

THERE is a vast difference between charlatans and scientific opticians, judging by the numerous misfits calling at Muller's depot, 135 Montgomery street.



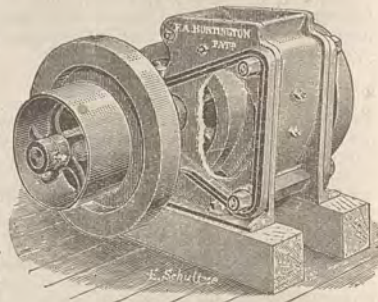


Centrifugal Roller Quartz Mill.

**F. A. HUNTINGTON,**  
MANUFACTURER OF  
**Centrifugal Roller Quartz Mills,**  
**CONCENTRATORS AND ORE CRUSHERS,**  
Mining Machinery of Every Description,  
**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

## Pacific Machinery Depot.

### H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

# MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.  
Frank & Co.'s Woodworking Machinery.  
New Haven M'fg Co.'s Machinists' Tools.  
Bement & Son's Machinists' Tools.  
Bickford's Power Drills.  
Blake's Improved Steam Pumps.  
Perry's Centrifugal Pumps.  
Perin Band Saw Blades.  
Sturtevant Blowers and Exhausts.  
Shimer Matcher Heads.  
Brainard Milling Machines.  
Turbine Water Wheels.  
Bradley Cushioned Hammers.  
Massey's Steam Hammers.  
Schlenker's Bolt Cutters.  
Holloway Fire Extinguishers.

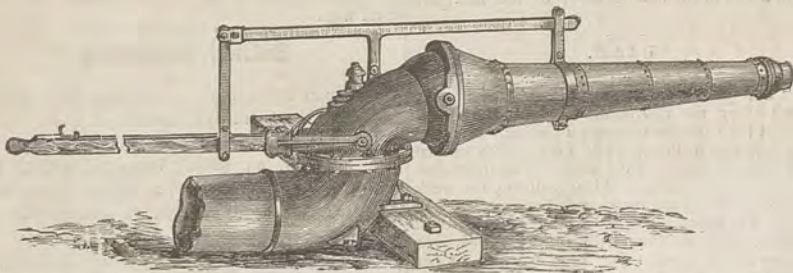
Williamson Bros' Hoisting Engines.  
Atlas Engine Works Engines and Boilers.  
Payne's Vertical and Horizontal Engines.  
Otto Silent Gas Engines.  
Clapp & Jones' Steam Fire Engines.  
Pickering Engine Governors.  
Judson Engine Governors.  
Tanite Co.'s Emery Wheels and Machinery.  
Nathan and Dreyfus Oilers.  
Korting Injectors and Ejectors.  
Disston's Circular Saws.  
New York Belting and Packing Company's Rubber Goods.  
Lane and Bodley Saw mills.  
H. W. Johns' Asbestos Packing, Paint, etc.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

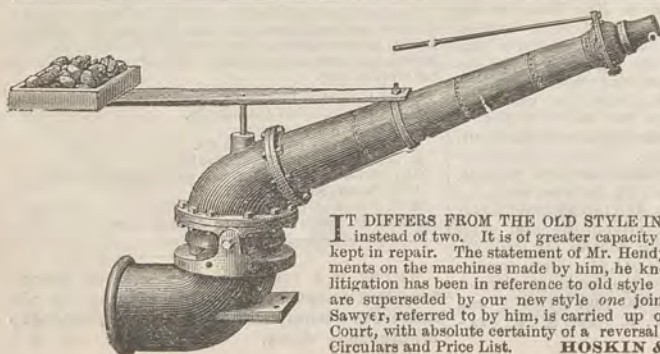
### IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,  
39 to 51 Fremont St., San Francisco, Cal.



This cut represents our

### IMPROVED HYDRAULIC MACHINE.

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.

HOSKIN &amp; CO., Marysville, Cal.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.  
J. O'B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market &amp; Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

### STEAM, AIR, AND HYDRAULIC MACHINERY.

### Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

## UNION IRON WORKS,

Successors to PRESCOTT, SCOTT &amp; CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



### THE CONSUMERS' COMPANY.

## VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

### Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

## VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.

## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

### GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

### JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

## BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

**Chicago Prices Beaten!**  
ESTABLISHED 1860.  
**S. F. PIONEER SCREEN WORKS,**  
221 & 223 First St., cor. Tehama, S. F.  
**J. W. QUICK, Prop'r.**

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).  
Orders Promptly Executed

## THE JENKINS STANDARD PACKING



IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the Jenkins Standard Packing can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing," and is for sale by the Trade generally.

Manufactured only by

For Sale by  
DUNHAM, CARRIGAN & CO., San Francisco, Cal. | JENKINS BROS. 71 John St. New York,



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

UTAH OFFICE—SALT LAKE CITY, UTAH.

DENVER OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE

CORNISH ROLLS,

JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

Metallurgy and Ores.

**SELBY**

**SMELTING and LEAD CO.,**

416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY**  
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

**Standard Shot-Gun Cartridges,**  
Under Chamberlin Patent.

**THOMAS PRICE'S**

**ASSAY OFFICE,**

**CHEMICAL**

**LABORATORY**

**Bullion Rooms and Ore Floors**

No. 524 Sacramento Street,  
San Francisco.

J. KUSTEL.

H. KUSTEL.

**METALLURGICAL WORKS,**  
318 Pine St. (Basement),  
Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.  
Assaying and Analysis of Ores, Minerals and Waters.  
Mines Examined and Reported on.  
Practical Instruction given. Treating Ores by improved processes.

**G. KUSTEL & CO.,**  
Mining Engineers and Metallurgists.

**C. H. AARON,**

**ASSAYER AND METALLURGIST,**

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

**WM. D. JOHNSTON,**

**ASSAYER AND ANALYTICAL CHEMIST,**

515 California Street,

Bet. Montgomery and Kearny, SAN FRANCISCO.

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

**JOHN TAYLOR & CO.,**

IMPORTERS AND DEALERS IN

**ASSAYERS' MATERIALS, MINE**  
**AND MILL SUPPLIES,**

CHEMICAL APPARATUS AND CHEMICALS, DRUGGISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco.

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scoffers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

**JOHN TAYLOR & CO.**

**Nevada Metallurgical Works.**

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED 1869.

Ores worked by any Process,

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

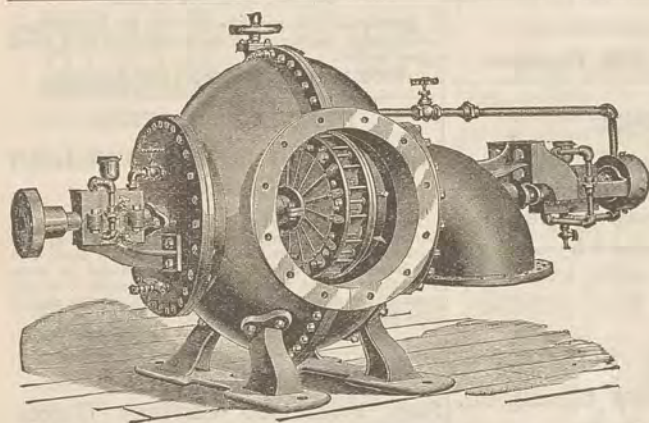
Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

**C. A. LUCKHARDT & CO.,**

(Formerly Huhn & Luckhardt),

**Mining Engineers and Metallurgists.**



**THE HARTSFELD**

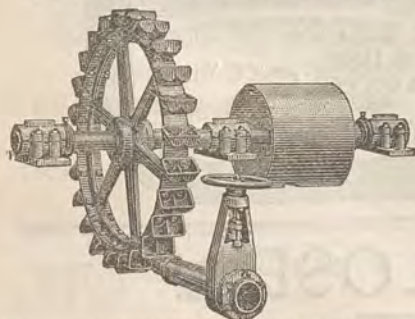
**Portable Smelting Furnace Co.**

OF NEWPORT, KY., U. S. A.

Desires to send free full illustration and price list of their latest improved patents of Smelting and Mining Machinery adapted for the economical treatment of all low-grade ores in Europe and the U. S. of A. The Canada patent rights for sale on shares, royalty or otherwise. Address as above.



**PELTON'S WATER WHEEL.**



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

**L. A. PELTON,**  
Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

**DEWEY & CO.'S** SCIENTIFIC PRESS PATENT AGENCY is the oldest established and most successful on the Pacific Coast. No. 259 Market St. Elevator 12 Front St., S. F.

## THE SCIENTIFIC PORTABLE FORGE



**AND**  
**BLACKSMITH HAND BLOWERS.**

**GUARANTEED**

**The Lightest Running! The Strongest Blast! The Most Durable!**

**ADAPTED TO ALL KINDS OF WORK,**  
Send for Catalogue! **AND MADE IN STYLES AND SIZES TO SUIT.**

**THE FOOS MANUFACTURING CO., - - Springfield, Ohio**



**ADAMANTINE**

**Shoes, Dies and Crusher Plates**

We manufacture the above Adamantine Shoes, Dies and Crusher Plates. They are in use on the hardest quartz in the United States and South and Central America, and have been for the last ten years; we warrant them to out-wear three (3) sets made of any other metal, and many report that they last from 4 to 8 times longer than any other make. They never break **AT THE SHANK**, and the wear is so light that little or no foreign matter gets mixed with the crushed ore.

Also **CHROME CAST STEEL** for Mining and General Use, of the finest quality.  
For further particulars, address

**CHROME STEEL WORKS,**

**H. D. MORRIS, Agent, 22 Fremont St., San Francisco.**

When ordering, a rough sketch, with full dimensions, is all that is necessary.

## CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

**STEIGER & KERR, Occidental Foundry,**

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.



## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co.	Nevada.	29.	25. May 28. July 2.	July 22. B. Burris.	329 Montgomery St
Belmont M Co.	Nevada.	40.	10. Apr 30. July 8.	Aug 3. J. W. Pew.	310 Pine St
Bodie Tunnel & M Co.	Nevada.	13.	25. May 28. July 6.	July 26. C. C. Harvey.	309 California St
Bodie Tunnel & M Co.	California.	5.	50. June 21. July 26.	Aug 16. G. W. Sessions.	309 Montgomery St
Best & Belcher M Co.	Nevada.	34.	50. June 14. July 20.	Aug 9. W. Willis.	309 Montgomery St
Crocker M Co.	Arizona.	3.	20. May 25. July 6.	July 28. A. Waterman.	309 Montgomery St
Dudley M Co.	California.	12.	25. June 21. July 27.	Aug 16. J. Stadfeld Jr.	419 California St
Golden Fleece G M Co.	California.	5.	20. May 23. July 13.	Aug 2. W. J. Glason.	309 Montgomery St
Gould & Curry S M Co.	Nevada.	53.	50. June 21. July 26.	Aug 17. A. K. Durbin.	309 Montgomery St
Hale & Norcross M Co.	Nevada.	90.	50. May 12. June 14.	July 7. J. F. Lightner.	309 Montgomery St
Justice M Co.	Nevada.	44.	10. May 12. June 16.	July 6. R. E. Kelly.	419 California St
Live Oak Drift G M Co.	California.	1.	25. May 25. June 30.	July 22. T. Wetzel.	522 Montgomery St
Lucky Hill Con M Co.	Nevada.	3.	05. Apr 5. June 7.	July 7. F. D. Black.	27 Ellis St
Mexican M Co.	Nevada.	32.	25. June 17. July 23.	Aug 12. C. B. Elliott.	309 Montgomery St
Mount Rose M Co.	Nevada.	4.	15. May 13. June 17.	July 8. J. O. Oodington.	309 Montgomery St
North Peer M Co.	Nevada.	4.	02. May 19. June 24.	July 12. H. Deas.	309 Montgomery St
Ophir S M Co.	California.	51.	25. June 7. July 13.	Aug 2. E. B. Holmes.	339 Montgomery St
Peerless M Co.	Arizona.	8.	50. May 12. June 22.	July 16. A. Waterman.	309 Montgomery St
Palomas Placer M Co.	California.	1.	02. June 1. July 5.	July 19. D. Buck.	309 Montgomery St
Potosi M Co.	Nevada.	24.	30. June 25. July 25.	Aug 19. C. B. Elliott.	309 Montgomery St
Sierra Nevada S M Co.	Nevada.	85.	25. May 27. July 1.	July 20. E. L. Parker.	309 Montgomery St
Savage M Co.	Nevada.	60.	50. June 17. July 20.	Aug 9. E. B. Holmes.	309 Montgomery St

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Best & Belcher M Co.	Nevada.	W. Willis.	309 Montgomery St.	Annual.	July 12
Hastings Con M Co.	Nevada.	C. H. Mann.	306 Pine St.	Special.	July 9
Silver Lining M Co.	Nevada.	J. Stadfeld Jr.	419 California St.	Special.	July 8
Union Con M Co.	Nevada.	J. M. Buffington.	309 California St.	Annual.	July 19

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
California M Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	10.	Feb 23
Con Virginia & California M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	30.	Feb 12
Derbes Blue Gravel M Co.	California.	T. Wetzel.	522 Montgomery St.	10.	Feb 9
Holmes M Co.	Nevada.	G. E. Elliott.	309 Montgomery St.	25.	Mar 20
Mono M Co.	California.	G. W. Sessions.	339 Montgomery St.	25.	Mar 20
Manhattan S M Co.	Nevada.	John Crocker.	419 California St.	25.	Feb 17
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Mar 15
Young America M Co.	California.			40.	May 20

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING June 10.	WEEK ENDING June 17.	WEEK ENDING June 24.	WEEK ENDING July 1.
Alpha.	.70	.75	.80	.85
Alta.	.35	.40	.45	.50
Andes.	.65	.70	.75	.80
Argenta.	1.10	1.15	1.20	1.25
Belcher.	.80	.85	.90	.95
Best & Belcher.	.25	.30	.35	.40
Bullion.	.25	.30	.35	.40
Bonanza King.	.15	.20	.25	.30
Bodie.	1.35	1.40	1.45	1.50
Bodie Con.	.05	.06	.07	.08
Bodie Tunnel.	1.55	1.60	1.65	1.70
Bulwer.	1.35	1.40	1.45	1.50
California.	1.35	1.40	1.45	1.50
Challenge.	.45	.50	.55	.60
Champion.	.45	.50	.55	.60
Chollar.	.45	.50	.55	.60
Confidence.	.45	.50	.55	.60
Con. Imperial.	1.35	1.40	1.45	1.50
Con. Virginia.	1.35	1.40	1.45	1.50
Con. Pacific.	.35	.40	.45	.50
Crown Point.	.90	.95	1.00	1.05
Day.	2.20	2.25	2.30	2.35
Eureka Con.	2.20	2.25	2.30	2.35
Eureka Tunnel.	.10	.11	.12	.13
Exchequer.	.10	.11	.12	.13
Grand Prize.	.50	.55	.60	.65
Gould & Curry.	.50	.55	.60	.65
Goodshaw.	1.75	1.80	1.85	1.90
Hale & Norcross.	1.75	1.80	1.85	1.90
Holmes.	2.50	2.55	2.60	2.65
Independence.	.25	.30	.35	.40
Julia.	.05	.06	.07	.08
Justice.	.05	.06	.07	.08
Martin White.	2.00	2.05	2.10	2.15
Mono.	.35	.40	.45	.50
Mexican.	.35	.40	.45	.50
Mt. Diablo.	3.10	3.15	3.20	3.25
Northern Belle.	.35	.40	.45	.50
Navajo.	.35	.40	.45	.50
North Belle Isle.	.40	.45	.50	.55
Ophir.	.40	.45	.50	.55
Overman.	.20	.25	.30	.35
Potosi.	.55	.60	.65	.70
Pinal Con.	.90	1.00	1.10	1.20
Savage.	.90	1.00	1.10	1.20
Seg. Belcher.	.40	.45	.50	.55
Sierra Nevada.	.40	.45	.50	.55
Silver Hill.	.75	.80	.85	.90
Silver King.	.75	.80	.85	.90
Scorpion.	.05	.06	.07	.08
Syndicate.	.30	.35	.40	.45
Texas.	.15	.20	.25	.30
Union Con.	.45	.50	.55	.60
Utah.	.45	.50	.55	.60
Yellow Jacket.	.50	.55	.60	.65

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., July 1.	500	Hale & Nor.	2.65@2.75
1100 Alta.	45@50c	81 Holmes.	3.20@3.25
250 Alpha.	.85c	200 Mexican.	.45c
400 B. & Belcher.	1.30	150 Mono.	2.00
400 Bodie Con.	1.55	550 Ophir.	.50c
200 Bulwer.	1.05	60 Occidental.	1.00
4700 Chollar.	1.45@1.55	1500 Potosi.	.75@80c
250 Con Va & Cal.	1.40@1.45	2150 Savage.	3.00@4.00
100 Confidence.	3.00	1000 Sierra Nevada.	.70c
95 Crown Point.	1.10	300 Scorpion.	.65c
100 Eureka Con.	3.00	50 Utah.	.60c
300 Exchequer.	.25c	1000 Union Con.	.45c
840 Gould & Curry.	1.55@1.60	100 Yellow Jacket.	1.30@1.35

## Haywards Hotel.

We take pleasure in calling attention to this well and favorably known resort. It has been long established and popular. The locality is elevated and healthy, the surroundings pleasant in the midst of the fruit region of Alameda county. The table will be found supplied with the best in the market, and the proprietor intends to spare no pains in making his house a pleasant and popular home for tourists and pleasure-seekers. Further particulars will be seen in the advertisement in this paper. San Franciscans and Oaklanders find it a very convenient and delightful place to tarry.

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

## Engraving

Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.

## San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, July 1, 1886.

ANTIMONY—French Star.	9 1/2 @ —
BORAX—San Bernardino.	— @ 8
Armstrong.	— @ 8 1/2
IRON—Glenbrook ton.	— @ —
Edgerton, ton.	23 00 @ 24 00
American Soft, ton.	21 00 @ 22 00
Oregon Pig, ton.	21 00 @ 22 00
Clippert Gap, Nos. 1 & 4.	22 00 @ 23 00
Clay Lane White.	22 50 @ —
Shotts, No. 1.	23 50 @ —
Steel—English, lb.	16 @ 25
Black Diamond, ordinary sizes.	10 @ 10
Pow.	4 @ 5
Machinery.	5 @ 6
Sanderson Bros.	10 @ —
COPPER—	
Braziers' sizes.	19 @ —
Pine-box sheets.	20 @ —
Bolt.	19 @ —
Sheeting.	18 @ —
Ingot.	12 @ 13
LEAD—Pig.	4 75 @ 5 00
Bar.	4 1/2 @ 5
Pipe.	7 @ —
Sheet.	8 @ —
Shot, discount 10% on 500 bag.	1 85 @ —
Buck, 1/2 bag.	2 @ —
Chilled, do.	2 25 @ —
ZINC—German.	9 @ 10
Sheet, 7x3 ft, 7 to 10 lb, less the cask.	7 1/2 @ —
QUICKSILVER—By the flask.	35 00 @ 36 00
Flasks, new.	1 05 @ —
Flasks, old.	85 @ —
TINPLATE—Coke.	6 00 @ —
Charcoal.	7 00 @ —

## New York Metal Market.

Telegraphic advices dated July 1st give the following New York prices:

BORAX—6 1/2% @ 7 1/2 c.
BAR SILVER—97 1/2% per oz.
COPPER LAKE—\$10.00 @ 10.12 1/2.
IRON—No. 1, \$17 @ 18.50; No. 2, \$15 @ 16.50.
LEAD—\$4.85 @ 4.95.
QUICKSILVER—43 @ 43 1/2 c per lb.

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Quiet, but fairly steady; Lake offered at 9.95c. Transferable Notices (Lake) offered at 10.00; Transferable Notices (Chili Bars) offered at 10.40.

LEAD—Quiet at 4.85 @ 4.95c. Transferable Notices (Domestic) issued at 4.90.

SPELTER—Dull at 4.35 @ 4.50c. Transferable Notices (Domestic) issued at 4.50c.

TIN—Firm and active, closing at \$22.25 @ 22.70. Transferable Notices issued at \$22.45c.

TIN PLATE—Dull. Transferable Notices issued at \$4.30.

IRON CERTIFICATES—Dull at \$15 1/4 @ \$17. Transferable notices (June delivery) issued at \$16 1/4.

SILVER—New York, 98 1/2% per oz. London, 44 1/2%.

MAKER'S PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge, \$15.00 @ 16.00.

Hudson River, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge, \$15.00 @ 16.00.

Southern, Grade No. 1, \$18.00 @ 18.50; No. 2, \$17 @ 17.50; Grey Forge, \$15 @ 16.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.40 @ 22.80; Billiton Tin, \$22.65 @ 22.75; Banca Tin, \$22.75 @ 22.85; Baltimore Copper, \$9.75 @ 10.00; Orford Copper, \$9.75 @ 10.00; P. S. C. Copper, \$9.75 @ 10.10; Foreign Lead, \$4.95 @ 5.05; Foreign Spelter, \$4.70 @ 4.75.

## Practical Treatise on Hydraulic Mining

By AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' lugs, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by DEWEY & Co., Publishers, 252 Market St., San Francisco.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A post card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.



UNCLE Sam has found it at last! A sure remedy for Torpid Liver, Sick Headache, Habitual Constipation, Chills and Fever, and all affections of the Kidneys and Liver. This is a New Compound, and one trial will convince you that it is the Cheapest and Best Remedy in the Market for Diseases of Kidneys, Liver and Stomach. If you want a pure vegetable compound, that is positively guaranteed to contain no mercury, go to your Druggist, and get a Bottle of the Arkansas Liver and Kidney Remedy. Price, \$1.00 per Bottle.

FOR SALE BY ALL DRUGGISTS.

## Haywards Hotel,

Haywards, Alameda Co., Cal.

## A PLEASANT and CONVENIENT RESORT,

Twenty miles from San Francisco.

Four Trains Each Way Daily. Time, One Hour.

Open the year round. Regular as well as transient guests entertained. The well-known excellence of the table will be maintained.

## Round Trip Tickets

Issued Friday A. M. to Sunday Noon, and good up to following Tuesday P. M., 75 Cts.

Terms reasonable. For particulars address

F. A. WILDER, Proprietor.

## FOR SALE.

Half Interest in Patent Right and Manufacture of the finest Quartz Breaker and Pulverizer of the age.

Machines in operation and subject to any test.

Call on C. G. Y., at office of DEWEY & CO., 252 Market Street, San Francisco.

## ASSESSMENT NOTICE.

Gould & Curry Silver Mining Co. ASSESSMENT No. 53.

Levied.....June 21, 1886  
Amount.....Fifty Cents per Share  
Due in office.....July 26, 1886  
Sale Day.....Tuesday, August 17, 1886

ALFRED K. DURBIN, Secretary.

OFFICE—Room 69, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.



FOR THE BEST IMPROVED

ARTIFICIAL LIMBS

ADDRESS

MENZO SPRING,

9 Geary St.

SAN FRANCISCO, Cal.

OFFICE 5.

Up-Street.

Send for Circular Blank for Self-Measure.

## JOHN A. ROEBLING'S SONS CO. WIRE ROPE

GALVANIZED SHIP RIGGING, MINING, TILLER, ELEVATOR, TINNED, & COPPER ROPE, SASH CORDS. LARGEST WIRE ROPE WORKS IN THE WORLD.

## IRON &amp; STEEL WIRE OF EVERY KIND.

TELEGRAPH WIRE, HARD & SOFT COPPER WIRE INSULATED FOR ELECTRIC USE. WIRES OF IRON & COPPER. FENCE WIRE, SWEDISH IRON WIRE, CRUCIBLE STEEL WIRE. TRENTON, N.J. & 14 DRUMM ST. SAN FRANCISCO, CAL.

## MINT CLOSED!

SEND YOUR BULLION TO THOS. PRICE, 524 Sacramento St., San Francisco.

COIN RETURNS IN 24 HOURS.

## DEWEY &amp; CO. PATENT SOLICITORS.

252 MARKET ST. S.F. ELEVATOR 12 FRONT ST. S.F.



The California Perforating Screen Company.

All kinds of Quartz Screens, slot or round holes; zinc, copper and brass for

## FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco

## American Exchange Hotel,

SANSOME STREET,

Opposite Wells, Fargo &amp; Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50 PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

## DIVIDEND NOTICE.

## The German Savings and Loan Society.

For the half year ending June 30, 1886, the Board of Directors of The German Savings and Loan Society has declared a dividend at the rate of four and thirty-two one-hundredths (4 32/100) per cent per annum on term deposits and three and sixty one-hundredths (3 60/100) per cent per annum on ordinary deposits, payable on and after the 1st day of July, 1886. By order.

GEO. LETTE, Secretary.

## DIVIDEND NOTICE.

## San Francisco Savings Union,

532 California Street, cor. of Webb.

For the half year ending June 30, 1886, a dividend has been declared at the rate of four and one-half (4 1/2) per cent per annum on term deposits, and three and three-fourths (3 3/4) per cent per annum on ordinary deposits free from taxes, payable on and after July 1, 1886.

LOVELL WHITE, Cashier

## THE RUSSELL PROCESS COMP'Y.

C. A. STETEFELDT, President.



## Educational.

W. E. CHAMBERLAIN, JR.

T. A. ROBINSON.



Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Evening Sessions during the entire year.

Call, or send for CIRCULAR to

CHAMBERLAIN &amp; ROBINSON, Prop's.

## Field Seminary for Young Ladies,

1825 Telegraph Avenue,

Oakland, California.

Address MRS. R. G. KNOX, Proprietor, or MISS FRANCES A. DEAN, Principal.

THE FIFTEENTH YEAR WILL BEGIN

Wednesday.....July 28, 1886

## PERRY SEMINARY,

Boarding and Day School,

1625 Telegraph Ave., Oakland, Cal.

MRS. HERMON PERRY, Miss KATE M. FULLER,  
PRINCIPALS.

Next Term will begin Monday, Aug. 2, '86

# HEALD'S BUSINESS COLLEGE,

24 Post St. S. F.

Send for Circular.

## Joshua Rose's Great Treatise on Steam Engines.

JUST PUBLISHED.

## Modern Steam Engines.

An Elementary Treatise upon the Steam Engine, written in Plain Language, for use in the Workshop as well as in the Drawing Office; giving full explanations of the Construction of Modern Steam Engines; including Diagrams showing their actual Operation; together with Complete but Simple Explanations of the Operations of Various Kinds of Valves; Valve Motions, Link Motions, etc., thereby enabling the Ordinary Engineer to clearly understand the Principles Involved in their Construction and Use, and to Plot Out their Movements upon the Drawing Board. By JOSHUA ROSE, M. E., author of "The Complete Practical Machinist." Illustrated by 422 engravings. In one volume, 4to., 320 pages. Price, \$6.00, free of postage to any address in the World.

An Illustrated Circular, 8 pages, 4to., giving the Contents of this remarkable book, will be sent free to any one who will furnish his address.

## HENRY CAREY BAIRD &amp; CO.,

Industrial Publishers, Booksellers and Importers, 810 Walnut St., Philadelphia, Pa., U. S. A.



WATER TANKS! WINE TANKS!

## CALIFORNIA WINE COOPERAGE CO.

FULDA BROS., Proprietors,

30 to 40 Spear St., San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

## NATIONAL ASSURANCE CO., OF IRELAND.

## ATLAS ASSURANCE COMPY, OF LONDON.

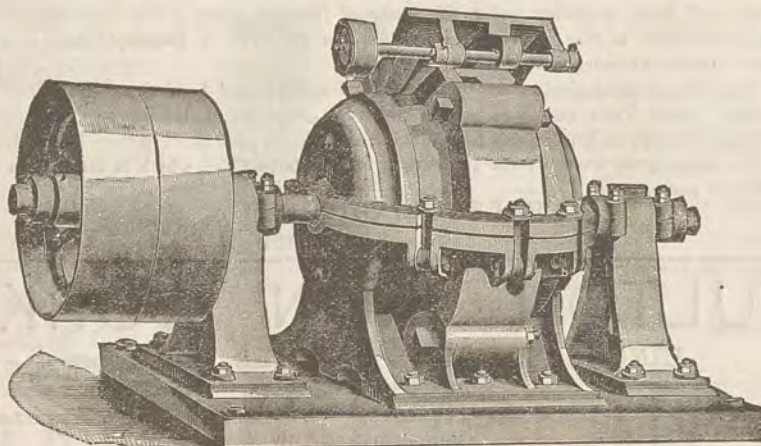
## BOYLSTON INSURANCE COMPANY, OF BOSTON, MASS.

## H. M. NEWHALL &amp; CO.,

GENERAL AGENTS,

309 &amp; 311 Sansome St., San Francisco, Cal.

## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.

Certificates as to performance of the Mills, and any information required, furnished on application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 &amp; 106 Washington St., NEW YORK.

OR PACIFIC IRON WORKS, SAN FRANCISCO.

## CALIFORNIA

## ARTIFICIAL STONE PAVING CO.

(SCHILLINGER'S PATENT.)

—FOR—

SIDEWALKS, GARDEN WALKS, CORRIDORS, OFFICES, CARRIAGE DRIVES, STABLES and CELLAR FLOORS, KITCHENS, Etc.

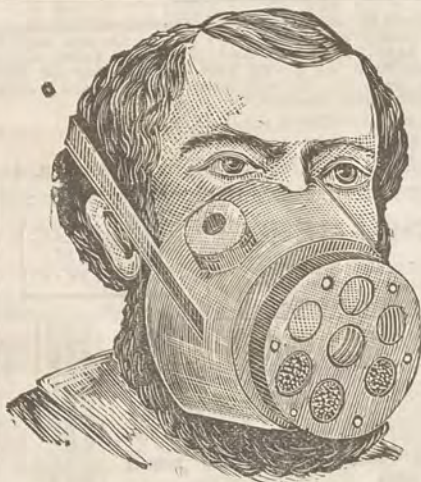
The Courts here and in the East have decided that Artificial Stone Pavements with plastic concrete and in detached blocks, are infringements on the Schillinger Patent; and also, that when the plastic material is blocked off with a trowel and cut through far enough to control the cracking caused by shrinkage, that such pavement is in law the same as if laid in detached blocks, and is an infringement of the patent. All property-owners having such pavements laid without the license of the above Company, will be prosecuted.

OFFICE, 404 MONTGOMERY STREET, SAN FRANCISCO.

EGBERT JUDSON, President.

ALBERT H. REICHLING, Secretary.

G. GOODMAN, Manager



PATENT

## LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, Threshing and Stock-driving, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,  
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.

## San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whal Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS &amp; CO.

611 and 613 Front St., San Francisco.

## The Famous KNABE PIANO.

L. M. GOTTSCHALK: "The best instrument now existing in both hemispheres."

A. L. BANCROFT &amp; CO.

SOLE AGENTS, 607 Market St., San Francisco.

## A. G. KITTREDGE,

MANUFACTURER AND IMPORTER OF



## IRON FENCES,

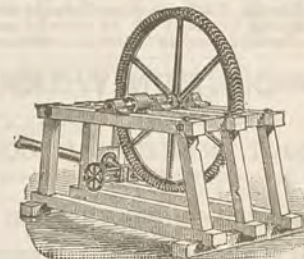
HOUSE CRESTINGS,

Weather Vanes, Tower Finials, Settees, etc.

Agent Champion Iron Fence Co.

18-20 Fremont St., San Francisco.

## KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.

SEND FOR CIRCULAR.

EDWARD A. RIX &amp; CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco.

## MACHINE TOOLS,

PRESSES AND DIES,

## PUNCHING and SHEARING MACHINERY.

## F. A. ROBBINS,

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

## N. W. SPAULDING

## SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

## Saws.

## SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

RICHARD C. REMMEY, Agent,

Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of

all kinds of

Chemical Stoneware

—FOR—

Manufacturing

Chemists.

Also Chemical Brick for Glover Tower.

## INVENTORS, TAKE NOTICE

L. PETERSON, MODEL MAKER,

258 Market St., N. E. cor. Front (up stairs), San Francisco. Experimental machinery and all kinds of metal, tin, and Brasswork.



## Iron and Machine Works.

THOMAS THOMPSON THORNTON THOMPSON  
**THOMPSON BROTHERS,**  
**EUREKA FOUNDRY,**  
 129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

## CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,  
 ENGINEERS AND MACHINISTS,  
 No. 119 Beale St., - - San Francisco.

BUILDER OF—

Steam Engines, Flour Mill,  
 Mining, Saw Mill and  
 Dredging Machines  
 Brodie Rock Crushers,  
 Steam Power, Hydraulic,  
 Side Walk and Hand-Power  
 ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic  
 Safety Catches for Elevators. All kinds of machinery  
 made and repaired. **ESTD ORDERS SOLICITED.**

## UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

## STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery  
 constructed, fitted up and repaired.

Front Street, between N and O Streets,  
 SACRAMENTO, CAL.

## Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery  
 of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Sts.

## California Brass Foundry,

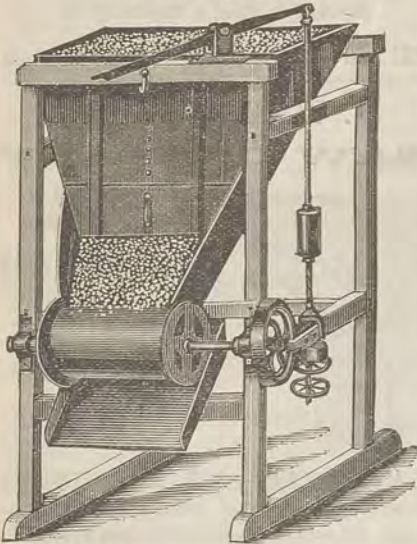
No. 125 First Street, Opposite Minna.  
 SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbit  
 Metal Castings, Brass Ship Work of all kinds, Spikes  
 Sheathing Nails, Rubber Braces, Hinges, Ship and Steam  
 boat Bells and Gongs of superior tone. All kinds of Cocks  
 and Valves, Hydraulic Pipes and Nozzles, and Hose Cou-  
 pings and Connections of all sizes and patterns, furnished  
 with dispatch. **ESTD PRICES MODERATE.**

J. H. WEED. V. KINGWELL.

## THE ROLLER ORE FEEDER

[Patented May 28, 1882.]



This is the best and cheapest Ore Feeder now in use.  
 It has fewer parts, requires less power, is simpler in  
 adjustment than any other. Feeds coarse ore or soft clay  
 alike uniformly, under one or all the stamps in a battery  
 as required.

In the Bunker Hill Mill it has run continuously for two  
 years, never having been out of order or costing a dollar  
 or repairs.

Golden State and Miners' Iron Works.  
 Sole Manufacturers,  
 237 First Street, San Francisco, Cal.

## QUARTZ BREAKERS!

—AND—

Pulverizers Combined.

To Run by Hand or Power.  
 Mining Machinery of Every De-  
 scription; Drawings, Plans  
 and Specifications.

E. I. NICHOLS, 316 Mission Street, S. F.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold  
 in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co.  
 (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting  
 that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,  
 Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded  
 to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quanti-  
 ties to suit purchasers.

BALFOUR, GUTHRIE & CO.,  
 316 California St., San Francisco.

## FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
 Tanks for Salmon Canneries  
 OF EVERY DESCRIPTION.

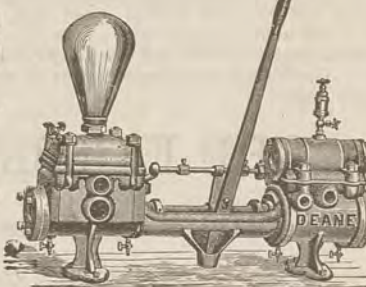
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

## Deane Steam Pump.

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
 Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
 Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
 CHINERY CASTINGS of Every Description.

—ALSO—

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

LOCOMOTIVE AND MARINE FORGINGS.

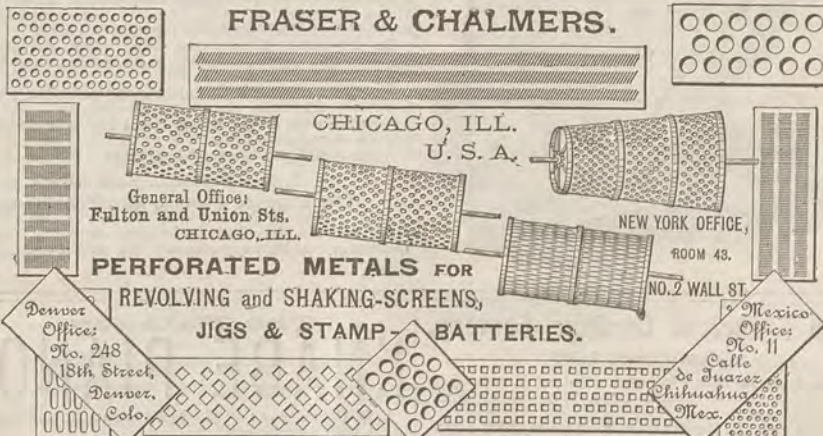
ALSO Steel Rods, from 1/2 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
 Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
**STEEL RAILS** from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
 Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
 Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
 and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

## FRASER & CHALMERS.



PERFORATED METALS FOR

REVOLVING and SHAKING-SCREENS,

JIGS & STAMP-BATTERIES.

## NOTICE TO

**MINING MEN,**  
**ENGINEERS, CONTRACTORS,**  
 and others interested in  
**TUNNELING, SHAFT-SINKING, ETC.**

Engineers' Tables of Progress

WITH MAPS, ILLUSTRATIONS  
 AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
 SENT FREE ON APPLICATION.

For Catalogues, Estimates, etc., address:

INGERSOLL ROCK DRILL CO.,

REPRESENTED BY

BERRY & PLACE MACHINE CO.

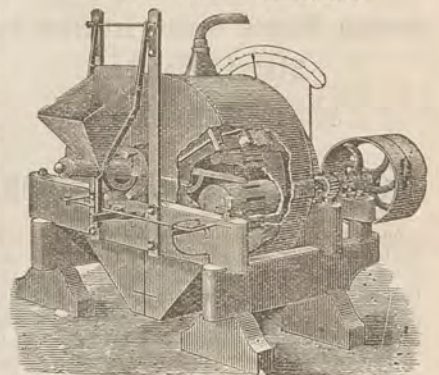
PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
 SAN FRANCISCO, CAL.

## Tustin's Pulverizer

WORKS ORE WET OR DRY

FULTON IRON WORKS, S. F.



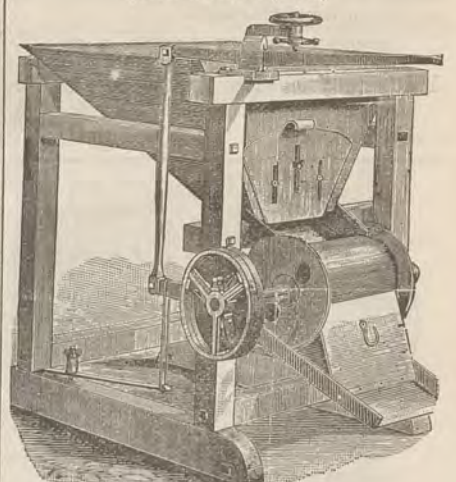
MANUFACTURED BY

HINCKLEY, SPIERS & HAYES,

THE ORIGINAL

Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar  
 work.

Manufacturers of the Celebrated "Chal-  
 lenge" Ore Feeders for any character of  
 ores; also "Stanford Improved" Ore  
 Feeders and Tullock's Ore Feeders for  
 dry ores.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco.

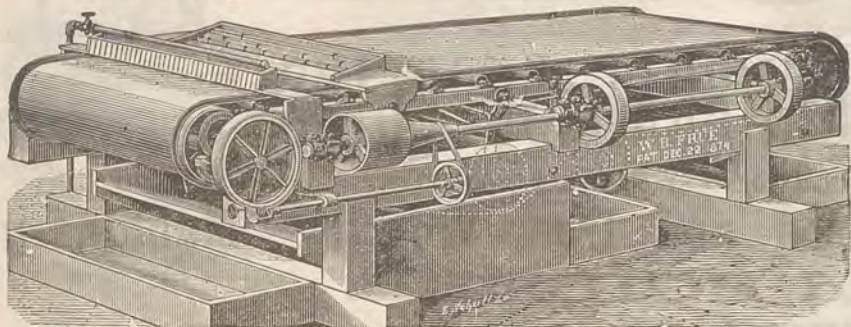
**A Good Opportunity for a Ma-  
 chinist.**

A variety of good Tools, Patterns, etc., with business  
 for sale cheap by a party retiring from business. A  
 splendid opportunity for an enterprising mechanic.

Address A. B. C., care of this paper.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS.**  
(\$575 00), F. O. B.

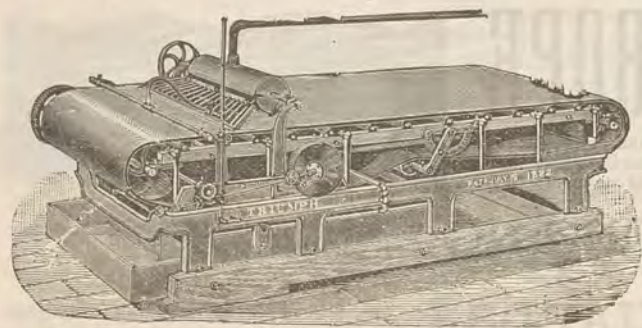
OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement. The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them. Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for. N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street.

SAN FRANCISCO, CAL.

# \$1,000 CHALLENGE ACCEPTED, PRICE, FIVE HUNDRED AND FIFTY DOLLARS (\$550.00).



**THE  
"TRIUMPH" ORE CONCENTRATOR.**

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE, placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.

**PACIFIC  
IRON WORKS**

1850. 1885.  
**RANKIN, BRAYTON & CO.,**  
BUILDERS OF...  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

## WATER JACKET SMELTING FURNACES

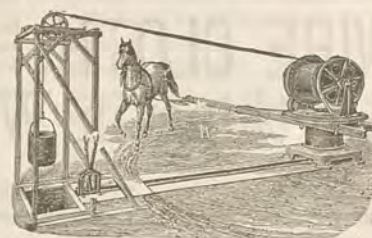
For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, A MOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS for smelting of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.

**WATER JACKET  
SMELTING  
FURNACES**

**THE DUNCAN  
CONCENTRATOR**

Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES THE BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



**Baker's Mining Horse Power.**

Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.

**HOISTING  
WORKS.**

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

# THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

## BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
AIR COMPRESSORS—Rope Power Transmission.  
HYDRAULIC PUMPING and Hoisting Machinery.  
WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch pipe of 1-inch iron for Spring Valley Water Works Company, San Francisco.  
SAW-MILL MACHINERY of all kinds.  
STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.  
MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.  
WILSON'S PATENT GAS-PRODUCER.  
STEAM BOILERS of all descriptions.  
SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.  
STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.

Send for Circular and Price Lists.



## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

**CLOT & MEISE,**

Sole Licensed Manufacturers of the

**Medart Patent Wrought Rim Pulley**

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

San Francisco, Cal.

Nos. 129 & 131 Fremont Street,

**DEWEY & CO.,** { No. 252 MARKET ST. } **PATENT AGENTS.**  
Elevator 12 Front St.

## THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

### MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS  
LOGGING, PORTABLE, STATIONARY, MARINE  
AND LOCOMOTIVE ENGINES,

**ACTS DYER CANNON BALL QUARTZ MILL**  
222 & 224 FREMONT STREET. SAN FRANCISCO.

### SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.

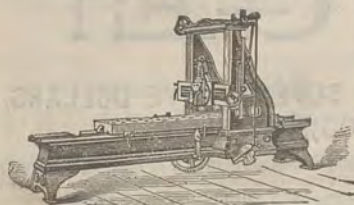


SALT LAKE CITY, UTAH.

Cooper Union Institute  
January 1 '85

SAN FRANCISCO, CAL.

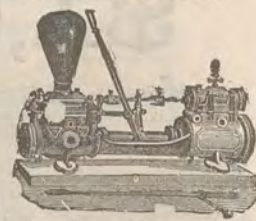
PORTLAND, OREGON.



Putnam Planer.

**PANKE & LACY.**

.....IMPORTERS OF AND DEALERS IN.....

**MACHINERY AND GENERAL SUPPLIES,**Knowles Steam Pump  
The Standard.

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

**Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
ENGINES and BOILERS.**

SEND FOR CIRCULARS.

**CALIFORNIA WIRE WORKS,**

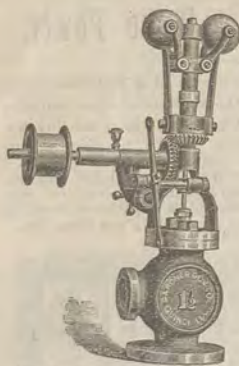
MANUFACTURERS OF

**WIRE ROPE**Of all kinds, Flat and Round, any Sizes and  
Lengths, made from only the Best Material  
and in the most careful manner.**WIRE** Of all kinds for Telegraph  
and Telephone purposes, Bal-  
ing Hay, and all purposes that wire can be put  
to. Brass and Copper—Galvanized.  
Annealed, Bright and Coppered Wire.ASK  
YOUR  
DEALER  
FOR

TRADE MARK.

Sole Licensees on the Pacific Coast for the manu-  
facture of Barbed Wire, Two and Four Point  
Wire and Flat Barbs.**Barbed Wire.****WIRE CLOTH.**Brass, Copper, and Steel, all kinds, and meshes  
from 1 to 10,000 to the square inch, for Quartz  
Screens, Flour Mills, Gravel Screens, etc.**WIRE FENCING**Of various designs, for Stores, Banks, Asy-  
lums, Gardens, etc.**WIRE GUARDS**For the protection of Windows, Skylights,  
Prisons, etc., etc.**WIRE RAILINGS**For House Fronts, Window Sills, Stores  
Public Squares, etc.**WROUGHT IRON**Railing, Fencing, Crestings, Entrance  
Gates, and Ornamental Work.**Anything in Wire or Light Wrought Iron, Ornamental or Useful,**

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.



Gardner Spring Governor.

**TATUM & BOWEN,**

25 to 31 MAIN STREET, SAN FRANCISCO, CAL.

91 to 93 FRONT STREET, PORTLAND, OR.

SOLE AGENTS FOR

**GARDNER GOVERNOR COMPANY,****J. S. Mundy's Patent Friction Hoisting Engines.**The Mundy Patent has been sustained in the United States District Court of New York against the Ledgerwood Manufacturing  
Company, and also in the District Court in the State of New Jersey against Kendall & Roberts for infringement. Therefore all parties are  
cautioned against making, using, or selling Friction Drums that infringe this patent.

Gardner Governor.

**GORDON & MAXWELL COMP'Y MINING PUMPS.**

THE MOST EXTENSIVE PUMPING MACHINE WORKS IN THE UNITED STATES.

**MORRIS COUNTY MACHINE and IRON CO. New High-Speed AIR COMPRESSOR.**We have recently furnished the contractors the machinery for La Trinidad (300 tons per day) and Silver Queen (100 tons per day). These mines are located in Mexico and belong to  
La Trinidad Company, of London. The Process is the Wet Concentration, and the Plants are, without doubt, the most substantial and complete of the kind ever built.**WE MANUFACTURE ENGINES, BOILERS, AND SAW-MILL MACHINERY, and Carry in Stock :****Wood and Iron Working Machinery, Best Belting, Lubricants for Cylinders and General Machinery  
Including the Celebrated ALBANY LUBRICATING COMPOUND.**

SEND FOR CIRCULAR.

**IMPORTANT TO GOLD MINERS!  
SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD**

IN QUARTZ, GRAVEL AND PLACER MINING.

**Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.****BEST SOFT LAKE SUPERIOR COPPER USED.**3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining  
Plates. Old Mining Plates Bought, Replated, or Gold Separated.**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.****E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR &amp; CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general  
complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating  
looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



# MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, JULY 10, 1886.

VOLUME LIII.  
Number 2.

## Cost of Gold Mining in Brazil.

The St. John Del Rey is one of the oldest gold mines now being worked, and may be considered a representative Brazilian mine. It will be interesting to California gold miners to learn something of the expense of gold mining in that country, especially as they are reducing the loss in treatment. The mine is owned by an English company, and at a recent meeting of the directors in London the following facts were elicited:

The total monthly produce of gold at Morro Velho from the 13th day of April, 1885, to the 12th day of April, 1886, both days inclusive, was 27,902.6508 ozs. troy. The produce for the corresponding period of last year was 26,102.0234 ozs. troy; for the preceding year, 22,908.7441 ozs. troy; the net profit on the working of the Morro Velho mine for the year has been £17,238 14 s. 3d.; the transfer and other fees, £10 15s. 9d.; the amount of net profit brought from last year, £3496 5s. 8d.; total, £20,745 15s. 8d. The general expenses for the year amount to £2760 8s. 8d.; debenture interest, £4518 3s.; income tax on interest, £86 12s. 8d.; bad debts in Brazil, £237 6s. 9d.; interest on loans, £87 2s. 7d.; total, £7689 13s. 8d.; profit, £13,056 2s. The amount of debentures paid off in November and following months was £15,450. Reviewing the figures, the result may be stated shortly as: First, that there has been less mineral raised and treated, caused mainly from want of power in the underground engine. Arrangements are in progress for an entirely new system of hauling, to supersede hauling by this underground engine, by which it is hoped the output will be considerably increased. Secondly, that the quantity of sand amalgamated has been considerably increased by the completion in April of four additional amalgamating barrels. Thirdly, that the yield or recovery has improved this year as last to the extent, in the two years, of, practically, 1 oit. a ton. Fourthly, that the loss in treatment this year as compared with last has been reduced 5.35 per cent. The rainfall during the past rainy season has been the smallest on record, only 39½ inches having fallen, the usual average being 58 inches. It is feared this may be inconveniently felt during the dry season now entered on. The total produce of gold from the Cuiaba mine during the year has been 2809.3713 ozs. troy. The produce for the corresponding period of 1884-5 was 3043.2102 ozs. troy. The quantity of mineral quarried and stamped was 16,718 tons, yielding .1593 oz. troy per ton. The quantity quarried and stamped last year was 18,736 tons, yielding .1699 oz. troy per ton. The average assay of the mineral stamped was .3798 oz. troy per ton, as against .3995 oz. troy per ton last year. The recovery of 1.384 oits. per ton, from the mineral which averaged 3.295 oits. a ton, shows the unrecovered gold to have been 57.43 per cent against 57.43 per cent last year. The total cost at this mine for the year was 11, £591 14s. 2d., as against £12,068 last year. The gold on sale produced £10,136 18s. 10d., leaving the expenditure in excess of the receipts

at £1454 15s. 4d. From the figures it will be seen that the total expenditure, both working and capital, has only been 13s. 10d. per ton, which a yield of 1.7 oits. per ton would have covered, and from the second set of figures that the working expenditure was more than covered by the yield of 1.384 oits. per ton, an important fact, as showing how cheaply the mineral from this mine can be raised and milled.

DEBRIS QUESTION IN CONGRESS.—The Committee on Commerce of the Senate amended the

## A Refinery for Bullion.

The process used on the Comstock for refining coppery bullion produced by amalgamating tailings was first used at the Lyon mill at Dayton, Nevada, and has been adopted at the other tailings mills on the Comstock.

These mills treat two classes of tailings: "sand," or material which has passed previously through the pans of the ore mills, and "slimes," or the fine, clayey material which, coming from the battery, is too light to settle

## Foundry Notes.

Matters in relation to the strike at the Union Iron Works remain about in the same condition as last week. The works are of course short-handed, and are still advertising for men, but none of the departments are shut down. The federated trades have sent the men under its jurisdiction a notice that the necessity for pecuniary assistance is felt, and that the present is a critical time in the life of the iron unions. The apprentices who threatened to return to

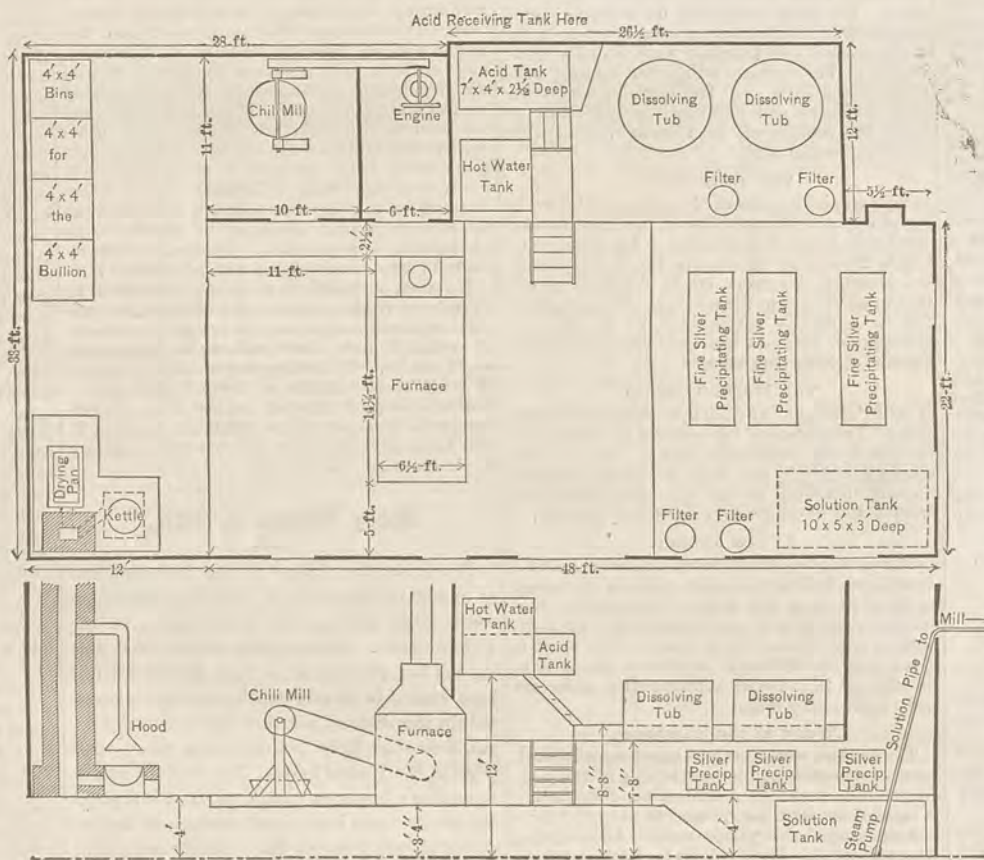
work unless they were recognized have received the assistance desired. The proprietors of the works, however, remain firm in their position, considering that the men had no reason to strike, as there had been no reduction of wages or increase of hours, and the men always received the highest prices for their labor and were promptly paid. They will not recognize any right of the unions to dictate to them what men shall be employed.

The Union Iron Works have just launched the third steel steamer built on this coast. She is a steel water boat for the Panama Railway Company, and will be towed down to Panama by one of the Pacific Mail Company's steamers. She is named the *Balboa*, and is 100 feet long, 14 feet beam, 8 feet depth of hold, and has three water compartments, with a capacity of 25,000 gallons. The engines are of the compound surface condensing type, the boilers being for 100 pounds of steam. The fresh water pumps aboard are capable of raising 10,000 gallons of water per hour. The house on deck, which extends nearly the whole length, is especially adapted for hot weather, and has ample accommodation for officers and crew.

The Fulton Iron Works have completed the machinery for the steam coasting schooner *Whitesboro*. The compound engine has an 11-inch high pressure and a 24-inch low pressure cylinder with 18-inch stroke. The works are also building a 40-stamp mill for the Kennedy mine, near Jackson, Amador county. The stamps weigh 850 pounds each, and the mill will be run by water power. Sixteen Frue concentrators will be used at the mill. The Fulton is still at work on the government dredges to be used in the bay and rivers, and which we have before described. They are working also on the double-ender ferryboat for San Diego bay, the dimensions of which we gave several weeks since. The engines for the new boat to replace the lost *Planter*, of the Inter-island Steam Navigation Company of the Sandwich Islands, are still in process of construction, making the fifth set made for this company.

There is still a lack of large contract work in the larger machine, foundry and boiler shops, and the dullness is reaching the smaller shops, even those which run on specialties.

NEW MINING DISTRICT.—The *Sierra Tribune* has received a letter from a friend who is prospecting in a new district on the border of Long valley, about four miles from Willow Ranch. The writer says they have a gold vein that assays from \$6 to \$30 a ton and is 8 feet wide,



ARRANGEMENT OF BASE BULLION REFINERY ON THE COMSTOCK.

River and Harbor bill by striking out the section directing the Secretary of War to bring suit to enjoin the hydraulic miners from washing mining debris into the tributaries of the Sacramento, San Joaquin and Feather rivers. The committee also amended Sec. 2, which makes it a penalty to wash debris into the rivers or deposit it in such place from which it is liable to be carried by floods into the rivers, so as to provide that no mining but hydraulic mining by water run through a nozzle and under pressure shall be construed to be prohibited. These amendments were made through Senator Jones, who is a member of the committee. Senator Stanford and Mr. McKenny had a conference in regard to these amendments, and Senator Stanford will move the restoration of the provision for bringing suits by the Secretary of War.

VISALIA was successfully illuminated by electric light for the first time on the 5th. The plant cost \$10,000 and is owned by two of the citizens. The system is the Western Electric, and this is its first introduction in California.

THE Carbon Hill coal mines at Tacoma, W. T., shipped 25,700 tons of coal during June—the largest shipments made since the opening of the works.

in the tanks inside the mills, and is caught in large reservoirs outside. The slimes, never having been worked, are richer than the sands, but the assay values of each class vary considerably among themselves.

After repeated tests of refining machines, including a year's trial at Dayton, the Bonanza firm adopted the process and built a refinery at the Omega mill, near Virginia City, where was treated all the base bullion forwarded by the mills owned by the Pacific Mill Co. The financial results obtained were beyond their most sanguine expectations. We give herewith an engraving of this refinery, showing the general arrangement adopted. Other mills on the Comstock have since made use of the process, which has been described in detail before the American Institute of Mining Engineers by A. D. Hodges, Jr. We shall in next week's PRESS commence a series of articles descriptive of the processes referred to of refining coppery bullion.

ORO PLATA.—The Mohave Co. Miner, (A. T.) says: Charley Maxson has sold out his lease on the Oro Plata mine to good advantage, and with the money he made while working the mine, he has cleaned up a nice little stake.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

## The Pine Creek Mines, Oregon.

EDITORS PRESS:—In reading your journal I have seen nothing for some time with regard to this very promising and growing camp. The two towns, Allantown and Cornucopia, are rapidly merging into one, as they are but one-half mile apart, and already the short space between is lined with cabins. There has been a steady influx of fortune-seekers the past month and our population now is about 1000, with numerous stores, etc., and three butcher shops. Provisions are very cheap, viz.: flour, \$1.25 to \$1.75 a sack; eggs, 20 cents a dozen; bacon, 10 cents per pound, etc. The region being so elevated (4700 to 9000 feet) the snow is slow in departing, and consequently little has yet been done in the mines, almost all of which are several thousand feet above the town. The Whitman, the only mine that has been worked all winter, is showing up handsomely. At the 200-foot level an ore chute has been struck assaying away up in the thousands. Work has been resumed on the Silver Bell, and a pan of the quartz brought to town Monday contained at least \$100 in gold. It is very rich in tellurides. The O. R. N. shipped some ore yesterday. The Dominican, or as generally called the Jack in the Hole, a ledge in close proximity to town, is being prospected by a new tunnel, 40 feet of which is now completed. The owners of the Norway ledge, a very strong vein some three miles distant, have about completed their adit. The "Contact," or as it is generally called, the "big silver mine," being some distance (four miles) from camp and very high up, has not been worked yet this spring, but it is pronounced by experts to be without doubt a true fissure vein, and as far as developed assays up in the hundreds in silver. It is a five-foot ledge lying at the contact of granite and slate, with well-defined walls and gangue of talc and porphyry. It has been developed under the management of the well-known California and Nevada expert, Mr. Robert Kelly, to a depth of 150 feet, and a drift has been run 50 feet on the vein. The assays run from \$50 up to \$700 per ton, and the quartz is enough to make the eyes of a mining man glisten. Messrs. Breck & Co. are putting in a reduction plant on a small scale and are about ready for business. Their works (the Pine Creek Metallurgical Works) include a reverberatory furnace, two-stamp mill and chlorination and leaching apparatus with a capacity of six tons per day. The power is furnished by a 14-foot overshot wheel. Everything is arranged very conveniently and everything is heated by a steam boiler. Their vats for lixiviation are six in number and were mostly built by Messrs. Jewell & Co., of your city, and are first-class in every particular. They have power and mill room for 10 stamps, and undoubtedly will soon put them in. Another year will see "Pine Creek" a booming camp well on its way to a Butte city. More anon.

Yours truly, J. A. STACKLOW.  
Allantown, Union Co., Oregon.

## Siphon Action of Discharge Pipes.

EDITORS PRESS:—In your issue of June 5th there is a description of a draining pump made by the San Francisco Tool Co. and some statements respecting such pumps which many of your readers will construe as coming from myself, because of my connection with that company.

This I wish to correct and to add that I am wholly opposed to siphon action in the discharge pipes of any pump unless unavoidable, as it may have been in the case alluded to.

The statement respecting the arrangement of pumping on this method in Europe "to the exclusion of other methods formerly applied" will be news to those who erect such machinery. The idea is as old as iron pipes, and the practice has fallen into "desuetude" from the face of experience. No cases being given, I am at a loss to know where the plan has been revived.

The agitation of water in passing through a pump of any kind releases air which lodges in the discharge pipes, and unless continually drawn off by some negative pressure, equal to the difference in the water levels, the siphon action soon ceases.

The employment of a condenser or steam ejector to remove this air takes draining apparatus from the field of simple mechanism so desirable in such cases, and offsets the counter-acting advantages.

Instead of such a method coming into use in the Old World, I think no maker of such machinery will, when avoidable, raise water above a discharge level. As before said, I am not aware of the authority on which the statement is made, but must recommend it be taken *cum grano salis*, at least I want no part in its paternity.

J. RICHARDS.  
Pittsburg, Pa., June 25, 1886.

THE South Pacific Coast Railroad Company has received six new passenger coaches from Wilmington, Delaware, two locomotives from the Baldwin Locomotive Works, and six street cars from Newark, Alameda county, for use upon the Telegraph avenue street-car route.

## Park City Mines, Utah.

Mining operations in the hills around the Park, says the *Miner*, may now be said to be renewed for the season in full blast. The snow has almost entirely disappeared from the high hills, and the usual spring drawbacks, occasioned by surface water, are well-nigh over with. The roads were never better than they are now, and no difficulty is experienced in getting fuel and supplies to the mines and hauling ore down to the mills and railroad. Prospectors are jubilant at the indications, and ere long many of them will be working their claims with their hard-earned cash of the winter. Altogether, the prospects of the season's work in the Park are very flattering. Every indication points to a lively boom for Snake Creek district this summer. There are numerous valuable prospects in the above-named mineral section that will come to the front just as sure as fate. The persistent claim-owners and prospectors of

## Snake Creek District

Have stuck by their convictions as regarded the ultimate proof of its richness, and now they are prepared to offer good inducements to investors. Aside from its immense area of mineral ground, it is also known to contain inexhaustible beds of white, black and colored marble. If capital from anywhere is looking for opportunities, we would recommend an inspection of this district, as it is bound to show up astonishingly in the near future. All Snake Creek needs is capital, and capital it is bound to get. We shall review this district in detail in a week or two.

## At the Ontario Mine

Everything is going along with its usual clock-work precision. The broken rod of the Cornish pump has been repaired and the iron column will reach here from San Francisco in a few days. The great pump will be working again very soon. Meanwhile the steam pumps on the three lower levels keep the water down without trouble. The Ontario mill, after having been closed down since the 1st inst., to make the needed repairs and overhauling, will start up about the middle of next week for another year's successful run.

## The Daly Mine

Is now employing about 110 men, and the working of every drift and stope in the mine reveals more and more rich mineral. An average of nearly 20 tons of high-grade ore is shipped to the sampler, and from 50 to 60 tons of ore is hauled to the mill each day. The output of this mine per day approaches 75 or 80 tons. Every move made at the Daly seems to be productive of flattering success.

## The Morgan Group

Is still "tied up" and little or nothing is being done. The company represented by George A. Meears holds possession, and as soon as the pending litigation has been sufficiently cleared up large hoisting works will immediately be erected and developments vigorously pushed.

## At the Anchor.

The present working force numbers about a dozen men, but this number will be increased to 20 or 30 in a few days. No trouble from surface water is now encountered, and the indications may be said to be good. The shaft is down past the 500 level, and more depth is to be attained in hopes of striking the main ore body before very long.

## Work at the Sampson.

The surface water which handicapped work here a few weeks ago is now a thing of the past. In the old workings considerable retimbering is being done, and the prospects are good for a fine showing of this year's work. Giles & Co., who worked the 200 level on a lease, have returned on a recent shipment that show 118-ounce ore. In the tunnel where the main ledge was cut a few weeks ago work is being pushed on the east and west drifts along the foot wall. The ledge has not been cut through yet, but it will average 20 feet in width. A fine body of ore is exposed and it can be advantageously worked when some connections are made and good ventilation secured. Thirty men are employed at the Sampson, but the force will soon be increased and ore shipments resumed.

## The Crescent's Operations.

Work on the Crescent Company's property is being prosecuted with vigor, and the good showing still continues. The Rebellion tunnel is in the hill a distance of about 800 feet and the Etna is in about 900 feet. A large portion of the force is kept at making raises to the surface, and when this work is completed the mine can be better worked than ever. At present 30 men are employed in the mine and 13 are required to load the ore in the cars. An average of 50 cars, or 175 tons of ore, is sent down to the concentrator daily. The total force of the Crescent, excepting the 15 or 20 at the concentrator, numbers over 50 men, and the force is soon to be largely increased. Several claims in the near vicinity are being developed by the Crescent Company also. Crescent stock is now quoted at \$1, with an upward tendency. The outlook for the season's work of the Crescent is very encouraging.

WILL BE FINISHED.—The Cape Cod ship canal, it is again stated, will be pushed through to completion, Fred A. Lockwood, the contractor, having obtained the necessary funds in New York.

## Expositions and Mines.

The Denver *Tribune-Republican* says: In May next, less than one year from this date, a World's Exposition will be held at London, in which the mineral productions and manufactures of every nation are expected to be represented. The United States has accepted an invitation to be represented, and President Cleveland will, from the executive office in the White House, open the Exposition. He will touch a little knob on a machine of American invention, which will set in motion the machinery at the Exposition, over 3000 miles distant.

Eastern manufacturers will embrace the opportunity to show their products, and will be largely represented. Mexico and some of the mining Territories in the United States will make a display of their mineral productions. So far nothing has been done to cause Colorado to be represented. Can the State afford to go unrepresented? It is true that Colorado has had a surfeit of expositions, but the fact is not generally known that a large part of the advancement that the State has made is due to those expositions. The vast canals of the San Luis valley, the Grand, Uncompahgre and, to some extent, the Platte valley, are due to the capital attracted to Colorado by the first exposition at Denver. Over a million dollars is positively known to have been invested in Colorado mines and more in their development, which was attracted here by that exposition. Some of the finest improvements in Denver have been made by men who were first attracted to Denver by that exposition. It is difficult to measure the good it did for Colorado; it is only known that it did much, and no one man knows all the good it did.

It was a grand advertisement, and in this modern age advertising is indispensable to success. The merchant who has goods to sell, the miner who has mines to dispose of, the town, city or State which wishes to attract capital and population, must advertise. Colorado wishes capital and population. It can get both when its natural resources are known. The prospectors and miners want aid in developing their properties; they can get it when capital is brought to the State. Farmers want a home demand for their products, and merchants want to sell more goods. Both can be satisfied with an increase of population. Will any effort be made to attract the capital and population?

No class of people is so much interested in having the State represented as miners, because no class is so much dependent on the investment of capital to make their business as prosperous as it can be. Will they move in the matter? If a fair representation of ores of gold, silver, lead and iron, of clays, of coal and coke, of feldspar, soda and quartz are made in London, it will be an advertisement which would certainly be worth more than its cost.

## Money Wasted in Mines.

The writer had charge of the investigations as to mineral resources of New England which were made during the tenth census of the United States. His inquiries showed that during the last 20 years more than \$4,000,000 had been wasted in utterly hopeless mining schemes within this district, yet this region does not begin to compare in its blunders with many other parts of the United States. The waste of money in mining schemes in various parts of this country which would have been condemned by the advice of such a survey has probably amounted, during the last 30 years, to about \$200,000,000, or many times the cost of a complete national survey. Already we have sufficient evidences that the information given by the survey can effectively prevent wild mining schemes. When the mines of Leadville were discovered, the conditions in which the ore occurred were new to the miners and the blunders great. Immediately on the establishment of the national survey, a competent geologist was detailed to study the district. His reports have formed the basis of exploration and have served to bring the mining of that region from the original speculative state to that of a legitimate industry.

Thus, not only as a means of discovering new resources, but in its work of correlating and controlling the earth industries of the country, the national survey has a field of very wide usefulness before it. Knowledge, such as it can obtain, is beyond the power of individual enterprise to acquire; it ranks in value with the resources of natural defense against foreign enemies; it is, in fact, a means of protection against ignorance, the common enemy of modern progress.

The limits of this article make it impossible to consider the claims of the other scientific departments of the Government upon the support of the public. They all have the same sound basis in that they are doing work which is beyond the power of the citizens or any association of citizens to do, and they are of great value to our modern economic life. This life depends upon an extended and ever extended knowledge of the earth. The best service a government can do for its people is to increase and diffuse this knowledge on which their success inevitably depends.—Prof. N. S. Shaler.

## The St. Regis Country.

John Miller and Jesse Pryer, says the *Cœur d'Alene Record*, walked from their mines in Deer creek, a tributary of the St. Regis, a distance of 41 miles over two mountain ranges, last Monday, and Johnnie's friends had to "head him off" to prevent him from walking on to Thompson Falls for supper. Mike Rochford, Billy Leonard and eight more of their partners are running a cut to their placer diggings on Deer creek and also prospecting for quartz. Mr. Miller favored the *Record* with a short visit and gave us a good many interesting facts about Deer creek and that part of the St. Regis country which he has seen. The valley, or more properly Deer creek gulch, is about 32 rods wide, covered with a vigorous growth of grass, underbrush and strong willows, but few trees. The creek has a fall of about eight inches to the rod. The first discovery of gold was made last fall, and the ground for a distance of 12 miles is staked in 20-acre claims. Not a single pan has been prospected that did not show gold and in about the same quantity, seldom falling below 10 cents and averaging 16 cents of fine round smooth gold to the yard all through from rim to rim on the bars as well as in the bottom. Coming down to the St. Regis river we find a valley somewhat broader than that of the south fork of the *Cœur d'Alene*, say about three-quarters of a mile wide. Unlike very much of the south fork country where the freshness of nature is blackened by burned and fallen timber, the St. Regis retains its primeval forest of bull pine and red fir, standing aloof from each other in their grandeur, admitting the sunshine and the shower and majestically guarding the luxuriant grass and verdure beneath them. The river is somewhat swifter than the south fork and at the present time is swollen beyond its banks and raging more furiously than ever in the last eight years at least. The flood has carried down all the foot logs and bridges for 22 miles, as these gentlemen can testify, and probably the same is true of its entire length. And still, after all the extreme warm weather of the last few days the snow is several feet deep for a distance of a mile and a half over the lowest pass out of the valley, while below the climate is as fine as one could wish. Deer and chickens are plenty, and provisions and supplies are laid down from Horse Plains at about Murray prices. At present the only dealer in goods is a trapper who has lived there eight years and frequently goes out with furs and brings back such supplies as the few miners order. A party of emigrants from Kansas, en route for Oregon over the Mullen road, are camping there for a few days. Quartz prospectors are scattered over the mountains and more will be there when the snow is gone. Some discoveries have been made, but no development beyond that. The rock formation is gray porphyry with an occasional dike of granite and quartzite. Considerable quantities of float quartz is in sight, and since the field to the south of us has been so encouraging to prospectors it is to be presumed that the St. Regis country will be pretty thoroughly gone over.

THE NIGGER PRAIRIE REGION.—John Gurley, who left Murray about the middle of last July on a prospecting trip on the South Fork, called on the *Record* to-day, and in a general way gave us a very candid and highly-encouraging report of the mines near Nigger Prairie. He says that no very great amount of work has been done on any of them except the Hunter, but that a little has been done on a good many, and that in every instance they show highly-encouraging results, and that capitalists are gradually taking hold and that a good deal of development will surely be done this season. He sums up the work on the Hunter as follows: First, a tunnel 150 feet, then a crosscut through the vein to the walls 50 feet, then a continuation of the tunnel 150 feet, then another crosscut which is now 30 feet through a body of good concentrating ore with strata of galena and gray copper, some of which he has been assured and believes assays as high as 3700 ounces. While these facts no longer excite our readers and we do not publish them as late news, since we hear substantially the same reports every day, nevertheless we enjoy having good reports confirmed by this reliable gentleman and to know that his own efforts are likely to find a good reward.—*Cœur d'Alene Record*.

CONSOLIDATED CALIFORNIA AND VIRGINIA.—The official statement of the bullion yield and expenses of the Consolidated California and Virginia mine for May has been received and filed at the office of the company in San Francisco. The number of tons of ore worked at the mills was 12,040, yielding bullion of the assay value of \$147,161.63, which, deducting the discount on silver—\$19,131.01—would leave a net yield of \$128,030.62. The expenses of the mine and mills alone in May aggregated \$137,482.90, or over \$9000 more than the net yield of the mine. The ore worked in June is of much lower grade than that in May, the average value of the battery samples at the Eureka mill last week being \$8.83 per ton. It cost fully \$11.50 per ton in May to produce bullion, the silver portion of which was subject to a discount of at least 25 per cent. Should the grade of ore continue thus low, assessments are not very far off.



## The Butte Copper Mines.

In the Boston *Commercial Bulletin* I read that the Calumet & Hecla can make a handsome profit by selling its copper at 10 cents, while producing it at a cost of seven, and also that Arizona and Montana producers will be compelled to close if 10 cents remains the price, and the market be left to the Calumet & Hecla and those Lake companies that can stand this price.

I am not in a position to speak for the Arizona producers, but as far as Montana—that is, Butte—is concerned, being conversant with the capacity of Montana producers since the first copper was shipped from here, and having been since then a close observer, I might perhaps be able to destroy this comfortable, though false, impression held apparently by the managers of the Lake concerns and by other parties interested in the copper trade.

The Calumet & Hecla may perhaps compel the Parrot Company, with its small ore reserves, and but one mine 800 feet long by 150 feet wide, to close down by reducing the price of copper to nine, or even eight cents, if the shareholders will allow it. But such concerns as the Anaconda or Montana Copper Company could not be compelled to close, even by reducing the price to less than eight cents.

The Anaconda will soon be in a position, by strict economy and after completion of its new concentrating mill—which in itself is a wonder of the age, the largest in the world, and provided with the latest automatic appliances—to reduce the labor charges, and to compete in the cost of producing copper with any concern in the world. At the same time, the Anaconda will be able to double its production, if forced to do so by the further reductions of the price of copper.

It is almost a certainty that the ore bodies in sight at the Anaconda & St. Lawrence mine warrant the same production for five, or perhaps—if the 1000-foot level continues to show as large an ore body as at present—for ten years to come. Besides, this concern could fall back on the other copper mines, indirectly controlled by it, such as Modoc, Mat, Adelaide, Wake-up-Jim, Green Mountain and many others. Most of them carry silver, and it is only a question of time when they will be prepared to desilverize on a large scale in this country, instead of allowing the English smelters to get the profits on the work.

In my last letter I wrote that the Anaconda plant would be enlarged by a 40-stamp mill, to work the silver ores of the surrounding silver mines, thus reducing general expenses. There is a large field left for such operations, and I believe that this is a move in the right direction, and very creditable to Manager Daly.

You may rely on it that the Anaconda cannot be frozen out by the Lake companies whatever moves they may make, or however they may surprise and demoralize the copper markets.

Neither can they do it with the Montana Copper Company, should that company decide to run. The greater part of its mine has hardly been opened and worked. For instance, in its West Colusa and Liquidator mine the rich surface ores between the 400-foot level and the surface are almost intact, and are estimated at 500,000 tons in sight, averaging from 15 to 17 per cent of copper and carrying some silver. Should the directors follow the advice of their Butte manager, they could produce copper cheaper than any other Butte concern. For some reasons, however, due probably to the circumstance that the controlling interest is in the hands of copper dealers who have also other interests, only a little development work is done at the Colusa mine, and most of the furnaces are lying idle. Four furnaces work some copper matte high grade in silver, to clean up silver custom ores on hand at the plant. Altogether about 200 tons of such matte will be made, and then these furnaces will be closed also.

In fine, I repeat that there can be no freezing out of these two companies and of some other smaller concerns here. Besides, in a year or two fuel will cost only one-half its present price. The Northern Pacific Railroad will have direct communication with Butte by the 1st of August, and be a strong competitor of the Union Pacific Railroad; also, a third railroad is surveyed to Butte and will no doubt be completed before the end of 1887. It is proposed to run the railroad north from Helena to Fort Benton, and to connect it with the Canadian Pacific, while it will extend from Helena south directly to Butte, passing the rich silver-galena mines at Boulder and Basin. The projectors of this road are wealthy capitalists.—*Cor. Engineering and Mining Journal.*

**LEACHING ORE.**—The Southern Utah *Times* has the following list of prices given for crude ore by Nesbit, Bailey & Co., delivered at their leaching works:

Oz.	Per ton.	Oz.	Per ton.
10.....	\$1.00	18.....	\$4.50
11.....	1.25	19.....	5.00
12.....	1.50	20.....	5.50
13.....	1.80	21.....	6.10
14.....	2.10	22.....	6.70
15.....	2.45	23.....	7.30
16.....	2.85	24.....	8.00
17.....	3.40	25.....	8.75

The above prices are subject to fluctuations of the market. The price-list for ores of higher grade is not yet complete.

## New Field for Prospectors.

J. F. McLinn and D. D. Zook called on the *Record* yesterday and gave some interesting facts about a portion of country lying between Vermillion and Swamp creek on the Swamp creek side and north of Clark's Fork some 35 to 40 miles northwesterly from Murray. The nearest route to the foot of the mountain which our narrative will be limited to is by the Trout creek trail, a distance of not less than 35 miles across Bald mountain, and in a line due nearly northwest. By the way of Thompson Falls, which at present is the easiest route, the distance is about 60 miles. The mountain rises in abrupt, almost perpendicular, craggy walls or benches, 75 to 100 feet or more in height, with marshy plateaus considerably broken and over-run by slides. These benches rise without marked variation for a distance of 12 miles to the summit, which is about the same height as Bald mountain, say about 6400 feet above the sea. The water, which comes plentifully from springs in the rocks, is soft and warm, and so highly impregnated with mineral that it is slippery, especially near the foot of the mountain, which is extremely difficult of ascent, owing to the almost perpendicular places. The marshy flats extend to the very top, where there is a big swamp. These flats are covered with grass and several bushes resembling chaparral, and are infested with black gnats and mosquitoes, which keep up a constant torture. Large trees standing well apart are distributed all over. The object of Messrs. McLinn and Zook being to hunt for mineral, they would of course endure almost any hardship to get ahead of less ambitious adventurers. But to their astonishment they found not only mineral in the rocks but pieces of pure metal and ruins of a crude smelting arrangement which had produced it. About this place they found remnants of plates, camp kettles, frypans, gold-pans, remnants of several books so completely matted together and decayed that scarcely any idea of their character could be reached, although the title of one could be distinguished as "Pleasant Days." On the top of the mountain a shaft had been sunk 30 feet. From the rottenness of stumps and general condition of what they saw, this camp must have been abandoned 25 years ago, and could not have been kept up many days. It probably dates about 1862, when the Government trail to the Kootenai mines was built, as previous to that time the Indians had possession of the country. There are very few prospectors and hunters trying their luck in this new field. No trouble in finding plenty of game. Deer are plenty, and to show that bear are not scarce they report that two men recently killed eight in a single day. The country rock is gray and black granite and porphyry. The leads are from one and a half to eight feet wide and carry gold, silver, copper and lead, the gold apparently increasing with the height of the hill and being also more prominent on the eastern slope. One place shows iron croppings 40 feet wide. The course of the veins is southeast and northwest. They brought in a box of fine-looking specimens of ore and also lead from the old smelter. Assays have been made, but the locators choose to withhold results. Other parties have gone from Murray, and we expect to hear more from these prospects.—*Cœur d'Alene Record.*

**THE SILVER DOLLAR.**—Of all the silly things thrust in our faces from day to day, the slush about the silver dollar being only worth 80 cents beats all. Will the fools never learn anything? The paper in a greenback dollar is not worth 80 cents, is it? Why not make this fact a pretext for retiring them all? True enough, the Shylock crew hate the greenback and want to destroy the last one, but who ever heard of any one arguing that because the paper upon which they are printed was not worth a dollar, therefore destroy them? That is "too thin." Everybody could see through that. And yet the argument against the silver dollar is exactly the same. Will the people never learn that money is one thing and the material used in making it another? The Shylock crew know this. We can't give them credit for being such fools as not to know it. But it is their aim and business to keep the masses in ignorance of the true nature of money. As Judge Tiffany says: "Truly speaking, there is no such thing as a gold dollar, a silver dollar, or a paper dollar."—*Elk Mt. Pilot.*

**THE NEW RAILROAD SHOPS.**—The new building is fast assuming gigantic proportions, says the *San Bernardino Index*. The framework for the second story will be in place to-day. The brickwork for the foundation of the kitchen and pantries is completed. The main passenger depot will be 40 by 138 feet, two stories in height, with a brick extension, 36 by 36 feet, all fronting on Third street, opposite the present temporary depot. The first story will be 16 feet in height, the second 14 feet. Covered porticos, 12 feet wide, of a new and elegant design, will extend the whole length of the main building on the south side on the first and second story. In the main building (ground floor) will be located the passengers' waiting-room, ticket and other offices, baggage-room, dining-room, etc., and the brick building adjoining will be devoted to the kitchen, bakery, also bed-room, etc., for use of employees of the dining-room. The second story of the main building will be occupied by the division head-

quarters and offices of the company. The total height of the building will be 40 feet; the material wood and brick. The freight depot will be situated 350 feet west of the passenger depot and division headquarters. Its dimensions will be 179 by 40 feet, exclusive of platforms. A large icehouse and a brick building for laundry and closets, 23x30, will be built between the two depots. The roundhouse will be 330 feet in diameter, with 24 stalls. There will be a car shed 40 by 300 feet; also a coal-bin 1050 feet long, of sufficient capacity to accommodate a whole cargo. The machine shops will be 100 by 150 feet; car shops same size; large transfer table; blacksmith shop 80 by 100 feet; boiler shop 50 by 80 feet; foundry 50 by 100 feet; pattern shop 50 by 50 feet; storehouse 40 by 80 feet, a three-story brick. There will also be built offices for the master mechanic and other officers in charge of the division shops.

## The Mother Ledge.

The gold deposits of the San Gabriel canyon have long been known. In 1857 a rush of miners took place there, and for seven years upward of 700 men kept themselves hard at work. They labored under great difficulties. The scarcity of water compelled them to pack pay-dirt on their backs for miles to the shallow stream of water. Still they labored, and upward of \$2,000,000 in dust was taken out. A mining excitement in Arizona, in 1864, caused a general stampede to that section, and since then but little work has been done there. The question has been asked many times, "Where does the placer gold come from?" Every miner says, "from the mother ledge," and many a miner has looked for the mother ledge of the San Gabriel canyon. It was way up somewhere around the slopes of Old Baldy.

The "mother ledges" are curious formations. The one at Cœur d'Alene was discovered, and proved to be very rich. It was about 300 feet long, and stuck right out of the side of the mountain. The corrosion of the elements for ages had worn off its face, and cloudbursts and floods had carried the pieces of float down the canyons till its wealth was scattered along for miles.

The writer has seen similar indications of a mother ledge in the famous Horseshoe Bend in the Quijotoa mountains. As early as 1774 Padre Lopez worked these mines. The placer dirt was washed at the water tanks, while the silver ore was shipped to Muleje, Lower California, for reduction. Somewhere up in the Horseshoe Bend is the "mother ledge" from which this placer gold has come, and some lucky prospector will find it.

Two prospectors of Los Angeles, Peter Walters and John Peterson, left to-day, determined to find the mother ledge of the San Gabriel canyon if it is possible. They took with them two months' provisions on six burros. They are the gentlemen who discovered the gold mines in the Cargo Muchacho mountains, west of Yuma, two years ago, and sold them for a handsome cash price. Mr. Peterson met with an accident last summer by which he lost his left eye, but his right eye is as good as ever, and knows gold rock whenever it is in sight. They will explore the Sierra Madre range clear over to the Mojave desert.—*Los Angeles Express.*

**A MYSTERIOUS MINERAL.**—It will be remembered that some weeks ago the *Inter-Mountain* published a short article concerning a strange mineral found in the Bell mine, near Sheridan. Max Meyers writes us that since that time the mineral has been examined by Prof. Baird, of the Smithsonian Institute, who says that it is the somewhat rare species tetradymite, the telluride of bismuth, containing from 35 to 50 per cent tellurium, the remainder being bismuth and occasionally a small amount of sulphur of itself. The professor also states that the samples sent him are similar to the tetradymite found in the Highland district of Montana at the Uncle Sam lode. Samples to the extent of 75 or 100 pounds will be sent to the institute during the summer, as developments may justify, to further determine the presence of any other tellurides. He says it may be possible that some of the very rich tellurides, such as occurred in Colorado, may be discovered. In assaying this tellurium to ascertain the amount of gold it contained, he says an enormous excess of lead is required in order to get accurate results. As before stated, the mine producing this ore is the Bell mine, and is located on the range of mountains between the north fork of Mill creek and Willow creek, and is owned and worked by Bush & Meyers. Late developments are very encouraging. All practical miners and mining men are admitted to all parts of the works; all others are excluded.—*Butte Inter-Mountain.*

**SAN DIEGO GOLD.**—The *San Diego Sun* says: "Milton Santee's discovery of rich quartz near Julian, and recent strikes at Jacumba and in the vicinity of Jamul, have created quite an excitement in mining circles. Signor & McNamara report that at Jamul, the Indian squaws are taking out from \$2 to \$3 per day by simply washing the soil in prospecting pans. A party from this city went out to Jamul yesterday, and will endeavor to locate the ledge from which the gold deposits come."

## Ketchum's Smelter.

The Philadelphia Mining and Smelting Company, in the Wood river region, Idaho, has started up its smelter. The *Wood River Times* says:

The works are situate on Warm Springs creek, near its confluence with Wood river and close to the depot, from which a side track runs to rooms where ore and supplies are deposited. The works were begun in 1881, from which time to this hour every improvement known to the scientific world has been added, and will be added whenever occasion offers.

The ample grounds upon which the "smelter" is located belong to the company. The buildings and improvements, in brief, consist of five roasting furnaces, with a capacity of 40 tons per day of working hours; four smelting furnaces with a capacity of some 60 tons each per day; 20 charcoal kilns with a capacity of 40,000 bushels at one charge; scales commensurate in capacity with the needs of such an establishment; stables, out-buildings, lodging-houses for 80 men employed about the works and suitable, well-arranged offices for the several officers of the company.

In the yards are great quantities of flux and charcoal; the latter easily burned from timber, floated upon Wood river from any distance and from its tributary stream—Warm Springs creek—a distance of 14 miles. There is not and never can be a lack in the fuel department.

June 16th the "roaster" was fired up. The company own numerous mines upon which they employed last year 200 and odd men. These mines, with an equal force, they will work from this day on. The Silver Star, owned by Messrs. Rhodes and Borie, of Philadelphia, is probably the most promising property of all those owned by these gentlemen, separate and apart from the company's properties. Its ore, with those of numerous other mines belonging directly to the company, or to gentlemen, part owners of company stock, as well as outside ores, will be operated at the smelting works.

"We are here to stay, sir; we mean business. We will duplicate any price for any class of ore that the country produces. We pay cash, and propose not only to keep these works busy all the time, but to increase their capacity whenever the ore production of the mines warrant it." This is the language of the officers present when the *Times* man visited them yesterday. They proved that they meant what they said.

The ore from the Silver Star has been contracted for at \$10 per ton, freight, delivered at the works. The road to that mine and its surroundings is not yet completed, but will be soon. The road to Germania Basin is practically open. Smoky District ores are pouring into the rooms of the Philadelphia Company. Those from the Sawtooth and surrounding districts will, if the owners see fit to sell, find a market there. The company propose to buy ore as long as they see 100 cents for \$1 expended. Their furnace starts next Monday. There are 500 tons of ore now in the plant, and great quantities on the dumps of the company's mines.

**SWAGGER MINING DISTRICT.**—A meeting of miners and mine-owners has been held at Hutton's Station, says the *Bodie Miner*, for the purpose of reorganizing the Swagger mining district. Norman Hutton was elected chairman, James Andrews secretary. On motion, it was ordered that the Swagger mining district be reorganized with the following boundaries: Commencing at the mouth of Murphey creek, at the crossing of the East Walker river toll road, and following said road south to Main street, in the town of Bridgeport; thence westerly in an air line to the mouth of the Buckeye creek canyon; thence up Buckeye creek to a point south of the headwaters of the Middle Walker river; thence north to said river, and down said stream to the point of intersection with the West Walker river; thence down the West Walker river to a point where the east and west line of Townships 6 and 7, north, crosses said river; thence following said line east to the summit of the mountains between the Walker rivers; thence south along said summit to the headwaters of Murphey creek; thence down Murphey creek to the place of beginning.

**SCULPTURE IN CALIFORNIA MARBLE.**—Morton Edwards, the sculptor, has cut a bust of Alex. D. Sharon from Inyo county marble, which is the first attempt ever made to use California marble in sculpture. In the case of Mr. Sharon's bust the trial has proved the excellence of the material for the purpose, and it is quite probable that in future considerable quantities of California marble will be utilized for artistic uses. Mr. Edwards has been awarded the contract for a large statue of the Savior on the Cross, seven feet six inches in height, for the new cathedral on Van Ness avenue.

**THE Genesee river** is surprising manufacturers along its banks, by its increasing volume of water from year to year. Some years ago, in common with other streams of the State, the water diminished, and the mills and factories that had depended on it for power were obliged to use steam. The *Rochester Democrat* says that millers who have not used their wheels for years are getting back to them, much to their financial advantage. No explanation is given for the condition of the river.





A. T. DEWEY.

W. B. EWER.

## DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 13 Front St.

W. B. EWER.....SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrearsages must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square).....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

## SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

## SAN FRANCISCO:

Saturday Morning, July 10, 1886.

## TABLE OF CONTENTS.

**EDITORIALS.**—Cost of Gold Mining in Brazil; A Refinery for Bullion; Foundry Notes, 17. Passing Events; Mining Engineers; Drift Mining; The Comstock, 20. Common Sense Geology—No. 1; Assaying With the Horn Spoon, 21.**ILLUSTRATIONS.**—Arrangement of Base Bullion Refinery on the Comstock, 17. Fig. 1—Apexed Line of Stratification; Fig. 2—Bent Stratum; Fig. 3—Strata Inclining Unconformable Stratum, 21.**CORRESPONDENCE.**—The Pine Creek Mines, Oregon; Siphon Action of Discharge Pipes, 18.**MECHANICAL PROGRESS.**—Increased Use of Iron and Steel; Pulsating Boilers; Wearing of Wagon Tires; Simple Test for the Cutting of Files; Experiments with Girders; The Corrosion of Boilers; Brazing Iron Pipe; Weight of Gearing; A New Machine, 22.**SCIENTIFIC PROGRESS.**—The Flow of Metals; Fine Drawn Wire; The Effect of Lightning Stroke; Liabilities of Hot Air and Hot Steam; Interior Temperature of the Earth; The Solidification of Oxygen; Heat of the Gulf Stream; Subterranean Heat; Insoluble Glue, 22.**ENGINEERING NOTES.**—Substitutes for Steam; The Staten Island Bridge; Swift Steamer, 23.**USEFUL INFORMATION.**—Building Stone Should be Seasoned; A Useful Light; How to Prevent Green Slime in Tanks; Catching Fish by Machinery; New Zealand Fungus; Coloring Matter from the Cotton Plant; Porpoise Fishing; Fruit Trees and Vines; Bee-wax; Alum for Settling Water, 23.**GOOD HEALTH.**—Interesting to Beer-drinkers; Bathing; Need of Country Sleep; Salt on Corns, 23.**MISCELLANEOUS.**—Park City Mines, Utah; Expositions and Mines; Money Wasted in Mines; The St. Regis Country, 18. The Butte Copper Mines; New Field for Prospectors; The Mother Lode; Ketchum's Smelter, 19.**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 24-25.**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 23.

## Business Announcements.

Machinery—H. P. Gregory &amp; Co.

Annual Meeting—Spring Valley Water Works.

Dividend Notice—Hibernia Saving &amp; Loan Society.

See Advertising Columns

## Passing Events.

Silver has gone down lower than ever, as our market reports show. But wheat has gone up in England, and transactions in the Indian markets are likely to raise the price of silver again before long.

The gradual adoption of the system of drift mining in the auriferous gravel fields of California is in a measure solving the much-vexing debris question. We present in another column some figures showing the cost of work by this system, which will interest owners of claims worked in this manner.

Private letters to a party in Candelaria from Aurora state that the English company which lately took hold of the mines in the latter camp are somewhat discouraged at the outlook, alleging there is nothing in the mines. This, if true, will be a great disappointment to the owners of other mines in that region.

The strike among the iron-workers in this city still continues, with no new features to report. No compromise or arbitration has taken place, and at present both sides seem determined to win.

There is little to report of the general mining situation outside of what we give in our usual mining summary. The news from the Comstock is rather encouraging, however, good ore having been found at the great depth of 320 feet.

## Mining Engineers.

A good deal of unfair criticism is indulged in against the profession of mining engineering because of blunders and mistakes made by men who are supposed to belong to it. But it should be remembered that not all who call themselves mining engineers have a right to the title; and before the profession is misjudged the standing of the individual should be investigated. We have in mind numbers of cases where the title has been appropriated by men without the slightest technical knowledge, or any practical training, but whose "cheek" has carried them through with doubtful enterprises. Men who have held bonds on mines and wanted to sell them have written reports to which they have signed their names, with the added initials of M. E. Others have bloomed out as full-fledged mining engineers on the flimsy basis of having compiled statistics concerning mining products; people who are simply assayers have, after examining a vein or two, taken the title as their own; and hundreds have traded on the gullibility of human nature by the magic words of "mining engineer" added to their names.

None can deplore this state of affairs more than the bona fide mining engineer. He sees an honorable profession scandalized; he sees the title used to promote schemes that no decent man would countenance; he knows his profession is injured, and its good name dragged in the dirt. But there is no remedy at hand in this case. In the medical profession if people assume a title wrongfully, the law steps in and stops it. But there is nothing to prevent any man calling himself a mining engineer who sees fit to do so. Mine superintendents, foremen, assayers, amalgamators, clerks, middle-men and others assume the title, and use it for their own advantage without the slightest right. We have seen reports made and signed by men as mining engineers who had no knowledge of mining whatever outside of that gained in promoting the sale of properties. And not once, but often. As a consequence, buyers who rely on reports from such people are apt to have their confidence abused.

There are, of course, in the ranks of this, as in other professions, men who do not deserve to belong to it; who will use their opportunities to "put money in their purse," irrespective of who is injured by it; men who will call themselves "experts," without expert knowledge. But these are the exceptions. The profession is an honorable one, and those belonging to it are mainly men of education, integrity and position. People who are buying mines can readily find mining engineers who will faithfully and correctly perform the duties assigned them, and in whose judgment they can confide. Some are specialists in the different branches of the profession, having made one department a study, and those who have gained reputation for these things are not apt, for temporary gain, to report outside the facts. But because a few renegades in the profession and a lot of others who do not properly belong to it have made mistakes or done dishonest acts, all the mining engineers of the country should not be condemned wholesale.

## Mining Accidents.

Peter Nichols last week received painful injuries while mining in East Calico, San Bernardino county. A portion of an embankment fell upon him, inflicting a number of cuts on the head and various parts of the body. He will probably be laid up for several weeks.

John Wright, a stockholder in Gover Mining Company, Amador county, met with a sad accident on Friday of last week. He came up from the city on a visit to the mine, and went down the shaft to inspect the underground works. On ascending the shaft in the skip, he threw his head up in some way that he received a blow which knocked him into the skip. In falling, he threw his right leg out, which was caught in the shaft timbers and fractured in two places—at the ankle and just below the knee. He also sustained internal injuries, though it is believed not of a serious nature.

David Bohm, a miner working in the Jefferson Consolidated mine, about three or four miles north of Six-mile canyon, in Flowery district, was found dead Sunday morning in the mine, evidently from an overpowering inhalation of powder smoke used in blasting.

## Drift Mining.

The importance of drift mining is largely increasing in this State, owing to the much vexed debris question, and the necessity of many hydraulic mining claims, resorting to the system to avoid injunction. It takes the place of hydraulic mining in places also where water is scarce or there is no dump room, and where the deposits are low, and it would be impracticable to move the whole by piping. The system is carried on more like vein mining than hydraulicking, although it is only used in gravel. The deposit is opened by tunnel, shaft or incline, developed by crosscutting, and the pay streak taken out. The pay streak generally consists of about three feet of gravel lying immediately on the bedrock, with the upper portion of the bedrock itself to a depth of from a few inches to sometimes three feet. The gravel is shoveled into hand-cars and wheeled to the mouth of the tunnel, or loaded in buckets or "buggies" and carried to the bottom of the shaft and hoisted out. The gravel is washed in sluices, though sometimes the cement is crushed in stamp mills. In the underground workings careful timbering is required, and in breasting out the gravel, pillars are left protecting the main galleries, or square sets of timbers are introduced, which are filled with waste. In most places blasting is practiced, but in many mines the gravel is soft-picking ground, and pumping is often required.

Some of the California mines have yielded largely, though it is difficult to get accurate results. Some returns, however, have been collected by the census officials, as may be seen from the following specimen cases.

PRODUCT OF SPECIMEN DRIFT MINES.			
Mine.	Locality.....	Length of Claim, Feet.	Yield per Linear Foot.....
Hidden Treasure.....	Placer Co.	10,560	\$294.00
Bad Mountain.....	Sierra Co.	7,500	464.00
Hawkeye.....	"	800	437.50
Eclipse.....	"	1,560	432.05
Monumental.....	"	1,040	312.00
Pittsburg.....	"	860	506.00
Union.....	"	2,400	625.00

The conditions which determine the expense of mining on this plan vary widely. Favorably situated deposits, requiring neither hoisting nor pumping appliances, can be worked at extremely low cost; but if the ground is loose, water troublesome, and pay irregularly disposed, the expenses are increased. Thus, while gravel yielding a trifle over \$1 per yard is profitable under certain conditions, in other localities an average of \$3, \$4, \$5 or \$6 per yard will barely cover expenses. At one mine in El Dorado county where the cement is crushed by stamps, gravel yielding \$3 per ton pays; at another, in Placer county, where crushing is also practiced, gravel of the same grade yields a handsome profit above cost of milling and mining. An average of \$2 a ton pays all expenses at another Placer county mine.

An analysis of the cost of mining in a series of mines in McAdams and Indian creek districts, Siskiyou county, compiled from census reports, is appended. These mines are shallow workings, from 28 to 74 feet in depth, the shafts penetrating a light wash and tailings. The "pay" is quite regular, lying in and on the bedrock, and is stoped out on the long-wall system, hoisted to the surface in buckets by horse-whims, and washed in sluices near the shaft mouths.

COST OF DRIFT MINING IN McADAMS AND INDIAN CREEK DISTRICTS, SISKIYOU CO., CAL.

	Cameron Mine	Carroll Mine	Hardy Mine	Lincoln, Hart & Henry and Oak Grove Mines	Williams Mine
Cost per Cubic Yard Mined.					
Cost Cubic Yd.	\$1.207	\$1.629	\$1.50	\$1.634	\$0.89
Labor.....	0.952	1.148	1.00	1.148	0.552
Timber.....	0.15	0.316	0.31	0.316	0.164
Powder.....				0.005	
Lights.....	0.02	0.064	0.05	0.064	0.012
Falls.....					0.036
Horse Feed.....	0.02	0.027	0.02	0.027	0.016
Wear and Tear	0.065	0.074	0.12	0.074	0.11

STATE MINERALOGIST WM. IRELAN, JR., has been inspecting the gold mines in Tuolumne county. He was thrown from a stage near Sonora and was quite severely injured, so that he has been compelled to return to the city for awhile. As soon as he is fully recovered he will resume his investigation of the gold mines of this State.

## The Comstock.

Although none of the Comstock mines have paid dividends for a long time, work is vigorously prosecuted all along the lode. Last week pretty good ore was found as deep as the 3200-foot level station on Chollar ground, and the miners are hopeful that it will develop into a good rich body. The vein matter is very promising. It is somewhat the fashion in other camps to belittle the Comstock, now that it has stopped paying any big dividends, and its magnificent record seems almost forgotten. At the same time many of the mines are turning out an amount of bullion that in other camps would be considered large. True, in most cases, it does not pay the heavy expenses of deep mining, but in other camps we hear more of the yield than of the cost; while here we are told more of the cost than of the yield. If, however, another bonanza should be struck, the regular "I told you so" would be heard from many quarters. And one more bonanza, at great depths, would bring back confidence in the whole lode. Shares would go up booming, and the value of all the other mines be largely increased.

The men who are managing and working these mines have plenty of pluck and energy, and have the courage to work against difficulties which elsewhere would have resulted in abandonment of the properties entirely. The expenses of mining at great depths are very large and difficulties are encountered which in shallower mines are never met with. Immense sums are paid out for material, hoisting, pumping, supplies, milling, etc., in mines which have not paid expenses for years. It takes a good deal of pluck to work ahead under such circumstances, and a good deal of money, too. The labor bills alone are very large. For instance, the pay-rolls of the Comstock mines for last month foot up as follows:

Con. California and Virginia.....	\$28,573 00
Gould and Curry.....	3,351 00
Hale and Norcross and Savage.....	10,159 00
Mexican.....	829 00
Ophir.....	4,308 00
Sierra Nevada.....	3,639 00
Belcher.....	10,048 00
Chollar and Combination Shaft.....	19,220 00
Crown Point.....	12,816 00
Union Consolidated.....	945 00
Utah and Union shaft.....	290 00
Alta.....	1,500 00
Justice.....	300 00
Kentuck.....	9,000 00
Six-mile Canyon pay-rolls.....	15,000 00
Osbiston shaft.....	8,183 00
Yellow Jacket.....	16,570 00
Carson river mills.....	56,000 00

Total.....\$200,369 00

When such sums as these are monthly paid out for labor alone in one camp, it is evident that the camp is by no means "dead," as it is the fashion to say the Comstock is. The old lode may at any time take up its course of bullion production again and prove for deep mining all that its friends claim.

## Common Sense Geology—No. 1.

[Written for Press by JUSTIN CHENOWETH.]

Prefatory to what I propose offering to the consideration of a reading and thinking public, I will state that 27 years ago I possessed only such knowledge of geology as ordinary general readers usually acquire. About that time an accidental circumstance directed my attention especially to the subject. Since then, with good opportunities for observation, I have devoted myself to the study of the principles pertaining to that pretended science in so far as an active outdoor, breadwinning life would permit. I have long since become fully convinced that the entire system, as now formulated, rests on a fallacious basis. I am aware that by many persons it will be regarded as the height of presumption for an obscure person like myself to controvert the dicta of the scientific world in this matter; but truth, whencesoever its origin, is irresistible, and once uttered will eventually prevail.

The allegation that a certain theory is generally accepted by savants is a very weak argument in support of its truth. Though occasionally disputed, the Ptolemaic system continued to be orthodox in astronomical science during a period of 1600 years. In relation to Galileo's discoveries, in Johnson's Cyclopædia the following passage occurs, viz.: "But the first to excite persecution were the men of science themselves, who were unwilling to be suddenly convicted of ignorance, to confess their mistakes, and to be sent back to school. It was these very men who forced Galileo to fly



from Pisa and seek the protection of Salviati, when he ventured to contradict by experiments made from the top of the Leaning Tower, the theories of Aristotle which declared "that the velocity of the motion of falling bodies is in proportion to their weight." Subsequently finding the savants impervious to argument, he assailed them with ridicule so vigorously that they were fain to shelter behind the power of the Inquisition. The treatment which Galileo received from the rulers of the Romish Church will ever remain a stigma on their character; but the more reprehensible persons are the scientists who instigated the diabolical persecution which he suffered.

Another illustration of the fallacious prejudice of the mass of scientific men, when once settled in a groove, is afforded in the fact that for half a century after Newton had mathematically demonstrated the correctness of his theory of gravitation the mathematicians of England, along with those of the continent, persisted in their efforts to refute it.

The entire system of geology rests on the assumption of a general principle, that all strata of aqueous origin was originally deposited in a horizontal position; that where they now appear in a position different from that it is the result of a disruption of the earth's crust while the main

body was in a molten state. I feel well assured of being able to present at this time facts and arguments tending to disprove the correctness of this assumed principle which geologists can neither gainsay nor refute.

Fig. No. 1 of the accompanying engravings is drawn from a photographic view of one side of a cut for a roadway in the town of Nanaimo, in British Columbia. That portion of the cut where the view was taken is of a stony appearance, but not so hard as to require blasting for

the purpose of removal. Farther down—that is, to the right of the view—the cut was through hard conglomerate in thin layers, inclined at angles between about 30 and 40 degrees. That part of the view marked A shows a distinct line of stratification forming a sharp apex.



FIG. 1.—APEXED LINE OF STRATIFICATION.



FIG. 2.—BENT STRATUM.

It is proper to explain here that the engraver has not very correctly copied the photograph from which Fig. 1 was prepared, in that the stratum, A, is represented as being fractured and disconnected at some points, while in fact

it is continuous and unbroken. On the opposite side of the cut the ground has precisely the same appearance. There is not any break nor the least indication of compression in the crooked strata, both of which would certainly have occurred had it been bent

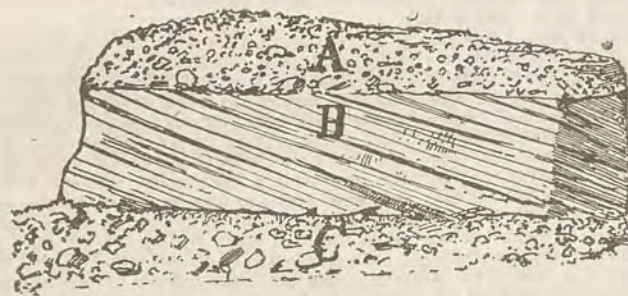


FIG. 3.—STRATA INCLOSING UNCONFORMABLE STRATUM.

at such sharp angles. It was undoubtedly deposited by the action of water in the shape in which it now appears.

Fig. 2 gives a view of a portion of the wave-worn beach of Nanaimo harbor. A

and C represent strata of conglomerate nearly horizontal in a line with the shore, and parallel with each other inclined slightly toward the water, while B represents an intermediate formation of this material laminated or stratified at considerable inclination. The stratum inclosed between the parallel strata of conglomerate must inevitably have been originally deposited in the inclined position in which it now appears in the figure.

Fig. 3 gives a view of the same beach a short distance from where that of Fig. 2 was taken. It represents a thin stratum of conglomerate nearly horizontal in a line with the shore, slightly inclined toward the water and resting on material somewhat softer and finer grained. At the point B the same stratum turns abruptly down at an angle of about 60°, while another formation precisely similar in aspect to that on the left of B, abuts against the downwardly inclined stratum and continues on to the right, as shown by C. It is necessary to make an explanation of Fig. 2 the same as that given of Fig. 1, with regard to the error of the engraver. The stratum A is represented as being broken and disconnected at the point B, while it is in reality continuous without the slightest indication of fracture at the point where the direction is changed so abruptly. About 200 feet up the

sloping hill, and about 100 feet to the right of the point B, a mining shaft was sunk to a seam of coal. Followed to the left, the seam thinned out, disappearing entirely, rising as it did so, in correspondence with the downward inclined stratum shown on the beach. A tunnel about 20 feet

long cut through solid rock intersected coal to the left of B, on nearly the same level as it was found in the shaft. It will thus be seen that here was a fault unmistakably of deposition instead of disruption, by which latter means geologists aver they are always produced.

It is clear to the observer that the material which formed the seam of coal which was long since mined out, and also that of the rock which inclosed it, was being carried from the southward (which is to the left in the view), the deposition temporarily terminating in a bold talus at the point B, and afterward continued in the same manner and from the same cause which produced the preceding deposit. Illustrations of the subject which I am now presenting may be observed on a larger scale in a rock bluff on the outer side of an island which forms Departure bay near Nanaimo. At one point, where the face is nearly perpendicular, about 100 feet high, composed of hard sandstone without flaw or fracture of any kind visible, the line of stratification at the top is nearly horizontal, while on a clearly defined vertical axis, before reaching the water, it has on one side attained an angle of fully 45°; but on the other retaining nearly the same horizontality as at the surface. I did not procure views there for the reason that they would have to be taken from a boat, and the occasions are rare when the water may be found sufficiently quiet to succeed in that way.

### Assaying with the Horn Spoon. No. 2.

[Written for the PRESS by ELBERT C. VAN BLARCOM.]

The principle involved in this method of assaying, is separation of the component minerals and metals by means of the difference in their specific gravities; hence, it follows that this method of assay is applicable to any ore in which the valuable mineral element is of greater specific gravity than the gangue.

The specific gravity of some of the more prominent gangue rocks is as follows:

Silica.....2.5-2.8  
Lime, carbonates.....2.5-3.1  
Oxide of iron.....3.4-3.95  
Oxide of manganese.....4.08-4.36  
Slate, clay shale, etc. (alumina rocks).....2.5-3

A comparison of the accompanying table will show at a glance the ores to which assaying by the horn spoon is applicable. The mineralogical table has been compiled to show the specific gravity, color, etc., of some of the more important minerals and metals, and will be found valuable for reference. (See preceding column).

Table showing Specific Gravity, Color, etc., of More Important Minerals and Metals.

Metal.	NAME OF MINERAL.	COLOR.	COLOR IN POWDER.	HARDNESS.	SPECIFIC GRAVITY.	PER CT. OF METAL.	REMARKS.
Alumina.	Corundum.....	From blue to black.....	.....	9.	3.9-4.16	53.2	Used for pointing diamond drills.
	Spinel.....	From red to black.....	.....	8.	3.5-4.1	72.	
	Cryolite.....	Snow white.....	.....	2.5	2.95		Iceland spar.
	Alunite.....	White, grayish or reddish.....	.....	4.	2.58-2.75	37.1	Alum stone.
	Turquoise.....	Bluish green.....	.....	6.	2.6	46.9	
	Antimony.....	Tin white.....	.....	3-3.5	6.6-6.75		Native antimony.
	Valentinite.....	Grayish white.....	.....	2.5-3.	5.67	88.56	White antimony.
	Stibnite.....	Lead gray.....	.....	2.	4.5-4.62	71.8	
	Arsenite.....	Tin white.....	.....	3.5	5.65-5.95		Native arsenic.
	Orpiment.....	Bright yellow.....	.....	1.5	3.4	61.	
Bis. Arsen. Anti. muth. to. mony.	Bismuth.....	Bright red.....	.....	1.5	3.35-3.65	70.1	
	Bismuthinite.....	Silver white with tinge of red.....	.....	2.5	9.7-9.8		Native bismuth.
	Tetradymite.....	Lead gray.....	.....	1.5	7.2-7.9	51.9	Sulphide of bismuth.
	Copper.....	Pale steel gray.....	.....	2.5-3.	8.84		Native copper.
	Chalcocite.....	Blackish lead gray.....	.....	2.5-3.	5.5-5.8	79.8	Copper glance.
	Chalcocypite.....	Brass yellow.....	.....	3.5-4.	4.1-4.3	34.6	Fool's gold.
	Bornite.....	Copper red to pinchbeck brown.....	Pale grayish black.....	3.	5.	55.8	Variegated copper pyrites.
	Tetrahedrite.....	Steel gray to iron black.....	.....	3-4.5	4.5-5.12	Variable	Gray copper.
	Atacamite.....	Green to blackish green.....	.....	3-3.5	3.75-3.9	11.25	
	Cuprite.....	Various shades of red.....	.....	3.5-4.	5.85-6.15	88.8	Red oxide of copper.
Copper.	Olivine.....	Olive green.....	.....	3.	4.1-4.4	49.9	Arseniate of copper.
	Malachite.....	Light green.....	.....	3.5-4.	3.7-4.	63.9	Green carbonate of copper.
	Azurite.....	Deep blue.....	.....	3.5-4.5	3.5-3.85	61.5	Blue carbonate of copper.
	Chrysocolla.....	Bright green, bluish green.....	.....	2-4.	2-2.4	40.3	Silicate of copper.
	Asbolite.....	Bluish black to black.....	.....	1.5-2.	2.95	18.9	Earthy cobalt.
	Erythrite.....	Peach red, occasionally greenish.....	Lavender blue (dry).....	.....	.....	29.6	Cobalt bloom—Peach blossom ore.
	Arsenopyrite.....	Sometimes yields from five to six per cent. of cobalt.....	.....	5.5	4.3-4.6		
	Chromite.....	Iron black and brownish black.....	Dark brown.....	.....	.....	.....	
	Chrome Ochre.....	Yellowish green.....	.....	2.5-3.	19-20.		Generally contains about 2% of impurities.
	Gold.....	.....	.....	4.5	7.3-7.8		
Co. min. bath.	Iron.....	Brass yellow.....	Brownish black.....	6-6.5	4.8-5.1	46.7	Iron pyrites.
	Pyrite.....	Bronze yellow.....	Dark grayish black.....	3.5-4.5	4.4-4.65	60.5	Magnetic pyrites.
	Pyrrhotite.....	Silver white.....	Dark grayish black.....	5.5-6.	6.3	34.4	Mispickel—often carries gold.
	Arsenopyrite.....	Dark steel gray to iron black.....	Cherry red or reddish brown.....	4.5-5.3	5.5-6.5	70.	Specular iron ore.
	Hematite.....	Iron black.....	.....	5-6.	4.5-5.	60-70.	Titanic iron ore.
	Monacanthite.....	Iron black.....	.....	5.5-6.5	5-5.1	72.4	Magnetic iron ore.
	Magnetite.....	Iron black.....	.....	5.5-6.5	4.85-5.1	Variable	Generally associated with ores of zinc.
	Franklinite.....	Black to ochre yellow.....	.....	5-5.5	3.6-4.	59.8	Brown hematite.
	Limonite.....	Black to ochre yellow.....	.....	1.5-2.	2.66	31.69	Peacock iron ore.
	Vivianite.....	Deep blue to green.....	.....	3-4.5	3.7-3.9	54.2	Spathic ore—Iron carbonate.
Iron.	Siderite.....	Light gray to brown.....	.....	.....	18.56		Native mercury.
	Mercury.....	.....	.....	.....	.....	64-73.	Contains from 27% to 36% silver.
	Native Amalgam.....	Bright red to brownish red.....	Scarlet red.....	2-2.5	8.5-9.	86.2	
	Cinnabar.....	Light yellowish or grayish.....	.....	1-2.	6.48	84.9	Horn quicksilver.
	Calomel.....	Reddish brown to brownish black.....	.....	4.	3.46	46.1	Sulphide.
	Hauerite.....	Iron black.....	Black.....	2-2.5	4.8	48.6	Oxide.
	Pyrolusite.....	Greenish black to black.....	.....	5-6.	4-4.4	63.2	
	Pailomelane.....	Brownish black to black.....	.....	1-6.	3-4.	30-70.	Bog manganese. Bog iron ore.
	Triplite.....	Blackish brown.....	Yellowish gray.....	5-5.5	3.4-3.8	Ab't 30	
	Rhodocrosite.....	Rose red.....	.....	3.5-4.5	3.4-3.7	47.27	Found as gangue in Butte, Mont.
Mangan. el.	Millerite.....	Brass yellow to bronze.....	Lighter than mass.....	3-3.5	4.6-5.65	60.4	Capillary pyrites.
	Nicolite.....	Pale copper red.....	Pale brownish red.....	5-5.5	7.3-7.7	44.	Copper nickel.
	Platinum.....	Dark steel gray.....	.....	4-4.5	16-19.		Generally found in small grains.
	Platiridium.....	.....	.....	.....	.....	19.64	Contains 78.6% iridium.
	Silver.....	Blackish lead gray.....	.....	2.5-3.	10.1-11.1		Native—generally contains copper and other metals.
	Argentite.....	Black to cochineal red.....	Cochineal red.....	2-2.5	7.19-7.4	87.1	Silver glance. Sulphide of silver.
	Pyrrargyrite.....	Light purple to light red.....	Light red.....	2-2.4	5.4-5.66	69.8	Dark ruby silver.
	Proustite.....	Iron black.....	.....	2-2.5	6.27	65.5	Light ruby silver.
	Stephanite.....	Gray, green, blue.....	Lighter than mass.....	.....	.....	65.5	Brittle silver ore. Black silver.
	Cerargyrite.....	Asparagus to olive green.....	.....	.....	.....	75.3	Horn silver. Silver chloride.
Silver.	Embolite.....	Bright brass yellow.....	.....	.....	.....	33.25	"Plata verde."
	Iodite.....	Steel gray to iron black.....	Blackish.....	.....	4.3-4.6	46.	
	Stannite.....	Brown or black.....	Pale gray to brownish.....	6-7.	6.4-7.1	37.	Tin pyrites. Tin sulphide.
	Cassiterite.....	Tin white.....	.....	2-2.5	6.1-6.3	78.67	Stream tin.
	Tellurium.....	.....	.....	.....	.....		Native tellurium.
	Tellurite.....	.....	.....	.....	.....		Minute white or yellowish crystals.
	Telluride.....	.....	.....	.....	.....		
	Tellurite.....	.....	.....	.....	.....		
	Tellurite.....	.....	.....	.....	.....		
	Tellurite.....	.....	.....	.....	.....		

\*The comparative hardness of minerals can be judged from that of the following: Talc, 1; rock salt, 3; orthoclase, 6; quartz, 7; topaz, 8; diamond, 10.  
\*Where no color is given it will be the same as the mineral in the mass.



## MECHANICAL PROGRESS.

## Increased Use of Iron and Steel.

## The Great Industry of the Future.

The rapid increase in the multiplication of the purposes for which iron and steel are used and the extraordinary increase in the consumption of those metals is one of the marvels of the age, and naturally suggests the query whether this constantly increasing rate of consumption will continue. That such will be the case is self-evident, and such increase will be due to two principal causes, which are, and must for many years continue, in operation.

On the one hand, there is the tendency for the use of iron to spread among communities not using it at present to the same extent as it is being used by the more highly civilized nations of the world; and, on the other hand, there is the ever-widening circle of purposes to which iron in one form or another is being applied. So far as the former cause is concerned, we may refer to the rapid growth which has taken place in the consumption in India and many other localities of late years; and as regards the latter, there are two cases in point. Firstly, the application of iron to shipbuilding purposes has extended so rapidly that, within little more than 30 years, the quantity thus applied has, in Great Britain, at least, come to exceed the tonnage of metal necessary for extensions of railways or renewals of permanent way. Secondly, there is the much more recent application of steel to the manufacture of railway sleepers, an application which is indeed only in its infancy as yet. In what other new directions iron may come to be employed in the future, it is impossible to say, but, with the experience of the past to guide us, it may with safety be predicted that finality has by no means been reached.

In regard to the prospect of the future demand by those which are at present non-commercial countries, an English cotemporary says: It has been calculated recently that 410,000,000 of the inhabitants of the globe consumed nineteen-twentieths of all the iron produced, whereas the remaining one-twentieth sufficed for the wants of 1,014,000,000 inhabitants. In other words, the latter consumed only 1.96 lbs. per head per annum, while the 410,000,000 used 107.57 lbs. per head. If, however, the 1,014,000,000 were to increase their consumption to a little over 6 lbs. per head—a very modest allowance compared with what the rest of the inhabitants of the earth require—there would be a new demand created which would necessitate the production of 2,000,000 tons more of iron every year. The possibilities of the future are, therefore, almost unlimited, for it will readily be understood that such an increase would not stand alone, but would, in the nature of things, occasion an increase in the rate of consumption among the 410,000,000 inhabitants.

These figures are highly suggestive, and lead naturally to the important inquiry as to what are to be the future facilities of this country for enjoying a share of this immense industry. The three main elements which have to be considered before an answer can be given to this question are as follows: First, the possession, in suitable proximity, of abundant and easily-wrought supplies of the raw materials. Secondly, the command of cheap and efficient labor. This latter has a very important bearing, seeing in what a peculiar degree the expense of labor enters into the cost of the manufacture of iron. Thirdly, the facilities enjoyed for the distribution of the finished product of the works.

With regard to the first we occupy as favorable a condition as any other people on the globe. In regard to the second we will have to rely largely upon the superiority of our skilled workmen, as the labor element here is inclined to exact larger pay than is required of our European competitors. It is possible that in the future, as it does now to some extent, well-paid labor may result in greater manufacturing skill and a more general use of machinery. It is possible that these two elements may more than counterbalance the uneducated cheap labor of Europe. Much in this regard will depend upon the laborers themselves. The facilities for distribution are not now what they should be; but a liberal and enlightened statesmanship ought to and might produce facilities in this direction equal to those possessed by any other people. This subject affords much matter for speculation, and should elicit the most profound thought of such of our statesmen as take any interest in the future growth of American industries.

**PULSATING BOILERS.**—We sometimes hear of "pulsating boilers." There is often a slight tremor in a boiler that might be called pulsation, but such phenomena are usually due to the pulsation of the steam pipe, which always takes place, to a greater or less extent, when the pipe is short and very rigid. Under such circumstances it often has the effect of shaking the boiler. Whenever there is a right angle turn there will be a thrust of the pipe in the direction opposite to the flow of the steam.

**WEARING OF WAGON TIRES.**—Country wagon tires wear in a curious way. If used much on a stony road they wear rounding, on clay, flat, and in the sand, concave. Tires much used in the Honey Lake valley wear in grooves. There will be a ridge in the center of the tire and a groove on each side, with the edge as high as the center ridge.

**SIMPLE TEST FOR THE CUTTING OF FILES.**—The Waverly Works, Sheffield, in a circular just issued, describe a novel and simple method which may be adopted by any workman to ascertain if files are machine or hand cut. Of course, it is an accepted fact that hand-cut files are capable of standing the most wear, and are in request by all workmen who have acquired the knowledge here described. With a straight edge, mark the angle of slope of the first cut on the file near the point, and again near the handle end of the file. If the teeth run in exact parallel, the file is machine-cut. In cutting with the machine, the angle at which the chisel starts is maintained throughout the length of the file, and the cuts must, in consequence, be parallel; whereas in handwork the hand of the workman, moving radially with the wrist as a center, necessitates a slight deviation from the exact parallel in every tooth, creating a considerable divergence in the angle of slope on the length of an ordinary file. This divergence may be seen by the eye on a large rough file, but it is difficult of detection on a narrow-pointed flat file; still, it will be easily apparent by extending the length of the lines with two straight edges. If the lines do not run parallel, the lengthening of the lines will at once show the divergence. The foregoing rule only applies to the first, and not to the finishing cut, as the man's wrist works quite differently in this cut. If the latter has been done by machine, this can readily be detected by observing that the first few strokes at the point of the file will be of the same pitch of tooth as farther up in the file; whereas the hand cutter for the first few strokes does not strike so heavily, but, so to speak, feels his way gradually, and consequently makes finer teeth than when he gets higher up into the body of the file. Some files are machine-cut at the point and finished by hand. By testing by both methods absolute certainty can be obtained.

**EXPERIMENTS WITH GIRDERS.**—In some carefully conducted experiments by the German government on steel and iron girders, each of the steel girders was found to show a large increase in strength over the iron girder, the soft steel girder proving 22 per cent stronger, and the hard steel girder 66 per cent stronger than the iron girder; the greater strength of the soft steel over the iron in the specimens was fully attained, and exceeded, in the girders, while the hard steel girders did not show so large a percentage of greater strength over the iron girder as did this material in the specimen. This last-named fact was accounted as the result of punched holes, which gave way by the fracture of the tension flange, whereas the girder with reamed holes gave way in the compression flange, and probably would have stood more before fracture had taken place in tension flange. Punching rivet holes without reaming did not produce any result other than an apparent loss of strength as compared with reamed holes. Lastly, the strength of steel girders strained in the manner of these girders appeared, by these tests, to be about the same for the two flanges, if made alike in sections.

**THE CORROSION OF BOILERS.**—M. M. Klein and A. Berg have been studying the action of sugars on the corrosion of boilers, and find that sugar in water has an acid reaction on iron which dissolves it, with a disengagement of hydrogen. The quantity of iron dissolved increases with the proportion of sugar in the water. The salt of iron formed is the acetate. A neutral decoction of malt also corrodes iron with disengagement of hydrogen; but glycerine and mannite are without action on the metal. These results are worthy of note in sugar refineries, and places where sugar sometimes finds its way into the boilers by means of the water supplied. The experimenters in question also find that zinc is strangely attacked by sugar; copper, tin, lead and aluminum are not attacked.

**BRAZING IRON PIPE.**—It is a very difficult matter for even an expert to braise iron pipe that has been split. It is much cheaper, says the *Scientific American*, to use new pipe. The brazing is done by cleaning the split edges, covering with borax that has been ground on a stone with water, and binding a piece of brass wire along the seam, with small iron wire wound around the pipe. Place the pipe in a charcoal fire, commencing at one end of the split, drawing the pipe through the fire as the brass melts. Soldering is done with a copper, using soldering acid, which is made by dissolving zinc in muriatic acid and adding a little sal ammoniac to the solution.

**WEIGHT OF GEARING.**—It is sometimes said that heavy gears run steadier and easier than light gears. Such is not always the case. Gearing should be heavy enough to do its work without strain or unnecessary wear upon cogs. Too heavy gearing is a detriment, and, moreover, to have the heaviest gears in the upper story of a mill or shop is reversing all mechanical laws as applied to the transmission of power, and displays a millwright's ignorance.

**A NEW MACHINE.**—It takes workmen well up in the use of the jack-knife to cut a lock in a hoop for a barrel, and it is a piece of work that was never supposed to be accomplished by machinery; but machines have been improved till at last it only requires the movement of a foot treadle and the three-way-under-gap is completed.

## SCIENTIFIC PROGRESS.

## The Flow of Metals.

## Properties Common to Fluids and Solid Metals.

In one of his recent lectures in London, Prof. Chandler Roberts-Austen spoke of the eight prominent points of resemblance between metals and fluids which have long been known. These eight points are the rejection of impurities on solidification, suffusion, flow under pressure, changes due to compression, absorption of gases, absorption of liquids, vaporization, and surface tension. Of these properties perhaps the most astonishing are those exhibited by metals when compressed. Placing cold powdered metals in a powerful press, Prof. W. Spring, of Siegen, caused lead to weld into a solid mass by a pressure of 13 tons per square inch; zinc, by 19 tons; tin, 32 tons; antimony, 38 tons; aluminum, 38 tons; bismuth, 38 tons; copper, 38 tons. At 33 tons per square inch lead actually begins to flow, and at 47 tons tin showed the same phenomenon. When a pressure of more than 50 tons to the square inch was given, the metals under experiment flowed through the fine cracks of the compression chamber like so much treacle. Prof. Spring also proved that the crystalline structure of metals may be changed by pressure as by fusion, and that it is possible even to build up alloys by pressure.

Prof. Austen pointed out that, although the characteristics of solid metals and of fluids appear at first sight to be widely different, there is much experimental evidence showing that under certain conditions solid metals behave like fluids. The phenomena attending the passage of metals from the fluid to the solid state were first dealt with, and the beautiful experiment of Van Riemsdijk, showing that pure gold, on freezing, behaved like water—that is, may be cooled below its solidifying point without becoming solid. When, however, by agitation, the metal sets, it becomes brilliantly luminous, owing to the liberation of the latent heat of fusion.

Passing to solid metals, Professor Roberts-Austen referred to a forgotten experiment made by Louis Lemery in 1726, showing that lead when cast in a peculiar form is sharply sonorous, and he alluded to Reaumur's experiments on this subject, which proved that hammering or the transfer of matter from one position to another by flow alters the shape of the grains and the way in which they touch one another, and leaves them, in the hammered lead, no longer free to vibrate. The results obtained by the late M. Tresca on the flow of solid metals were then fully dealt with, and the lecturer passed again to the elaborate investigations of Prof. W. Spring, on the compression of finely-divided metals into solid blocks. He repeated many of M. Spring's experiments, obtaining crystalline bismuth under a pressure of 6000 atmospheres, and building up the alloy fusible metal, which fused at 100° C. from the powders of its constituent metals, which have much higher melting points. The importance of the recognition of the flow of metals in science, in art and in industry was then referred to, and some observations by Mr. Baker, the engineer of the Forth Bridge, were alluded to as showing the important and beneficial effect of compression on the mechanical properties of steel destined to be used for certain purposes. Professor Austen concluded by showing that, as regards absorption of gas, diffusion, vaporization and surface tension, solid metals present close analogies to fluids.

**FINE DRAWN WIRE.**—Platinum wire has been drawn so fine by H. F. Read, of Brooklyn, N. Y., as to be invisible to the naked eye, although its presence upon a perfectly white card could be detected by the touch, and could be seen by the aid of a small magnifying glass when the card was held in such a position that the wire cast a shadow. A small platinum wire, about No. 18, was inclosed in a close-fitting tube of silver. The tube was made by taking a long and narrow sheet of silver, about one-twentieth of an inch thick, folding it over into a cylinder, and drawing down until the wire would just fit in it. This was then drawn down until the tube containing the wire was only as large as the original wire. A short length of this was cut off and incased in a second tube of silver, which was drawn down in the same way. This operation was repeated until the platinum wire had been reduced sufficiently in diameter. The last wire was drawn as fine as the dies would permit, when the silver coating was removed by an acid. During the work it was necessary occasionally to anneal the wire. It was designed to be used for cross wires in telescopes, its opacity and fineness rendering it particularly applicable, but its extreme weakness made its handling almost an impossibility.

**THE EFFECT OF LIGHTNING STROKE.**—An examination of the body of John W. Wilson, who was killed by lightning at Seymour, Ind., recently, showed a curious state of things. He was pumping water when a ball of fire leaped from a lightning-rod near by, struck him on the arm and burned several seconds. He did not fall and friends ran to his assistance, but he lived only five minutes. The bones of his arm were found to be shattered into countless fragments and the flesh was bruised and torn, but no other injury to his person could be discovered.

**LIABILITIES OF HOT AIR AND HOT STEAM.**—The subject of the spontaneous combustion of wood has been discussed at various times by the French Academy of Sciences. Among the most interesting statements made on these occasions is that by M. Cosson, describing an accident which occurred in his laboratory, it appearing that, while he was working in his laboratory, a portion of the boarding of the floor spontaneously took fire; the boards were in the vicinity of an airhole, fed with warm air from a stove about 13 feet away on the floor below. A similar accident had occurred two years previously, and, in consequence, M. Cosson had the boards adjoining the airhole replaced by a slab of marble. The boards which subsequently ignited adjoined the marble, and though the heat to which the boards were subjected was very moderate, being only that of air at 77° F., still the boards slowly carbonized, and, being thus rendered extremely porous, a rapid absorption of the oxygen of the atmosphere had resulted, and sufficient heat was thus produced to originate combustion. A similar instance of spontaneous fire is said to have occurred at Passy a few days before, due to the action of the warmth from the airhole of a stove upon the woodwork, thus showing the danger liable to arise from this source, and the necessity of attention to the same on the part of builders.

**INTERIOR TEMPERATURE OF THE EARTH.**—The *London Times*, referring to the deep shaft being sunk near Schladebach by the German Government, with the special object of obtaining reliable data concerning the rate of the earth's increased temperature toward the interior, concludes, from all that has thus far been developed, that the earth's crust cannot be more than about one-ninetieth of its radius. It seems that the plan pursued has been to ascertain the temperature at successive stages by means of a special thermometer, the principle of construction being that as the heat increases the mercury will expand so as to flow over the lip of an open tube, the difference of the overflowing giving the rate of increase of the temperature. At the depth of 1392 metres the temperature indicated 49 degrees Centigrade, or 120 degrees Fahr. If the temperature increases regularly at this rate, the boiling point of water ought to be reached at a depth of 3000 metres, or nearly two miles, and at 45 miles the heat would be that at which platinum melts.

**THE SOLIDIFICATION OF OXYGEN.**—Professor Dewar has succeeded in the production of solid oxygen. At the Royal Institution he lately exhibited for the first time to a few friends the method he employs. Last year the professor gave a lecture on liquid air; but, although he and other experimenters had made liquid oxygen in small quantity, no one had succeeded in getting oxygen into a solid condition. The successful device employed at the Royal Institution depends upon allowing liquid oxygen to expand into a partial vacuum, when the enormous absorption of heat which accompanies the expansion results in the production of the solid substance. Oxygen in this condition resembles snow in appearance and has a temperature of 200° C. below the freezing point of water. A supply of this material will enable chemists to approach the absolute zero of temperature and to investigate many interesting changes in the physical properties of bodies under the primordial condition of the temperature of space.

**HEAT OF THE GULF STREAM.**—It is well understood that Great Britain and other parts of Northwestern Europe owe much to the warming influence of the Gulf Stream. The extent of the effect has been given in the calculations of Dr. James Croll, who has found that the amount of heat conveyed northward in the Atlantic by this stream is equivalent to 77,479,650,000,000,000 foot pounds of energy per day, which is equal to all the heat received by 1,560,935 square miles at the equator, and more heat than conveyed by all the air currents. The heat of the Arctic Seas and North Atlantic would be diminished that much by the stoppage or diversion of the great ocean river.

Heat only flows down the gradient of temperature, and in any particular substance the rate at which heat flows is proportional to the gradient of temperature. Hence to get the heat from the source or furnace into the working substance a certain time must be consumed, and this time diminishes as the difference of temperature of the furnace and the working substance increases.

**THE PETALS OF THE BUTTERCUP** have, as well known, peculiar varnish-like luster. The cause of this has been investigated by Dr. Mobius, who attributes it to a highly refractive yellow oil existing in the epidermic cells, increased by the fact that the layer of cells of the mesophyll is densely filled with minute starch grains.

**SUBTERRANEAN HEAT.**—From his studies of the Krakatoa catastrophe, Verbeek is led to maintain that part of our globe remains still in a molten state, and he disputes the theory which has been advanced, that the heat of the volcanic furnaces is entirely due to the local chemical action.

**INSOLUBLE GLUE.**—In order to render glue insoluble in water, it is only necessary to add a little potassium bi-chromate to the water in which it is dissolved and expose the glued part to the light. One-fiftieth part of the bi-chromate will suffice.



## ENGINEERING NOTES.

## Substitutes for Steam.

At the recent spring session of the American Society of Mechanical Engineers, at Chicago, one of the most interesting papers presented was that by Mr. Geo. H. Babcock, of New York, on "Substitutes for Steam."

Mr. Babcock gave a brief history of many attempts to work engines by using some other fluid than steam, and said none of them had proved successful except air and gas engines for lighter powers. After describing the many attempts in detail and their failure, he reached the conclusion that a successful substitute for steam in motive power cannot be found among vapors, and most probably, if found at all, it must be among permanent gases. By a bountiful provision of nature an equally free and exhaustless supply of a perfect gas—atmospheric air—has been provided, which has several elements of value in the problem. As it requires 500° of heat to double its pressure at 39° Fah.—the point of greatest density of water—it may be heated to a very high temperature before it reaches a practical limit of pressure. It is a poor conductor of heat and does not condense when cooled; therefore, it will suffer less loss from being used in a cool cylinder.

Being a supporter of combustion, the fuel may be burned within the working fluid, and the loss due to the furnace avoided. It also offers the opportunity of recovering a larger share of its rejected heat to be used again. In a steam engine the only use to which this rejected heat can be put is in heating the feed-water and air for combustion, and only a small fraction—not over one-sixth—can be utilized in that way, while with air Rankine estimates that as much as 90 per cent of the heat in the exhaust may be retained for use, by a device invented by Stirling, known as the "economizer" or "regenerator." There are disadvantages, however, peculiar to air, among which are its bulk and the necessity of initiating motion by external power. The former is overcome by compression before heating, and the latter may yet be provided for in some simple manner.

Air, then, gives the best promise for an economical substitute for steam in pressure engines. The development of its advantages involves many difficulties, but these are fast being overcome. The air engine of Stirling of 40 years ago equaled in economy any steam engine of its day, while the Shaw air engine, of 1867, equaled in economy of fuel the largest and most perfect steam engines of to-day.

The Otto gas engine, and others of similar character, exhibit an economy of heat double that of our first-class steam engines, but they are handicapped by the necessity of using a very expensive fuel, and are necessarily confined to small powers and special circumstances. The prospect of much further economy in steam engines is not bright. By means of a non-conducting lining for the cylinder, a saving might be effected of, say, two per cent in fuel, bringing the efficiency up to 13 or 14 per cent, and by running the pressure up to 250 pounds we might attain, possibly, an efficiency of 17 per cent, or the same as is now attained in gas engines.

Are there still further possibilities of economical development of power? Probably not in the line of pressure engines. But science already points to the possible conversion of heat directly into electricity, and if that can be done without too great a loss the electrical engine may yet become a prominent rival of the steam or air engine. The conversion of 90 per cent of electrical energy into mechanical work is not beyond reasonable expectations, even if it is beyond present attainment, and if the heat of combustion can be converted into electricity with a loss of only 10 per cent—which is supposable—we then should get a horse power for .22 of a pound of coal per hour. This would be a saving of 30 per cent over the best probable results with air engines, or 85 per cent over the best results yet attained with steam.

Is steam, therefore, doomed to be superseded? By no means. Even if robbed of its position on the throne of power, it must ever remain one of the most useful servants of man. Its large specific and latent heat renders it the best attainable medium of transferring heat within a certain range of temperature, from the furnace to the place where it may be wanted for various processes, and even now it fills a larger field in that direction than it does as a prime mover. So far as now appears, it need fear no successful substitute in that field.

THE STATEN ISLAND BRIDGE, it is thought, will lessen the terminal charges in New York harbor about 25 per cent on all Western and Southern produce, by rendering available ten miles of water front in New York harbor, now inaccessible by railway. It is also thought that a revolution impends in regard to the shipment and storage of grain, flour, cotton and provisions of a very significant character for the West and South.

SWIFT STEAMER.—Efforts have recently been made in Europe to invent small steam craft capable of being propelled at almost express railway train speed. A small vessel for service in the Adriatic is now being constructed by a Prague engineer, the speed of which will, it is alleged, equal that of a fast railway train. This result is expected from an improved screw and a novel method of construction.

## USEFUL INFORMATION.

## Building Stone Should be Seasoned.

An important consideration in the use of stone for expensive buildings is that of having it quarried, stored and seasoned for some considerable time before being hewed, or at least before being placed in the walls. By these means the water naturally contained in the stone is allowed to evaporate and the stone is tested as to its quality. On breaking open a piece of the hardest granite or quartz that has just been extracted from a point in the earth below the permanent water-line—and often from much above that line—the severed walls will be found to be completely saturated with water, and in quantity sufficient to moisten the hand or saturate a handkerchief. Seasoning adds to the cost, but the money so expended is well spent in preventing the otherwise rapid wasting away of the stone from rains, frost or other atmospheric influences, which last, especially in cities, soon acts upon the surface of newly quarried stone.

Stone that is quarried one day and built into a wall the next day is in a green state and unfit for durability. It is at its weakest point of endurance either of pressure or of atmospheric influences. Its pores are open and ready to absorb not only moisture, but all the gaseous and disfiguring influences which tend to its destruction. Every stone mason knows that to get a polished surface on a stone the same must have lain for some time out of the quarry and exposed to the drying influences of the sun and weather. This is a sufficient hint to the builder to see to it that the stone of which he would rear a permanent structure must be thoroughly seasoned before it is placed into a wall.

A USEFUL LIGHT.—What promises to be a useful light for industrial purposes, where work has to be carried on in the open or large covered spaces by night, is described by the *English Steam Users' Journal*. The light consists of a cylindrical vessel capable of containing 30 gallons of heavy hydro-carbon oil. Air under a moderate pressure is conducted to the cylinder, which is fitted with a special burner having two tubes, one within the other, leading up to it. The inner tube dips into the creosote and the pressure of air on the latter forces it up to the tube. A portion of the air finds its way to the burner through the annular space between the inner and outer tubes, and the air and oil, combining at the burner, form, when ignited by a match, a flame which gives a light that is useful for general working purposes over a radius of 150 to 200 yards. The proportions used to form the proper light are four of air to one of oil by volume. The jet being produced under pressure, is not affected either by wind or rain.

HOW TO PREVENT GREEN SLIME IN TANKS.—Some one asks how to prevent green slime from collecting on inside walls of a water tank. My tank for several years was troubled the same way and had to be frequently cleaned, and at length I chanced upon what seems, after two years, to be the remedy. It is forcing air through the water. At first the feed-pipe to the tank discharged upon the surface of the water and there was very little disturbance. Then the pipe was changed so as to enter the tank at the bottom, and as the windmill is on slightly higher ground than the tank, the forcing in of the water by the pump carries with it a large amount of air, so that when the tank is filled it boils and bubbles at a great rate. Since that time the tank has been perfectly free from slime, and after two years has not required to be cleaned even once, and a colony of brook fish have kept it free from "wrigglers" of all sorts, and seem to have made fair growth, though fed very unfrequently.—*Country Gentleman*.

CATCHING FISH BY MACHINERY.—A Mr. Robertson, of Stockton, Me., owns a patent on a machine for catching fish, and is having a number of them made in Belfast. The implement consists of a frame on which is mounted a windlass which is geared to a strong spiral spring. The fish-line is wound on the windlass, and leads over a sheave at the end of an arm which extends out-board, and then to the water. The spring being wound up and the line run out, the machine is ready for operation. When the fish bites the pull on the line disengages the spring, and the fish, if he isn't stronger than the machine, is pulled in. When the sinker reaches the end of the arm, a catch which has held the arm in place disengages, and the fish is thrown in-board, and landed on deck. The model works well on land, and the inventor claims that he has given it a practical trial in catching haddock in the bay, and that it works perfectly.

NEW ZEALAND FUNGUS.—A curious trade has sprung up of late years in a peculiar kind of fungus that grows on the trees in the North Island of New Zealand, and which is exported exclusively to China. The uses to which it is applied do not seem to be well known. In 1873 the British authorities at Hongkong said it was "much prized by the Chinese community as a medicine administered in the shape of a decoction to purify the blood, and was also used on fast days with a mixture of vermicelli and bean-curd instead of animal food." Subsequent information shows that it is used in soups as ordinary food, and it is also used as a dye. The

exports during the past ten years have grown from £1927 to £18,939, but the increase has not been uniform. The gathering of the fungus is probably one of the vagabond industries; if so, the irregularity is easily accounted for. The exports in 1884 were 6387 cwt., valued at £11,079.

COLORING MATTER FROM THE COTTON PLANT. The value of the cotton plant (*Gossypium herbaceum*), great as it is, seems to have the possibility of being increased, since it has been discovered that the bark of the root contains an available coloring matter. W. C. Stahl reports that with alcohol of 0.84 specific gravity a red-brown solution is obtained from this bark, which, after distilling the alcohol, leaves a resinous residue, the weight of which is eight per cent of the bark used. This product has a black and shiny appearance, and, if pulverized, takes the color of cochineal. It dissolves in 14 parts alcohol, 15 parts chloroform and 122 parts benzol. It also dissolves in commercial alkalies and is precipitated by acid. With potash it becomes green, and sulphurous acid gives it a red-brown appearance.

PORPOISE FISHING is becoming quite an important industry on the Atlantic Coast. Quite a large number of small vessels are now engaged in the business, which is proving quite remunerative. A large factory has lately been established at Hatteras, N. C., for reducing these fish to their proper economical conditions. They yield a large amount of valuable oil; their hide is manufactured into a leather, valuable for many light but useful purposes; what remains is worked up for fertilizing purposes. They are caught in peculiarly constructed and very strong nets. Sometimes as many as 80 or more of these large and powerful marine animals—some of them fully eight feet long—are caught at a single haul. Some portions of the flesh are considered very good for food.

FRUIT TREES AND VINES.—The estimated number of fruit trees in this State is as follows: Total number of trees, 8,000,000, divided as follows: apple, 2,700,000; peach, 1,200,000; pear, 500,000; plum and prune, 600,000; cherry, 400,000; apricot, 500,000; orange, 1,600,000; lime and lemon, 500,000; grape vines in bearing condition, 70,000 acres.

BEESWAX.—Beeswax is nothing more than the voluntary excretion of the honey bee, like perspiration from the human body. To save time and to enable them to devote all their energies to honest gathering, apiarists now provide these bees with artificial comb, which the latter as readily undertake to fill as though constructed by themselves.

ALUM FOR SETTLING WATER.—It is said that a tablespoonful of powdered alum, sprinkled into a hoghead of water and stirred, will, in the course of a few hours, precipitate to the bottom all the impure particles and leave the water clear and pure as spring water. Four gallons would need but a teaspoonful.

## GOOD HEALTH.

## Interesting to Beer-drinkers.

A Petaluma correspondent of a cotemporary writes on the subject of beer-drinking and beer manufacture as follows: To begin with, there is not one quart of the manufacture of our breweries in this State that ever reaches the dignified state of beer. The patrons and the manufacturers alike are in too big a hurry for that. It is all drunk as sour mash. Let us explain.

Fermentation is the work of an infusorial cryptogam or bacteria. These little creatures make our alcohol in a struggle for existence. They are so small that billions of them occupy a space of half an inch, and in point of multiplication one will develop a million in 24 hours, while one hour is their average life. You must understand that they are a sexless animal. Should the beer-drinker, as a preliminary measure, place his delicate, foamy luxury under a magnifying power of eight or ten thousand diameters he would perhaps postpone the enjoyment of his delicacy to some future time. A vat of barley, undisturbed, might remain until it rotted and it would produce no beer. But stir it up and force the bacteria down in the fluid where they cannot obtain a sufficiency of oxygen upon which to live, they take the sugar and manufacture alcohol from it, and from the alcohol they can abstract enough oxygen to support life.

This is fermentation; but the fermentative process is only in its incipency before all the stuff is drunk. The foam on your glass of mash is cryptogamic. Drink it, and you convert your stomach into a vat for the fermentative process. The temperature of the stomach being favorable to their healthiest existence, fermentation continues, developing and disengaging a gas, bloating, weakening and relaxing the intestinal tract; impairing the digestive process, developing an alarming quantity of abnormal fat, weakening all the vital organs, and, finally, with an aldermanic corporeity, the victim steps down and out. And this is a subject that some medical men treat with levity. Thus far, we have not discussed beer, ale, or porter—simply the primary or elementary principle, sour mash.

When this mash has been bottled or bar-

reled from two years and nine months to three years it becomes beer, ale or porter, as the case may be. Then it becomes capable of imparting whatever benefits a stimulant may be capable of accomplishing, if any. But experience teaches that no stimulant is of any benefit except in actual indisposition, and under the same intelligent guidance that other therapeutic agents are prescribed. C.

Petaluma, June 15th.

## Bathing.

There are thousands of pores to each square inch of the skin of the higher animals. The office of these pores is to serve as outlets for the dead, offensive matter secreted by the glands of which they are the mouths. So much has been written about the offensive matter thrown off by the lungs and the contamination of the air thereby, that people are usually well informed as to the necessity for ventilation; yet the skin throws off, naturally, a greater amount of impurity than the lungs throw off. The skin and lungs throw off impurities in the relation of 11 to 7. But if the pores be closed, these impurities cannot be thrown off by the skin.

Whenever there is any check on this work of the skin, greater work is thrown on the lungs and kidneys; and this soon overtakes them; they are unable to accomplish all required of them, the blood becomes poisoned, and disease results. This has been demonstrated by Dr. Fourcault, who experimented in the suppression of the perspiration of animals. Just as the perspiration was interfered with were the evil effects manifested. The excretory action of the skin was entirely stopped by varnishing the animals; and this invariably produced speedy death. Any suppression of this action of the skin must produce a greater or less diseased condition of the body, since the blood can be kept pure only when the skin performs its functions properly. It has been well said that the great secret of preserving health is maintaining a healthy action of the organs that carry off the wastes of the system.

The matter exuded from the glands, of which the pores are the outlets, is of a sticky nature, and not only has it a tendency to adhere to the edges of the pores and close them, but it also holds the dust that falls upon it. In the summer the pores are closed most rapidly, because then the perspiration is most profuse, and there is the most dust in the atmosphere. The filth that clogs the pores can be removed most easily by the use of soap and water, or bathing. Hence bathing often enough to keep the pores open is essential; and it should be most frequent at this season. A house in the city is not considered complete without a bath-room; yet very few farmhouses have such a room, although farmers should bathe oftener, perhaps, than any other person.

The absence of bath-rooms in our houses shows our indifference to one of the most important methods of maintaining our health. The cost of a bath-room is but little, and every house should have one. But its lack is no excuse for not bathing. We can at least have a tub. And while we know that many of our readers will be incredulous when we say it, yet we know that the sounder sleep and greater bodily vigor attained through bathing makes it profitable ten-fold from a labor standpoint alone, not considering the gain in comfort and health. We know this because we speak from our own experience of years on the farm.

NEED OF COUNTRY SLEEP.—Some physiologists have said that three hours of close thinking are more exhausting to a man's vital energies than ten hours of the hardest physical labor. The nerves need building up and replenishing quite as much as the muscles. And they equally need rest, for recuperation. Men in literary employments, and in many kinds of business, especially in cities, are put to great mental strain during a few hours of the day. It is important to their health, to the maintenance of intellectual vigor and business efficiency, that their nervous systems have perfect quiet during at least one-third of every 24 hours. This cannot be had in a city residence. Though they may doze the usual period and their muscular powers be in a quiescent, semi-unconscious state, the nervous system is kept disturbed by the slightest noise, such as that of street cars, carriages passing on the pavement, of the early milk and market wagons, etc. There is scarcely ever any cessation of noise and jar in any city or large village, or at most during barely two or three of the small hours of the morning. The only absolute quiet to be found is in a country retreat, where wagons seldom move between sun and sun, and then only over soft earth roads which produce no jarring. Those business men are wise who retire every day in the year to a rural home, away from all disturbance. The writer has usually been in the midst of the city's hurry and scurry a part of each day for a third of a century; but the rule has been, when night came, to change the feet gear for dry covering that would be proof against any chill from damp ground, and then go for rest far from the city's turmoil. This course, with simple, digestible, nutritious food, has helped him to prolong his working power so that, though well past three-score, he is able to endure about as much daily mental labor as he could 20 or more years ago.

SALT FOR CORNS.—It is said that if common salt is placed upon corns on the feet and allowed to remain there for two weeks, the troublesome pests will come away without pain,



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**KENNEDY.**—*Amador Ledger*, July 2: Everything around this mine has suddenly assumed a beehive-like activity. The announcement that grading had commenced for the erection of a 40-stamp mill took the public by surprise. We are glad to be able to state that the report is true. Last Monday we visited the scene of operations and had an interview with the gentlemanly superintendent, Mr. Thomas. Some 30 men were busily engaged in grading. The spot selected for the mill is about 100 feet southeast of the hoisting works, lower down the gulch, with a fall of perhaps 30 feet between the two. The Fulton Iron Works of San Francisco has secured the contract for putting up the mill complete. Most of the heavy castings and other material are now ready, and will be shipped as soon as the grading is near completion. The stamps are to be 800 pounds in weight, and the mill will be finished with 16 Frue concentrators. The contractors guarantee it to crush 100 tons per day, and are under engagement to have it in running order by the 1st of September. It will be a first-class piece of work in every respect, equal, in fact, to any mill in the county. Concerning the prospects of the mine in justification of this movement for a new mill, we may state that there are large bodies of ore in all the levels, enough, in fact, to run a 40-stamp mill for five years. It is low-grade ore, and could not be made to pay under the expensive method of working in vogue 15 years ago. An examination of the books shows that the last 2000 tons of ore crushed yielded an average of over \$6 per ton in free gold. As the property was then fixed, running mill and mine by steam, and using 12 or 13 cords of wood per day, and crushing with 20 stamps of 400 pounds each, not more than 20 tons per day, it cost about \$16 per ton to mine and mill the rock, representing a loss of \$10 on every ton crushed. Work was prosecuted in the hope of encountering richer ore. Now, the calculation is to fix up in such a manner that this low-grade ore will yield a handsome margin of profit, and that this can be done in the favorable situation of the Kennedy for the use of water-power at hoisting works and mill, with 250 feet pressure, there is no room to doubt. The shaft is now over 900 feet deep. They are now making a sump, to be 45 feet deep. The sinking has followed the side of the ledge, and frequently the ledge would be exposed, showing ore of a richer character than that in the upper levels. It is intended to open a new level at 900 feet immediately. The prospect of the Kennedy taking its place among the permanent mines of the county is very flattering. As the ore body is large, it is estimated that mine and mill, when in full blast, can be run by a force of from 50 to 60 men.

**MISCELLANEOUS.**—The shaft of the New London, the rising mine of the Plymouth district, is now down nearly 400 feet, still in fine ore, with a tendency to pinch out. It is expected that the ore chimney will exhibit the same characteristics of narrowing and widening out at intervals as are met with at other places along the mineral belt, so that this pinching tendency is not regarded as a discouraging sign. The quartz is very similar in appearance to that met with in the Pacific. It is the intention of the company to sink to a depth of 800 or 1000 feet before anything will be done toward the erection of a mill. This company last week purchased another claim near the New London from A. B. Summers for \$5000. They are also working up a plan to get water to the property by the construction of a ditch to tap a large watershed in the mountains. The company means business, and everything indicates that it has unbounded confidence in the richness and permanence of its property.

## Calaveras.

**SALE.**—*Calaveras Prospect*, July 2: An important mining sale was made a few days ago in the disposal of the Esmeralda mine on Indian creek, generally known as the Kelly mine, to E. A. Davis. The former owners of the Kelly mine, Chas. Krause and Mrs. Kelly, had previously bonded the mine for \$500, and when the sale was consummated a cool \$10,000 in cash was paid down. Mrs. Kelly went down to San Francisco this week to deposit her money in the bank.

**MURPHYS.**—*Cor. Calaveras Citizen*, July 3: Mining matters are still stirring in this vicinity, and when the break in the Union Water Company's ditch is mended, work will be accelerated. Rock from two mines in Angels was hauled to the Oro Plata mill at this place to demonstrate the fact of superiority of the Tustin pulverizer over stamps in the mill used on the Utica, Chas. Lane, superintendent, and the pulverizer used by Col. Tozier in crushing his ore. The ore was passed through the Tustin, wet process, and was a triumph for the Tustin pulverizer. A number of mining and milling men were here several days to witness the result. Supt. Morse, of the Oro Plata, has added an improvement to the Frue concentrator, for which he has applied for a patent. It is a corrugated belt instead of the one now in use, and now one machine will do the work of three, and more thoroughly.

## El Dorado.

**RICH GRAVEL.**—*El Dorado Republican*, July 3: The bed of gravel recently struck in the Rogers mine, at Smith's Flat, holds its own both in volume and richness, and it is hoped it may extend into the ground of the Kum Fa mine, and reward the efforts of that company which is driving a drift in that direction. The Ohio mine, formerly known as the Valdora, at Grizzly Flat, has been bonded by the owner, A. H. McAfee, to J. H. Smith, the former superintendent of the Mt. Pleasant mine. Active work will soon be commenced on the mine. Under the direction of Mr. Smith, if there is anything in the mine it ought to be discovered. It has always been well thought of by miners. Joseph White, of Poverty Point, had a crushing of over 50 tons of rock run through the mill not long since which turned out \$5 per ton.

## Nevada.

**THE BADGER MINE.**—*Grass Valley Union*, July 2: All the water is now out of the Badger mine,

and after some work has been done, mining will be commenced. Another pump will be put in the old shaft, and the drifts cleaned out. An eight-inch ledge of fine-looking rock shows itself in the bottom workings. More will be known about the Badger in a few days.

**THE BUCKEYE MINE.**—*Transcript*, July 3: J. M. Kitts & Co., who are reopening the old Buckeye quartz mine at the junction of the Snow Mountain ditch and Slate creek, in Willow Valley, have recently struck a rich and evidently extensive chute of pay ore. The four-stamp mill which formerly stood on the Spargo mine is being put up on this one, and it will be in readiness to begin crushing this week. The Buckeye was prospected some several years ago, a tunnel 800 feet long being run. Kitts & Co. having cleared out the tunnel, are thus enabled to open and work the claim at a comparatively slight outlay.

## Placer.

**MAYFLOWER.**—*Cor. Placer Herald*, July 3: The Mayflower mine has shut down except work on the tunnel, which will be prosecuted under contract. The machinery for working Burleigh drills has been going through town for the past three or four days, for the Golden River mine near the Fork's house. They have already moved up the buildings from Succor Flat and will soon have everything in working order, and I hazard the prediction that they will develop one of the most extensive and valuable mines in the State. They are not investing their money at hap-hazard, but have called to their aid some of the most practical as well as the most scientific men in the State. The channel for which they are running is as well defined and known to them as though it was a living stream. If all the mining enterprises were carried on upon this principle, there would not be so many failures to record, such worthless waste of capital and labor to the detriment of our mining industries.

**MACHINERY.**—*Placer Republican*, July 7: The Golden River Company is having large quantities of machinery hauled by way of Forest Hill. An 8000-pound boiler was taken over by a four-horse team last week, which is thought to be the biggest load ever taken to that divide by four horses. The May Flower Company is hauling to the mine 24 tons of steel T rails for the new tunnel.

## San Bernardino.

**MINERS' WAGES.**—*Calico Print*, July 4: The large mining companies of East Calico recently reduced miners' wages to \$3 per day. Most probably the Oro Grande Company will be compelled to lower wages to the same figure, owing to the ore they are now mining being of a low grade.

## Shasta.

**AT WORK.**—*Shasta County Democrat*, July 1: Sunderhaus, Busch & Co. have 14 men at work on the Snyder mine, Squaw creek. Henry Herzinger left last Friday for a two months' prospecting trip in the Klamath range. B. B. Miner, a mining man well known in this county among the miners, died in Los Angeles last Thursday, of paralysis of the brain. Uncle Dick Johnson is prospecting in the Backbone country for some rich gold quartz he and his old friend Hoovy found in that region over 20 years ago. Thomas Derby, who a year ago had bonded the Whitton and Small mines on Squaw creek, now known as the Cresson mine, went up on the train last Monday evening to look at some mining property in that camp. We stated last week that De Forest and the Bemis Bros. are developing a piece of mining property at Lower Springs on the widow Myers' place. We erred as to De Forrest. The Bemis Bros. are doing the work, and have the property bonded.

## Sierra.

**EXTENSION.**—*Mt. Messenger*, July 3: The Bald Mt. Extension Co. have commenced pumping water at the Pliocene shaft for washing their gravel at Forest city. To dispel the misunderstanding occasioned last week by our item in regard to the Bald Mt. Extension drift mine, Forest City, we will state that the men employed there only were able to work two days, the previous week, owing to a cave in the breasts, and in that time there were taken out 350 carloads of gravel, yielding 95 ounces of coarse gold, over \$5 per carload. Mr. Vanslyke is progressing satisfactorily with his mining affairs. The pump at Butcher Ranch has been started and the shaft about drained. The main tunnel is advancing rapidly. The rock is soft, and the ledge will be struck about 150 feet ahead. Arrangements have been made with John Schriver, of Goodyear, to run his sawmill and furnish lumber for the Gold Valley quartz mines.

**MORE STAMPS.**—*Sierra Tribune*, July 3: Of the additional 20 stamps which are being put in at the Young America mill, ten will be ready for operation by July 5th. The other ten will be ready a few weeks later. When all of those stamps are turned loose (there will be 40 altogether) the Young America will by its big yields make this district famous in mining circles.

**NOTES.**—There is activity all along the line. The owners of the Perry Consolidated, across the river south of town, are crosscutting this week and are meeting with most excellent indications. We understand that the Loyalton parties are highly pleased with the prospects which they have encountered in their ledge at Gold Lake. Work has been resumed at Gold Valley, and it is believed that the improvements in machinery and knowledge of working ores will make a success of that property. The ore is said to assay very high, but most of the gold is in the sulphurets. Charley Hendel has six men at work on his new discovery and feels quite certain that he has a bonanza. At the Cleveland they are adding 10 more stamps to the mill, and the mine looks well enough to satisfy its owners. At the Young America mine, work on the mill addition is going rapidly ahead, and the 20 new stamps will be crushing before long. This company concentrate their mill tailings, and probably will erect chlorination works after awhile. No change of note is reported at the mine. The hills are full of prospectors, and nearly every day a party of them comes in town, gets a small bill of "grub," some tools, and goes out, no one knows where, to prosecute work on some new find. There is lots of gold left in Sierra county.

## Trinity.

**PAYING WELL.**—*Trinity Journal*, July 3: Bailey, Lawton & Bergin made a cleanup of their arastra on East Fork this week. Twenty tons of rock from

the Thanksgiving mine yielded at the rate of \$45 per ton.

## NEVADA.

## Washoe District.

**CHOLLAR.**—*Enterprise*, July 3: The station for the 3200 level, which is being opened out on the west side of the shaft, is a very roomy affair, being the whole width of the shaft, 30 feet, and it has been carried back for the same width a distance of 20 feet from the shaft. It is 11 or 12 feet in height, and is very heavily and substantially timbered, owing to the unreliable nature of the ground, the shaft and station being in the main ore channel at that point. The material has been largely quartz, most of which gave low assays, and, as heretofore stated, being in the ore channel itself, every foot of progress westward was very liable to crosscut into a good ore body at almost any time. Therefore the strike of Thursday night, when the face of the station suddenly cut into a well-defined ore vein, was not altogether unexpected. How valuable and extensive this new ore deposit is cannot be stated at present, as work has been suspended pending instructions from below. The miners, however, as well as all others concerned, consider the strike an important one, judging from the little they have seen of it, the good assays coming from it and the peculiarly fertile and "kindly" character and texture of the rock. Ore has never been found so far south by 300 feet in the deep explorations of the middle mines, and in connection with the huge ore vein adjoining and running to the southward through the Chollar and Potosi, the indications are that the ore is "growing" in the lower levels.

**HALE AND NORCROSS.**—On the 2900 level a diamond drill was sent out west from the face of crosscut No. 5, which demonstrated a strong ore vein in that direction, and the drillings also indicated good ore. Last Monday the drill was withdrawn, and since then the crosscut has been advanced, verifying the drillings by cutting through ore of a fair grade, with streaks and bunches of rich ore. A good strike is anticipated further in. The drill hole in the face of the main north lateral drift is allowing the water to drain out from that direction.

**SAYAGE.**—Work is suspended in the face of the main lateral drift south on the 600 level, owing to the swelling nature of the ground passed through necessitating the easing of the timbering and lagging. A drain is also being cut throughout the entire length of the drift to the Gould and Curry line. This will be properly boxed throughout, and is intended to drain the water met with in the face of the drift, and any increase of the same that may be encountered. It will also receive the drainage from the east crosscut. This crosscut east is being advanced, with its face in good-looking vein material—porphyry, quartz and clay.

**BEST AND BELCHER.**—At six o'clock A. M. yesterday, the raising of the flag over the hoisting works of the Osbiston shaft signified the fact that at last the water was drained out, and the track floor of the 2319 or bottom level reached. The station is now being cleaned out and repaired, and when all other requisite arrangements are completed, the proposed sinking the shaft deeper will be resumed. This present lowest level corresponds with the 2500 level of the C. and C. shaft. The Osbiston shaft is to be sunk 400 or 500 feet deeper, to correspond and connect with the 3200 level of the Combination shaft.

**CROWN POINT AND BELCHER.**—The main double hoisting engine at the Crown Point having been repaired and started into operation, the full force of miners were put to work in both mines on Tuesday, and about 400 tons of ore per day are now being extracted as before the break-down.

**ALTA.**—The west drift from the main north lateral drift on the 700 level, which was expected to intersect the Lady Washington shaft, is found to have passed it entirely, owing to an inaccurate survey. The face of the drift is now 175 feet west from the north lateral drift, and is being pushed forward to intersect the Keystone ledge, upon which the old Justice mine is located. About 125 feet further remains to be drifted to reach the Keystone.

**POTOSI.**—The diamond drill, which was being run to the eastward on the 3100 level, after penetrating 235 feet, had to be withdrawn, owing to the difficulty experienced in working it to such a great distance. About 200 feet of it is in a pure, solid vein of quartz, more or less mineralized throughout, and now the hole is being reamed out, to make it larger and allow the drill to be driven further in, and, if possible, to the other side of the immense vein.

**OPHIR.**—The surface machinery, which has been thoroughly overhauled and put into a complete state of repair, was started into full operation again day before yesterday, allowing of a full resumption of exploration and other work in the mine.

**GOULD AND CURRY.**—The crosscut west from the upraise incline, 50 feet above the 500 level, is still in good-looking vein matter, giving low assays. The same may be said of the east crosscut and the north lateral drift at that point.

**SIERRA NEVADA.**—On the 520 level the north lateral drift from the west crosscut was advanced 45 feet during the week, making a total of 215 feet. No change in material.

**CON. CALIFORNIA AND VIRGINIA.**—Daily yield about 400 tons, as usual. The exploration work on the 1400 and 1600 levels goes ahead judiciously, as usual.

**YELLOW JACKET.**—Daily yield 140 tons from the old stopes and breasts above the 1500 level.

**KENTUCK.**—Daily yield 60 tons from the old upper workings, keeping the Rock Point mill steadily supplied.

## Aurora District.

**RESIGNED.**—*Aurora Star*, July 5: We understand that Mr. Mills, the superintendent of the Con. Esmeralda Company, still acting, sent in his resignation as superintendent some days since. Considering the condition of the property, mines and mill, at the time he took charge, and what has been accomplished since by way of repairing the mill at a cost of \$12,000, and the development work on the Durand Middle Hill tunnel; the sinking and drifting on the New Esmeralda property; the work on the Esmeralda and sinking 200 feet of shaft at the Humboldt, crosscutting at the two and three hun-

dred foot levels and sinking the winzes between the 90 and 200-foot level, and some other work on other properties connected with the Con. Esmeralda Company, costing in the aggregate perhaps \$60,000, and in the meantime taking out ore to keep the 20-stamp mill running and producing bullion to pay a third of the expenditures—it may be said of him, "well done."

## Jackson District.

**MILL RUNNING.**—*Silver State*, July 2: Charley Bernard is in from Jackson District. He says that Pennsylvania mine is looking well and the mill is running steadily. The mill has ten stamps, four concentrators and two pans and a settler. All the base metals and sulphurets are saved by the concentrators, and the chlorides are amalgamated in the pans.

## Paradise District.

**ORE.**—*Silver State*, July 2: One of T. C. Emery's teams arrived yesterday with 16,581 pounds of concentrated ore from the Paradise valley reduction works. Yesterday E. Reinhart & Co. shipped a carload of concentrated ore from the Paradise Valley Co's mines to Argo, Colorado.

## Tuscarora District.

**NORTH BELLE ISLE.**—*Tuscarora Times-Review*, July 3: The crosscut on the 150-foot level, near the old shaft, has been extended 17 feet the past week. South drift on east vein from No. 4 crosscut, 350-foot level, has been extended seven feet and connected with the north drift from No. 5 crosscut, making good ventilation; south drift from No. 5 crosscut on the east vein, same level, has been extended eight feet. South drift on the west vein, 150-foot level, has been extended 12 feet. Have stopped work in No. 6 upraise on the east vein, same level, and started upraise No. 7, 75 feet further north on the same vein. Stopes on the 150 continue looking well. Mill running on company and custom ores.

## White Pine District.

**CLEANUP.**—*White Pine News*, July 3: J. R. Kendall, of the Jennie A. Co., is at present engaged in a general cleanup of the California mill and doing needed repairs on their water privileges, which are among the best in the county. Frank Paul, who has a lease of the Edgar mine, has four men at work, and himself and Oliver Whalen, lessees of the Eberhardt Company, have a like number at work on the North Aurora. Ore is being hoisted from both works, and a test is to be made of the values thereof. Assays from the latter are reported as showing up well. The water tunnel running as a connection between the Sweetwater Company's lower well and the upper one, across from Hayes, is being pushed on and has about reached the contract of 100 feet given Messrs. Pritchard and Lewis. They have worked eight-hour shifts latterly, as the ground became very hard and the water seriously interfered. The distance still to go will probably be contracted for shortly. S. E. Starrett, in a close, almost abandoned mine near town, by his indefatigable exertions, has struck a good showing, and may have found that which many have sought but failed to discover—a very rich pocket, as some have before been found in the same locality.

## ARIZONA.

**GLOBE DISTRICT.**—*Silver Belt*, July 3: The development of mines in Globe and contiguous districts has been greatly retarded by reason of the low price of copper and a lack of capital to systematically work our silver properties. Our nearness to the White Mountain reservation has also militated against the growth of the camp. However, if we read the signs of the times aright, the day of our prosperity is near at hand. With the construction of the Arizona Mineral Belt Railroad, our numerous rich deposits of copper ore can be profitably worked, and Eastern capital will seek investment with us. Globe has the resources to make it a mining center second to none in the Southwest.

**MORENCI.**—*Cor. Clifton Clarion*, June 30: Matters at Morenci are quiet. The regular force of men are at work and the output of copper up to the usual amount. A change has been made in the gearing of the concentrators, and the rate of speed has been changed. They are now working to the best advantage possible and the result is highly satisfactory. Mike Shea and Louis Jantzen are working their mine, the West Thompson, and are taking out some fine ore. The prospect for this mine is good.

**GOLD.**—Several parties are engaged in washing gold on the river near Oro with a fair measure of success. The gold exists in large quantities in the cement-like formation along the river, and if a system of hydraulic works were established, by which the gravel might be quickly and economically washed, with proper management the working of the claims along the Frisco might be made a financial success.

**LONGFELLOW.**—*Clifton Clarion*, June 30: Mining matters are quiet, the regular work going on as usual, with nothing startling or strange to report. Ore is being brought in from the Clay mine, and we presume will be run through the concentrators at the company's works, when those shall have been completed.

**QUEEN.**—Among the new prospects visited were the following claims: "Lizzie," the property of N. C. Hinds; "Lee," owned by J. H. McGuigan; "Rob Roy," J. H. Vaughn owner, and "Little Gem," belonging to Henry Hill. These are situated about five miles to the northwest of Clifton, in the range back of Chase creek, and all within the limits of the Greenlee Gold Mountain mining district. The claims promise well, and with proper work, no doubt, can be made to pay. The mountain on which they are located is covered with a good growth of evergreens valuable for fuel. Nothing is known as yet as to the extent of the mineral body on the leads, as no prospect work has been done; but apart from that, the four locations are valuable for the timber that is on them, and are well worth doing the legally-required assessment to acquire a title.

**NUCKET MILL.**—*Silver Belt*, July 3: J. C. Ogden will start up the Nugget mill, after the 5th, on ore from the Fame mine. There will be over 30 tons of high-grade ore and a considerable quantity of a lower grade. It is expected that the yield from this lot of ore will be much greater than from the last, which was in the neighborhood of \$11,000,



The Fame is now the largest silver-producer in Globe district, and is worked in a systematic and economical manner. The ore house is connected with the mine by a track through the main tunnel, which reduces the cost of handling the ore to a minimum. We are told that the mine never looked better than at present.

#### COLORADO.

**TUNNEL.**—La Plata Miner, July 3: Some weeks since the Miner gave notice that another tunnel would shortly be run under the workings of the North Star on Sultan, and the officers of the company are now here with a view of beginning the work right away. As the successful completion of this tunnel will require considerable engineering ingenuity, the gentleman who runs the 12,000-foot tunnel at the Big Bend in California, lately completed, has been sent for, but as the Big Bend Company have offered him extraordinary inducements to remain in their employ it is probable that the North Star people will have to look elsewhere for the man they want. The tunnel will be 2100 feet long, and it is estimated that the work can be completed in one year with the use of air drills, whereas two years will be required with hand power. Mr. L. B. Kendall, the president of the company, with surveyors, was laying off the line of the tunnel on Monday last, and he states that air drills will be used in the work and the tunnel pushed to completion. The work is to be commenced Monday. The depth gained under the present lower workings will be 190 feet, which is very small considering the length of tunnel to be run, but the tunnel will open up 3000 feet of ground, every foot of which contains pay ore, which could be run out of a tunnel much cheaper than it could be hoisted from a shaft. Only 60 feet above the creek level is allowed for dumping ground, which will be ample, and the tunnel will be large enough for a double track and for the admittance of machinery, when it shall be found necessary to continue exploitation below the tunnel level. An increased force is to be put in the upper workings and the output largely augmented, which is controlled by the number of men employed. The present output is 300 tons per month and the ore body in the stope is scarcely scratched. On the completion of the new tunnel the North Star will be one of the most extensive and best developed mines in the State.

#### IDAHO.

**BALD MOUNTAIN.**—Coeur d'Alene Record: Louis Block gives the Record some particulars about the quartz prospects up the east fork of Eagle creek. Beginning about 1800 feet from the foot of the mountain, six miles above Eagle city, is the Keystone, owned by Campbell, Pease & Rice; next, Buckeye, owned by Woodling, Coad, Dokey & Stoops; next Sandusky, owned by Coad, Woodling & Dokey; next Mountain Rose, owned by Block & Stoops; next Crown Point, owned by Block, Woodling, Dokey & Coad; next Emma, owned by same parties; next Clara, owned by Olendorf, K. S. Burke, Penny & Linn; next Belcher, owned by Block & Frank Olendorf. On another vein McAllister, Olendorf & Avery own the Chieftain; Rice, Campbell, Pease & Nagle, the Phoenix and Alice; McAllister, Morrill & Avery, the Grub Stake and Evergreen; Woodling, Coad & Doty, the Wyandotte; Block, Stoops, Vernon & Landes, the Vivian; Rice, Campbell, Pease & Merrill, the Silver Bell; Renkard, Peck & Crown, the Howling Dog and the Silent Friend. There has been some work done on all these locations, and all show free milling gold and silver bearing veins. Most of the work being done now is on the Mountain Rose, Crown Point, Emma, Clara and Belcher. The richest tests have been made from the Emma, reaching the astonishing figures of \$25,000 in gold to the ton, these assays being from decomposed mineral matter distributed through a two-foot vein at a depth of about 20 feet. The shaft on the Belcher is now about 25 feet deep, and the vein five feet wide, and improving in width and richness, assays reaching to \$500, though taken together it will probably run about \$25. Over the mountain the other side there are more locations and as much work as on the south side, and will be kept up all around till enough is done to establish the question of their true character.

**CLEANUP.**—Coeur d'Alene Record, June 26: We are informed that Mr. Herrman made a cleanup of about 300 ounces of gold from a pit at the head of the Trail gulch bedrock flume. The Coeur d'Alene Water Supply & Mining Company are making active preparations for more vigorous work on the flume commonly known as the Coulter ditch. Additional workmen will be put on at once and the force gradually increased as fast as profitable work can be done. Wm. M. Stoops came in from Bald Mountain to-day. He states that the mine-owners have just completed a good trail up to their claims some six miles from Eagle city. The prospects are all improving as work progresses. Frank Olendorf and Louis Block are down 16 feet on the Belcher and have a vein 5½ feet wide, making a gain of two feet in width from the start.

**AFTER QUARTZ.**—Idaho World, June 25: Deadwood Basin and Silver district promise to be the chief magnets this season for the prospectors. A large number of prospectors will flock into the former place soon from Custer county and other points. Fifteen or twenty locations were made there last fall by citizens of Custer county. Silver district already has quite a large number of newcomers, mostly from Atlanta. Both these districts will be thoroughly prospected this season for quartz. Matt, Graham, Sr., and Matt, Graham, Jr., we are informed, will soon have ore from their mine—the Julia—crushed in one of the Atlanta mills. George Bidwell came down a few days ago from near the head of the Thorn creek ditch, where he has been since the mining season opened, tending the said ditch. The Thorn Creek Ditch Company quit work last Tuesday. Their head of water weakened a few weeks earlier than last year.

#### MONTANA.

**THE CLEAR GRIT.**—Inter-Mountain, July 5: Operations on the Clear Grit are confined principally to the 220 and 320-foot levels and the intervening stopes. The first has a length of 160 feet east and 300 west of the shaft, while the second extends 60 feet east and 250 feet west of the shaft. On the

lower level in the face of the west drift the pay ore body has a width of six feet, the same as in the level above, while eastward it increases in size to the face of the east drift, where a 15-foot breast is being extracted. In the 220-foot level, at a point 150 feet west of the station, a cross vein intersects the main ledge. It carries a very high grade of ore, assaying on an average \$100 in silver, \$30 in gold and a percentage of copper. This cross vein is being followed in both directions from the point of intersection, and is yielding handsomely. The pay streak is about one foot wide. From the main workings the daily product is between 25 and 30 tons, assaying from 6 to 10 per cent copper and 25 ounces in silver. It is being treated at the Butte Reduction Works, where its character renders it particularly desirable for fluxing purposes, as it carries fully 70 per cent iron and only 30 per cent silica, with no zinc. Mr. Kessler is working 18 men on the property, and is naturally in high spirits over its magnificent appearance.

**NOTES.**—In the Gagnon, drifting west is progressing on the 600 level. The report of the bonding of the Nettie for \$150,000 is untrue. The Elm Orlu is producing 25 tons of ore daily.

**BEAVERHEAD MINES.**—Cor. Butte Inter-Mountain, June 25: A new steam Frazer & Chalmers hoist is being placed in position on the Rena, in the Argenta district, with a capacity of working to a depth of 400 feet. A new shaft is now down to a depth of 40 odd feet, the old one being so crooked as to be unfit for use. Three carloads of ore have been shipped from this mine and a fourth is now ready. The returns for those already sent give \$75 in gold, from \$15 to \$30 in silver, and a small percentage of lead. The Dexter property in the same district met with an accident which will seriously retard its development. Owing to the owners being busy developing other claims the Dexter was suffered to remain idle for a short time, during which it filled with water. A short time ago some parties from Butte came down, and getting a lease, started to revive work. The pumps were put in and started, and work was just fairly begun, when it was noticed to be unsafe. The utmost haste served only to get the machinery out of the mine, when it caved almost from the surface. The shaft was about 125 feet deep with numerous drifts upon the ore veins. It is expected a new shaft will be sunk right away, and the development of the mine continued. The last ore shipped from the Dexter was a sample lot of 80 sacks, which netted considerable over \$100 per sack. The Golden Era, belonging to French & Laughlin, is reported as a bigger and better thing than ever. Work is rapidly being pushed, and a great deal of ore extracted. The properties worked by Morgan & Grubb are turning out a high-grade ore. A sample lot of 8700 pounds netted \$157 per ton. The Bismark, owned by L. C. Fyhrle, is reported as having developed a wonderful amount of ore of great richness. Rumor says that a consolidation of the Kent and Bismark properties may be looked for and great improvements will be the result. B. C. Kingsbury, who returned from a tour of inspection of the mines in this region last Saturday, confirms the reports of the value of the Cavanaugh properties, one-half of which are owned by Mr. L. C. Fyhrle, and speaks in great praise of the mines of G. W. Perkins, which are situated away above timber line on Bald mountain. The properties of the Lillon Mining Company are reported by Mr. Connors as awaiting the finishing of the mill, which has been much delayed on account of the trouble to obtain lumber as fast as needed. Matters are now being rushed to completion, and we may soon look for splendid results. Placer mining along the bed of Grasshopper creek is actively progressing, with apparently the best of results. The Shelby Mining Company are still to the front in furnishing large quantities of high-grade magnetic iron ore from the mines on Birch creek, under the management of Mr. O. Willis. It finds a ready sale to the Hecla company, and some has even been shipped into the Wood River country with good results. The tin mines, just across in Madison county, being owned and operated by Dillon capital, deserve mention here. They are being actively developed and expect to make a showing soon that will astonish our people.

**AROUND HELENA.**—Helena Independent, June 28: The mining business of the district tributary to Helena is developing so rapidly that it is becoming recognized as one of our greatest and most profitable industries. The Independent learns that work on the Empire is progressing in the most satisfactory manner, and that the new mill will be completed about July 1st, the arrival of the machinery having been delayed by the labor troubles in the East.

#### NEW MEXICO.

**ORGAN MINES.**—Rio Grande Republican, July 5: Anthony Comstock and Billy Gibbs went to work on the Grey Eagle last week. Their labors were rewarded by finding a pocket of high-grade ore, the extent of which is not yet known. The mine has yielded well in the past and has a future before it. Not long ago the mine in the Organs known as the Poor Man's Friend was leased to a Mexican who got out 1200 pounds of poorly assorted ore and it was shipped to Socorro by Williams & Lohman. The returns on this shipment, after all expenses were deducted, netted the shipper \$26.28. The mine has now been leased to Barlen and the Foyes, who are getting out a ton a week of \$200 ore. S. M. Ashenfelter was in the city this week and completed arrangements with the Foy Bros. of Organ, leasing to them the old Stephenson mine which he jumped several years ago. It will be remembered that this property was patented, but Ashenfelter jumped it on the grounds that the company to which the patent was granted no longer existed. He now proposes to start work and go to shipping ore, tons of which are in sight, and thus force the other claimants to bring suit against him.

**ORE.**—Silver City Enterprise, June 26: J. B. Malone recently made another shipment of ore from the Tenderfoot mine which returned him 360 ounces per ton. The Tenderfoot will soon have a record as one of Grant county's best producers. Advice of the past few days from the Mogollons state that the new turbine wheel for the Peacock company has arrived and is being placed in position. The vanner floor of the mill is covered with concentrates, which are being sacked for shipment. W. C. Hadley, superintendent of the Lake Valley mines and mills, visited this city last week. He reports everything

about the mines and works as flourishing. The mill is now running on regular time and is saving the metal up to 90 per cent. Mr. Hadley is well satisfied with the success with which he has met as manager of the new plant. The enlargement of the ore body at the bottom of the Atlantic mine, Pinos Altos, has naturally resulted in an increased production of ore from that property. Not only this, but with the increase in size came an increase in the value of the ore yielded. Free wire gold is found quite frequently, and the average proportion of value saved under the stamps continues as high as before. The new ore body is fully 2½ feet in width along the bottom of the shaft, and drifts that have been started both ways on the vein show it to be continuous. An average of ten tons is now outputted daily, and this will shortly be more than doubled when stopes are started. Two carloads of concentrates were recently shipped by Messrs. Lewis & Perkins that assayed between \$70 and \$80 per ton. Some beautiful wire gold specimens are produced from the new ore body. The Bremen mill, with the many changes recently made, started up one week ago, and has run continuously since in a most satisfactory manner, treating 20 tons of ore daily, saving the mineral much more closely than during any time in the history of the mill. The new machinery came from the reliable old house of Fraser & Chalmers, Chicago, that furnishes nine-tenths of the legitimate mining companies of the Rocky Mountain country with plants that always give satisfaction. C. H. Wilkie superintended the construction of the machinery, while Frank Milstead has charge of the running of the mill. The amalgamating process works particularly satisfactory, as does every portion of the new plant. The mill is now one of the most complete in the Territory, and is doing work second to none.

#### OREGON.

**HAVE DONE WELL.**—Jacksonville Times, July 2: The miners of Grave, Wolf and Cayote creeks, Josephine county, have generally done well during the past season. Geo. H. Lynch and others, while engaged in running a ditch in the Wagner creek district, discovered two quartz ledges which promise well. We learn that Desselles & Connell, of Scotch gulch, have sold their well-known mining claim to a Chinese company for \$25,000. It is one of the best in the State. The Wagner creek quartz mill is running regularly now and crushing a considerable quantity of ore daily. Some more machinery will be put in before a cleanup is made. Ex-Governor Chadwick has some intentions of putting in a mill at his quartz ledge near Rogue river, and has had that stream examined with the intention of securing water-power. McDonough & Co. struck another small pocket in their ledge near Fort Lane, which yielded a neat sum of money. The Sterling Mining Co. are about bottoming up and will soon commence their annual cleanup. Their ditch is full, but as the snow at its source has melted the supply will soon begin to fail. Smith & Lynch, who purchased the diggings on Wagner creek in which S. McConnell found a \$300 slug last spring, have had a ditch surveyed to bring enough water to them to insure several months' run. It will be nearly three miles long. The miners of Foot's creek are cleaning up with favorable results. Most of them have done better this season than for several past. Shepherd Bros., who are working their ledge on Sugar Pine gulch, two miles south of Ashland, have had some rock tested and \$40 to the ton is reported. The placer miners of Southern Oregon have generally gone into summer quarters. Much more gold dust has been taken out during the past season than for several past. The Wagner Creek Mining Co.'s large new mill, in which Messrs. Koehler and Brandt, of the O. & C. R. R., are interested, will soon be grinding at its fullest capacity. Much faith is put in the mines of Wagner creek, and we hope to see it fully realized. Prospects at the Hope ledge on Wagner creek, owned by Messrs. Bragdon, High, Garret, Alford and others, are of a favorable nature. They have sunk a shaft 50 feet deep, where the ledge is over four feet wide and yields ore containing considerable free gold. Brown & Co.'s mill, in the vicinity of the Swinden ledge, is doing good work. The stamps purchased of N. DeLamater, of Kerbyville, are being used and prove much more satisfactory than the grinding apparatus heretofore utilized. There is said to be endless quantities of decomposed quartz, which is easily worked and pays well. Several hundred dollars have already been realized. Chas. Baume, of the U. S. bakery, has bought the machinery formerly used by Beekman & Klippel, and will add enough to it soon to make it a first-class ten-stamp mill. He has also purchased the old Bowden mill-site on Jackson creek, in which vicinity exist excellent mines, in some of which he is interested. It is expected that there will be enough ore on the dump to keep the mill running when it is completed, which will probably be in the course of a few months.

#### UTAH.

**REVIEW.**—Salt Lake Tribune, July 2: Bullion receipts in this city for the six months of 1886 were as follows: January, \$328,852.66; February, \$456,024.03; March, \$469,722.63; April, \$519,666.08; May, \$387,891.49; June, \$527,036.97; total, \$2,689,243.86. This excludes all ores, and reckons only the bullion and refined precious metal produced. The receipts of ore in this city for the week ending June 30th, inclusive, were \$58,575.57—a good average. Of bullion in the same time, the receipts were \$101,002.08—a total of \$160,178.55. For the previous week the total receipts were \$204,790.88, of which \$109,001.47 was bullion and \$95,789.41 was ore. No bullion came down from the Ontario during the week; the run of the silver stream has not begun since the cleanup at the mill. The ore sales for the week were two lots, of an aggregate value of \$17,003.34. The Daly product for the week was 16,511.36 fine ounces. Base bullion receipts for the week were \$17,950; one silver bar, \$150; fine bars, \$1300. The product of the Hanauer smelter for the week was \$35,485; of the Germania, 12 cars, \$25,717.34; of the Pascoe, \$1675. The Stormont sent up, on the 25th, silver bars valued at \$3224. The Alice reported, on the 29th, 19 bars of bullion, \$16,100.64. Ore receipts were: By Wells, Fargo & Co., \$21,300; by McCormick & Co. (including \$1270 Queen of the Hills), \$18,330; by T. R. Jones & Co., \$18,575.57.

#### List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 262 Market St., S. F.

FOR WEEK ENDING JUNE 29, 1886.

- 344,563.—BELTING—J. D. Channell, Nevada City, Cal.
- 344,519.—SETTLER—Clayton & Mackie, Salt Lake City, U. T.
- 344,520.—CONCENTRATOR—Clayton & Mackie, Salt Lake City, U. T.
- 344,357.—MECHANICAL MOVEMENT—S. Desvisme, Los Angeles.
- 344,370.—WHISTLE, MATCH SAFE AND CIGAR CUTTER—A. Greth, S. F.
- 344,373.—SIGN—H. L. & W. L. Harris, S. F.
- 344,654.—GAS REGULATOR—H. L. & W. L. Harris, S. F.
- 344,532.—ELECTRIC LIGHT REFLECTOR—W. A. Jones, S. F.
- 344,538.—LAMP FILLER—J. M. McFarland, Virginia City, Nev.
- 344,456.—BRIDLE BLIND AND LOOP—H. J. Noyes, S. F.
- 344,401.—CAR AXLE BOX—J. Petithomme, Sac.
- 344,682.—ANIMAL EXTERMINATOR—M. Scholl, S. F.
- 344,689.—CARRIAGE GEAR—Edward Squires, Beaverton, Oregon.
- 344,466.—KNITTED STOCKING—Frank Wilcomb, S. F.
- 16,758.—DESIGN, BRIDLE BIT—W. Davis, S. F.
- 16,762.—DESIGN METAL INGOT—F. B. Morrow, S. F.

#### Mining Share Market.

The holidays closed up mining stock operations for several consecutive days, but some little activity is being shown. An important improvement in the Comstock shaft and middle Comstock mines helped the market. Good ore has been found in the face of the station being cut out for the 3200 level from the Combination shaft of the Chollar-Norcross-Savage Companies. This station occupies the entire west side of the shaft, therefore is 30 feet in width. It has been excavated to a distance of 20 feet west from the shaft, presenting a face 30 feet wide by about 11 or 12 feet in height. At this point a clay seam was found, smooth and standing nearly perpendicular. Considerable quartz had already been met with in opening the station, some of which gave low assays of the precious metals. The apparent clay wall proved to be a narrow seam two or three inches thick. Immediately beyond it a splendid vein of pure quartz was cut into, which showed good ore. Samples taken from various points across the face show it to be a genuine ore vein, and the quartz is of that peculiar sugary, granulated texture and fertile, kindly character peculiar to the bonanza sections heretofore worked in the Comstock, and not partaking at all of the hard and less tractable character found in the 3000 and levels above. Assays from select pieces give results as high as \$100 and \$200 per ton. Superintendent Hamilton shoveled out a sack of it, getting as fair an average as possible, and it assayed from \$2 to \$70 per ton. It may not be classed as a high-grade proposition just yet, but the existence of a strong ore-bearing vein of such a character at that depth and locality is of very important significance. It lies in Chollar ground, 60 feet south of the Norcross south line, near the east side of the great main Comstock ore channel, 300 feet further south than any ore has yet been found in the deep exploration of the middle mines. It is considered to be a continuation of the good ore streaks and deposits heretofore found in the explorations of the Hale and Norcross from the 2400 level down.

#### Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Alice, June 29, \$27,280; Navajo (for June), \$51,236; Silver Bow, 30, \$18,160; Lexington, 30, \$17,920; Dexter, 30, \$3200; Stormont, 28, \$3224; Hanauer, 29, \$5425; Germania, 29, \$3825; Alice, 30, \$16,100; Pascoe, 29, \$1675; Germania, July 1, \$4499; Alice, July 2, \$16,692; Germania, 2, \$4293; Hanauer, 2, \$5895; Pascoe, 2, \$1505; Queen of the Hills, 2, \$1300; Hanauer, 3, \$2900; Germania, 3, \$4433; Germania, 4, \$2161; Hanauer, 4, \$2900; Stormont, 4, \$2230; Queen of the Hills, 4, \$1400. The shipments of ore out from Salt Lake City for the week ending Saturday, July 3d, inclusive, were 36 cars of bullion, \$69,832 pounds; 14 cars of ore, 403,400 pounds; 5 cars copper ore, 143,400 pounds; total, 1,416,632 pounds.

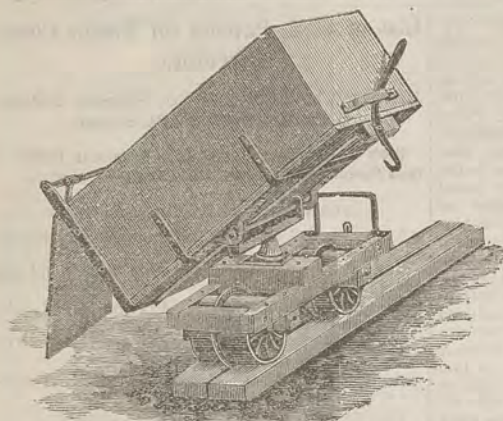
#### Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

#### Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.





JAMES' PATENT ORE CAR.

This Car has two double Tread Wheels that carry it on two pieces of scantling laid side by side, two inches apart, making a track ten inches wide for the car driver to walk upon, and only requires a narrow space in the tunnels or drifts for the track. **PRICE, \$35.00.**

We have recently furnished the contractors the machinery for LA TRINIDAD (300 tons per day) and SILVER QUEEN (100 tons per day). These mines are located in Mexico and owned in London. The Process is the Wet Concentration and the plants are, without doubt, the most substantial and complete ever built.

25, 27, 29 &amp; 31 MAIN ST., SAN FRANCISCO.

91 &amp; 93 FRONT ST., PORTLAND, OREGON.

## TATUM &amp; BOWEN,

## JAMES' PATENT ROCKING STAMP QUARTZ MILL.

PRICE, \$350.00.

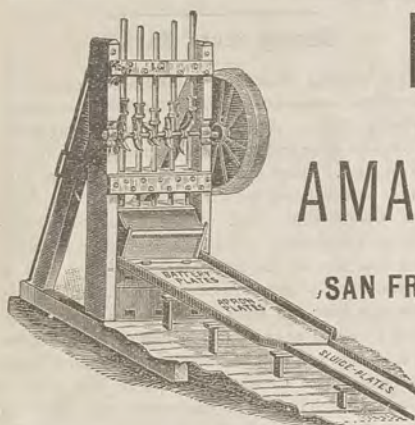
CAN BE SEEN IN OPERATION AT OUR WORKS.

It is the CHEAPEST, SIMPLEST, MOST DURABLE and EFFECTIVE MILL for the Reduction and Amalgamation of Gold Ores.

NO WEAR EXCEPT ON SHOES AND DIES.

Combined weight of Boss and Shoes (1400 lbs.) is alternately imparted to EACH Shoe with any requisite degree of rapidity.

It saves a higher percentage than any other machine, and requires no skilled labor to set up and run. Weight, 3000 pounds. Capacity, 6 tons in 24 hours through No. 40 Screen. Requires 4 H. P.



## NOTICE TO MINING MEN!

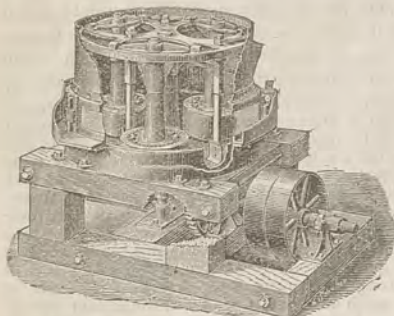
### SILVER PLATED AMALGAMATING PLATES FOR SAVING GOLD!

Get our Prices before ordering elsewhere. Samples furnished on application.

SAN FRANCISCO NOVELTY AND PLATING COMPANY, Removed to 108 First St.

JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 &amp; 523 Market St., San Francisco.

NOTICE TO MILL MEN.—All our plates are guaranteed to have the Full Weight of Silver agreed upon, and are all tested before leaving our Works, thereby avoiding the complaints about light-weight, made so often formerly before our starting in this branch of business. PLATES CAN BE FURNISHED AT ANY PRICE REQUIRED.



Centrifugal Roller Quartz Mill.

## F. A. HUNTINGTON,

MANUFACTURER OF

## Centrifugal Roller Quartz Mills,

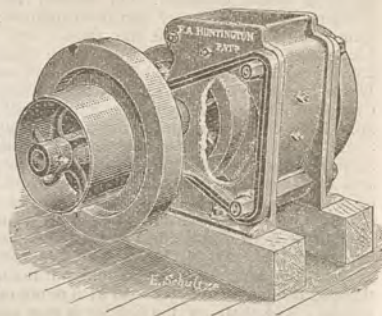
### CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,

Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.



SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS!

### SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

BEST SOFT LAKE SUPERIOR COPPER USED.

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.  
E. G. DENNISTON, Proprietor.

These Plates can also be procured of JOHN TAYLOR &amp; CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

## CINCINNATI

### CORRUGATING COMPANY.

## Over 1500 Tons Iron in Stock!

FOUR WIDTHS OF CORRUGATIONS MADE!  
STANDING SEAM PLAIN ROOFING!  
All Paint Re-ground in Pure Linseed Oil!

DEWEY &amp; CO., { No. 252 MARKET ST. } PATENT AGENTS.

JOHN F. HAZEN, Prest.

JAMES HICKS, Treas.

J. G. BATTELLE, Sec'y.



## JENKINS PATENT VALVES.

Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over all other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN &amp; CO., San Francisco, Cal.

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco,



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,  
JIGS and TROMMELS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



HOISTING

ENGINES,

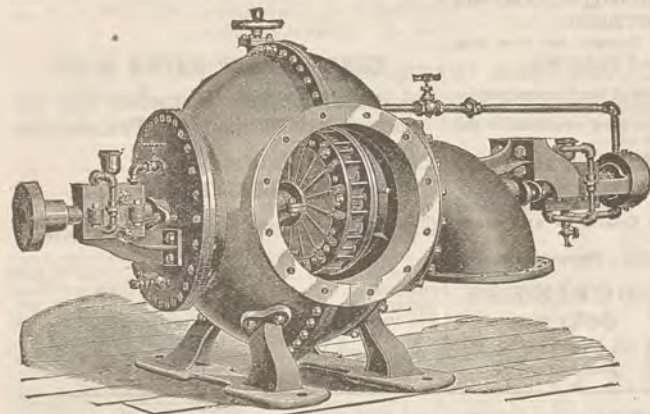
HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.  
NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.  
MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.  
UTAH OFFICE—SALT LAKE CITY, UTAH.



## JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.  
Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.  
Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

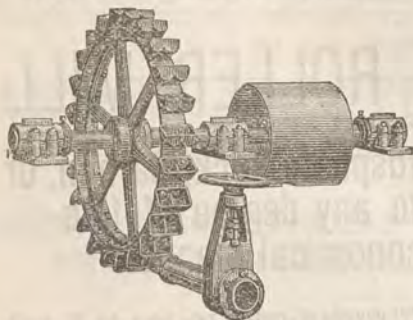
JAMES LEFFEL & CO.,  
Springfield, Ohio, Or 110 Liberty St., New York  
FRASER & CHALMERS, General Agents,  
Chicago, Ill., and Denver, Col.  
PARKE & LACY, General Agents, San Francisco, Cal.

### THE HARTSFELD Portable Smelting Furnace Co.

OF NEWPORT, KY., U. S. A.  
Desires to send free full illustration and price list of their latest improved patents of Smelting and Mining Machinery adapted for the economical treatment of all low-grade ores in Europe and the U. S. of A. The Canada patent rights for sale on shares, royalty or otherwise. Address as above.



### PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 per cent, distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,  
Nevada City, Nevada Co., Cal.  
AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY is the oldest established and most successful on the Pacific Coast. No. 259 Market St. Elevator 12 Front St., S. F.

## THE SCIENTIFIC PORTABLE FORGE AND BLACKSMITH HAND BLOWERS.



GUARANTEED  
The Lightest Running! The Strongest Blast!  
The Most Durable!

ADAPTED TO ALL KINDS OF WORK,  
AND MADE IN STYLES AND SIZES TO SUIT.

THE FOOS MANUFACTURING CO., - - Springfield, Ohio



## ADAMANTINE Shoes, Dies and Crusher Plates

We manufacture the above Adamantine Shoes, Dies and Crusher Plates. They are in use on the hardest quartz in the United States and South and Central America, and have been for the last ten years; we warrant them to out-wear three (3) sets made of any other metal, and many report that they last from 4 to 8 times longer than any other make. They never break AT THE SHANK, and the wear is so light that little or no foreign matter gets mixed with the crushed ore.

Also CHROME CAST STEEL for Mining and General Use, of the finest quality.  
For further particulars, address

### CHROME STEEL WORKS,

H. D. MORRIS, Agent, 22 Fremont St., San Francisco.  
When ordering, a rough sketch, with full dimensions, is all that is necessary.

## CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.  
STEIGER & KERR, Occidental Foundry,  
No. 137 FIRST STREET, SAN FRANCISCO, CAL.  
IRON CASTINGS OF ALL DESCRIPTIONS.

## Metallurgy and Ores.

### SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY  
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,  
LEAD PIPE,  
SHEET LEAD,  
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,  
Under Chamberlin Patent.

### Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,  
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869.

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

### THOMAS PRICE'S

ASSAY OFFICE,

CHEMICAL

LABORATORY

Bullion Rooms and Ore Floors

No. 524 Sacramento Street,  
San Francisco.

J. KUSTEL. H. KUSTEL.  
★ METALLURGICAL WORKS,  
318 Pine St. (Basement),  
Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.  
Assaying and Analysis of Ores, Minerals and Waters.  
Mines Examined and Reported on.  
Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,  
Mining Engineers and Metallurgists.

C. H. AARON,

ASSAYER AND METALLURGIST,

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

515 California Street,

bet. Montgomery and Kearny, SAN FRANCISCO.

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

### JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - - San Francisco.

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Mullers, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.



## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co.	Nevada.	29.	25.	May 28.	July 2.	July 22.	B Burris.	329 Montgomery St
Belmont M Co.	Nevada.	40.	10.	Apr 30.	July 8.	Aug 3.	J W Pew.	310 Pine St
Bodie Tunnel & M Co.	California.	13.	25.	May 28.	July 6.	July 26.	C C Harvey.	309 California St
Bodie Con M Co.	California.	5.	50.	June 21.	July 26.	Aug 16.	G W Sessions.	309 Montgomery St
Best & Belcher M Co.	Nevada.	34.	50.	June 14.	July 23.	Aug 9.	W Willis.	309 Montgomery St
Crocker M Co.	Arizona.	3.	20.	May 25.	July 3.	Aug 28.	A Waterman.	309 Montgomery St
Dudley M Co.	California.	12.	25.	June 21.	July 23.	Aug 16.	J Stedfield Jr.	309 Montgomery St
Golden Fleece G M Co.	California.	53.	50.	May 23.	July 13.	Aug 2.	W J Gleason.	419 California St
Gould & Curry S M Co.	Nevada.	53.	50.	June 21.	July 26.	Aug 17.	A K Durbrow.	309 Montgomery St
Live Oak Drift G M Co.	California.	1.	25.	May 25.	June 30.	July 22.	T Wetzel.	522 Montgomery St
Mexican M Co.	Nevada.	32.	25.	June 17.	July 22.	Aug 12.	C E Elliott.	309 Montgomery St
Mayflower Gravel M Co.	California.	31.	25.	July 1.	Aug 9.	Aug 31.	J Morizio.	328 Montgomery St
North Peer M Co.	Arizona.	3.	02.	May 19.	June 24.	July 19.	H Deas.	309 Montgomery St
Ophir S M Co.	Nevada.	51.	25.	June 7.	July 13.	Aug 9.	E B Holmes.	333 Montgomery St
Peerless M Co.	Arizona.	8.	50.	May 12.	June 25.	July 16.	A Waterman.	309 Montgomery St
Palomas Placer M Co.	California.	1.	02.	June 1.	July 5.	July 19.	D Buck.	309 Montgomery St
Potosi M Co.	Nevada.	24.	30.	June 25.	July 25.	Aug 19.	C E Elliott.	309 Montgomery St
Sierra Nevada S M Co.	Nevada.	85.	25.	May 27.	July 1.	July 20.	E L Parker.	309 Montgomery St
Savage M Co.	Nevada.	66.	50.	June 17.	July 20.	Aug 9.	E B Holmes.	309 Montgomery St

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Best & Belcher M Co.	Nevada.	J M Willis.	309 Montgomery St.	Annual.	July 12
Union Con M Co.	Nevada.	J M Burlington.	309 California St.	Annual.	July 19

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Holmes M Co.	Nevada.	C E Elliott.	309 Montgomery St.	25.	Mar 20
Mono M Co.	California.	G W Sessions.	359 Montgomery St.	25.	Mar 10
Silver King M Co.	Arizona.	J Nash.	328 Montgomery St.	25.	July 15
Young America M Co.	California.			40.	May 20

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING June 17.	WEEK ENDING June 24.	WEEK ENDING July 1.	WEEK ENDING July 8.
Alpha.	.75	.89	.85	.95
Alta.	.40	.45	.40	.45
Andes.	.10	.10	.10	.10
Argenta.	1.15		1.25	
Belcher.	.80	.90	.95	1.15
Belling.	.28	.30	.25	.30
Best & Belcher.	.80	.90	.95	1.15
Bullion.	.28	.30	.25	.30
Bonanza King.				
Bodie Lode.	1.40	1.80	1.40	1.90
Benton.	.05	.05	.05	.05
Bodie Tunnel.	.60	.75	.85	1.05
Bulwer.	1.60	1.75	1.50	1.70
California.	1.15	1.20	1.30	1.40
Challenge.			.35	.40
Champion.	.35	.45	.40	.45
Chollar.	2.25	2.40	2.25	2.40
Confidence.	2.25	2.40	2.25	2.40
Con. Imperial.	.10	.15	.10	.15
Con. Virginia.	1.15	1.20	1.30	1.40
Con. Pacific.	.35	.40	.35	.40
Crown Point.			1.10	1.20
Day.	2.25	2.30	2.40	2.50
Eureka Con.	.05	.10	.05	.10
Eureka Tunnel.	.05	.10	.05	.10
Excelsior.	.30	.40	.30	.40
Grand Prize.	.80	.90	.80	.90
Gould & Curry.	.80	.90	.80	.90
Goodshaw.	2.00	2.10	2.00	2.10
Hale & Norcross.	2.00	2.10	2.00	2.10
Holmes.	2.00	2.10	2.00	2.10
Independence.				
Julia.	.15	.20	.15	.20
Justice.	.15	.20	.15	.20
Martin White.	2.00	2.10	2.00	2.10
Mono.	2.00	2.10	2.00	2.10
Mexican.	.33	.35	.30	.35
Mt. Diablo.			3.00	3.10
Northern Belle.	.60	.70	.65	.75
Navajo.	.35	.45	.35	.45
North Belle Lode.	.85	1.00	.85	1.00
Ophir.	.38	.40	.35	.40
Overman.	.30	.40	.30	.40
Potosi.	.45	.50	.40	.50
Pinal Con.	.90	1.20	1.10	1.40
Savage.	.90	1.20	1.10	1.40
Seg. Belcher.	.30	.35	.30	.35
Sierra Nevada.	.30	.35	.30	.35
Silver Hill.	.75	.85	.75	.85
Silver King.	.75	.85	.75	.85
Scorpion.	.20	.25	.20	.25
Syndicate.	.20	.25	.20	.25
Union Con.	.37	.40	.35	.40
Utah.	.50	.60	.50	.60
Yellow Jacket.	.70	.85	.75	.90

## New York Metal Market.

Telegraphic advices dated July 8th give the following New York prices:

BORAX—6½¢ @ 7¼¢.  
 BAR SILVER—97½¢ per oz.  
 COPPER-LAKE—\$10.00 @ 10.12½¢.  
 IRON—No. 1, \$17 @ 18.00; No. 2, \$15 @ 16.00.  
 LEAD—\$4.85 @ 4.95.  
 QUICKSILVER—43 @ 43½¢ @ lb.  
 The following is the latest by mail from the "New York Metal Exchange Market Report":  
 COPPER—Again nominal; Lake offered at 9.75¢ @ 9.85¢. Transferable Notices (Lake) offered at 10.00; Transferable Notices (Chili Bars) offered at 10.40.  
 LEAD—Firm at 4.90 @ 5.00. Transferable Notices (Domestic) issued at 4.95.  
 TIN—Quiet and easier, closing at \$22.35 @ 22.50. Transferable Notices issued at \$22.50.  
 TIN PLATE—Dull. Transferable Notices issued at \$4.30.  
 SILVER—New York, 97½¢ per oz. London, 44½¢.

MAKER'S PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge, \$15.00 @ 16.00. Hudson River, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge \$15.00 @ 16.00. Southern, Grade No. 1, \$18.00 @ 18.50; No. 2, \$17 @ 17.50; Grey Forge \$15 @ 16.  
 Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.35 @ 22.60; Billiton Tin, \$22.75 @ 23.00; Banca Tin, \$22.75 @ 23.10; Baltimore Copper, \$9.75 @ 10.00; Orford Copper, \$9.75 @ 10.00; P. S. C. Copper, \$9.75 @ 10.10; Foreign Lead, \$4.95 @ 5.05; Foreign Spelter, \$4.70 @ 4.75.

## FOR SALE.

Half Interest in Patent Right and Manufacture of the finest Quartz Breaker and Pulverizer of the age.

Machines in operation and subject to any test.

Call on C. G. Y., at office of DEWEY & CO., 252 Market Street, San Francisco.

## San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, July 8, 1886.

ANTIMONY—French Star.	9½ @
BORAX—San Bernardino.	— @ 8
Armstrong.	— @ 6½
IRON—Glenbrook ton.	— @ 22 50
Eglinton, ton.	— @ 21 50
American Soft, ton.	23 00 @ 24 00
Oregon Pig, ton.	21 00 @ 22 00
Clippert Gap, Nos. 1 & 4.	22 00 @ 23 50
Clay Lane White.	22 50 @
Shots, No. 1.	23 50 @
STEEL—English, lb.	16 @ 25
Black Diamond, ordinary sizes.	10 @
Plow.	4 @ 5
Machinery.	5 @ 6
Sanderson Bros.	10 @
COPPER.	
Braziers' sizes.	19 @
Fire-box sheets.	20 @
Bolt.	19 @
Sheathing.	18 @
Ingot.	12 @ 13
LEAD—Pig.	4 50 @ 4 65
Bar.	5 00 @
Pipe.	5 00 @
Sheet.	8 @
Shot, discount 10% on 500 bag Drop, P bag.	1 85 @
Buck, P bag.	1 85 @
Chilled, do.	2 05 @
ZINC—German.	9 @ 10
Sheet, 7x3 ft, 7 to 10 lb, less the cask.	35 00 @ 36 00
QUICKSILVER—By the flask.	1 05 @
Flasks, old.	85 @
Flasks, new.	85 @
TIN PLATE—Coke.	5 85 @
Charcoal.	6 75 @

MERIT will tell; misfit spectacles will ruin your eyesight; judge by comparison. Muller's optical depot, 135 Montgomery St. x

## ANNUAL MEETING.

Spring Valley Water Works  
San Francisco, Cal.

The annual meeting of the Stockholders of the Spring Valley Water Works will be held at the office of the company, 516 California street, on WEDNESDAY, July 21, 1886, at 12 M., for the election of Trustees for the ensuing year, and for such other business as may be brought before the meeting.

WM. NORRIS, Secretary.

## DIVIDEND NOTICE.

OFFICE OF THE

## Hibernia Saving and Loan Society

N. E. cor. Montgomery and Post Streets,  
San Francisco, July 2, 1886.

At a regular meeting of the Board of Directors of this Society, held this day, a dividend at the rate of 3½ per cent per annum was declared on all deposits, for the six months ended June 30, 1886, free from all taxes, and payable from and after this date.

R. J. TOBIN, Secretary.

NATIONAL ASSURANCE CO.,  
OF IRELAND.ATLAS ASSURANCE COMPY,  
OF LONDON.BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.

H. M. NEWHALL &amp; CO.,

GENERAL AGENTS,

309 &amp; 311 Sansome St., San Francisco, Cal.

## DIVIDEND NOTICE.

## The German Savings and Loan Society.

For the half year ending June 30, 1886, the Board of Directors of The German Savings and Loan Society has declared a dividend at the rate of four and thirty-two one-hundredths (4 32-100) per cent per annum on term deposits and three and sixty one-hundredths (3 60-100) per cent per annum on ordinary deposits, payable on and after the 1st day of July, 1886. By order.

GEO. LETTE, Secretary.

DEWEY & CO  
PATENT  
SOLICITORS.  
252 MARKET ST. S. F.  
ELEVATOR 12 FRONT ST. S. F.

THE H. H. H. Horse Liniment puts new life into the Antiquated Horse! For the last 14 years the H. H. H. Horse Liniment has been the leading remedy among Farmers and Stockmen for the cure of Sprains, Bruises, Stiff Joints, Spavins, Windgalls, Sore Shoulders, etc., and for Family Use is without an equal for Rheumatism, Neuralgia, Aches, Pains, Bruises, Cuts and Sprains of all characters. The H. H. H. Liniment has many imitations, and we caution the Public to see that the Trade Mark "H. H. H." is on every Bottle before purchasing. For sale everywhere for 50 cents and \$1.00 per Bottle.

For Sale Everywhere.

American Exchange Hotel,  
SANSOME STREET.Opposite Wells, Fargo & Co.'s Express, one door from  
Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50  
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

HEALD'S  
COLLEGE,  
24 Post St. S. F.  
Send for Circular.

## LUBRICATION.

Our readers can procure of CHARLES J. WOODBURY Manufacturer of Oils, 123 California St., San Francisco, a fine Lard Engine Oil, unsurpassed by any other Oil for general use, and which will flow through any feeder at all temperatures. Also, Cylinder Oils, Refined Cylinder Tallow, Lubric Compound, Farm, Machine, and strictly pure Lard Oil. The Woodbury Oils are in use on the Central, Southern, and Northern Pacific Railways, and on nearly every Railroad and Steamship line on the coast.

Joshua Rose's Great Treatise on  
Steam Engines.

JUST PUBLISHED.

## Modern Steam Engines.

An Elementary Treatise upon the Steam Engine, written in Plain Language, for use in the Workshop as well as in the Drawing Office; giving full explanations of the Construction of Modern Steam Engines; including Diagrams showing their actual Operation; together with Complete but Simple Explanations of the Operations of Various Kinds of Valves; Valve Motions, Link Motions, etc., thereby enabling the Ordinary Engineer to clearly understand the Principles Involved in their Construction and Use, and to Plot Out their Movements upon the Drawing Board. By JOSHUA ROSE, M. E., author of "The Complete Practical Machinist." Illustrated by 422 engravings. In one volume, 4to., 320 pages. Price, \$6.00, free of postage to any address in the World.

An Illustrated Circular, 8 pages, 4to., giving the Contents of this remarkable book, will be sent free to any one who will furnish his address.

## HENRY CAREY BAIRD &amp; CO.,

Industrial Publishers, Booksellers and Importers, 810 Walnut St., Philadelphia, Pa., U. S. A.

## ASSESSMENT NOTICE.

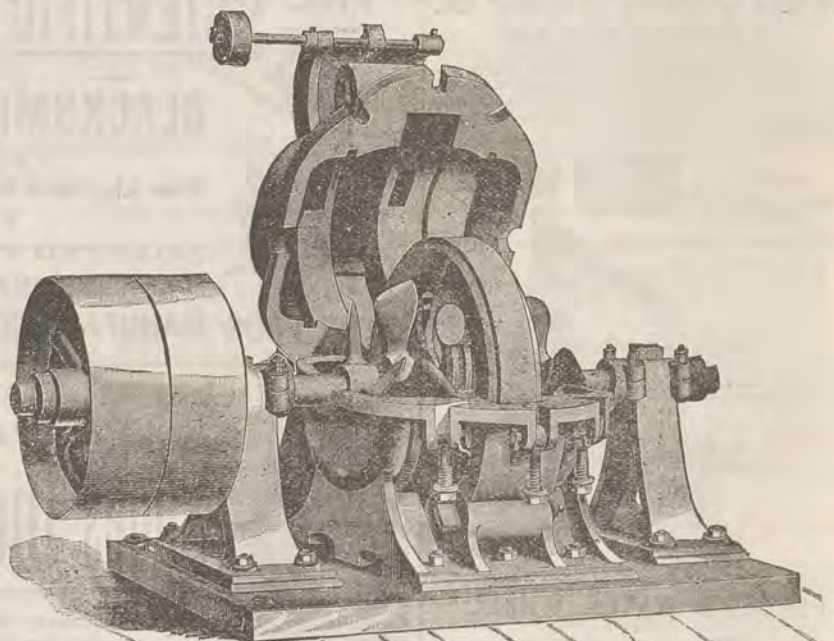
## Gould &amp; Curry Silver Mining Co.

ASSESSMENT No. 53.

Levied.....June 21, 1886  
 Amount.....Fifty Cents per Share  
 Due in office.....July 26, 1886  
 Sale Day.....Tuesday, August 17, 1886

ALFRED K. DURBROW, Secretary.  
 Office—Room 69, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

## THE FRISBEE-LUCOP MILL,

A CENTRIFUGAL ROLLER MILL  
—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco. Certificates as to performance of the Mills, and any information required, furnished on application.

THE FRISBEE-LUCOP MILL CO.,  
Office, 104 & 106 Washington St., NEW YORK.

OR PACIFIC IRON WORKS, SAN FRANCISCO.





## CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

### Sporting, Cannon, Mining, Blasting and HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

**No. 1 (XX) is the Strongest Explosive Known.**  
**No. 2 is superior to any powder of that grade.**

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street - - San Francisco, Cal.



THE CONSUMERS' COMPANY.

## VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.

218 California Street, San Francisco, Cal.

## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN &amp; CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS. SAN FRANCISCO, CAL.

CALIFORNIA

## ARTIFICIAL STONE PAVING CO.

(SCHILLINGER'S PATENT.)

—FOR—

SIDEWALKS, GARDEN WALKS, CORRIDORS, OFFICES, CARRIAGE DRIVES, STABLES and CELLAR FLOORS, KITCHENS, Etc.

The Courts here and in the East have decided that Artificial Stone Pavements with plastic concrete and in detached blocks, are infringements on the Schillinger Patent; and also, that when the plastic material is blocked off with a trowel and cut through far enough to control the cracking caused by shrinkage, that such pavement is in law the same as if laid in detached blocks, and is an infringement of the patent. All property-owners having such pavements laid without the license of the above Company, will be prosecuted.

OFFICE, 404 MONTGOMERY STREET, SAN FRANCISCO.

EGBERT JUDSON, President.

ALBERT H. REICHLING, Secretary.

G. GOODMAN, Manager

## H. P. GREGORY & CO.

Nos. 2 and 4 California St.,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

# MACHINERY

SOLE AGENTS FOR

J. A. FAY &amp; CO.'S WOODWORKING MACHINERY.

FRANK &amp; CO.'S WOODWORKING MACHINERY.

NEW HAVEN MANUF'G CO.'S MACHINISTS' TOOLS.

BEMENT &amp; SON'S MACHINISTS TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND EXHAUSTS.

SHIMER MATCHER HEADS.

BRANARD MILLING MACHINES.

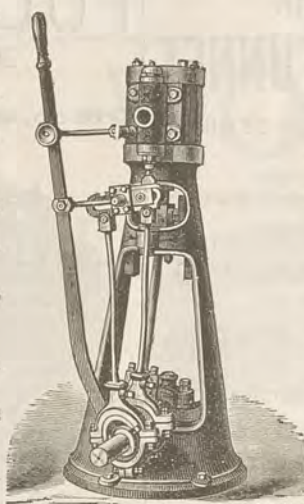
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS.

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISHERS.



WILLIAMSON BROS' HOISTING ENGINES.

ATLAS ENGINE WORKS ENGINES AND BOILERS.

PAYNE'S VERTICAL AND HORIZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS.

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECTORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

YACHT ENGINES.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

L. C. MARSHUTZ.

G. T. CANTRELL.

NATIONAL

## IRON WORKS,

N. W. Cor. Main and Howard Sts., San Francisco,

...MANUFACTURERS OF...

Stationary and Compound Engines,

FLOUR, SUGAR, SAW and QUARTZ MILL MACHINERY.

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

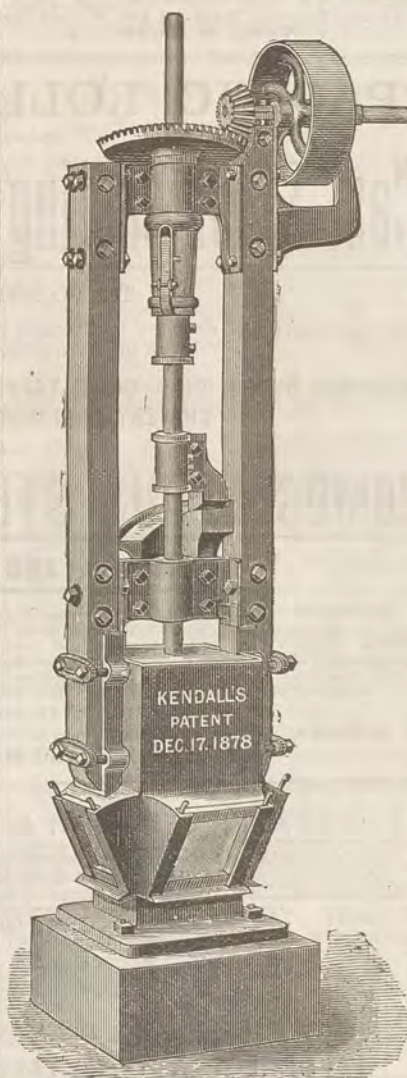
All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

...SOLE MANUFACTURERS OF...

KENDALL'S PATENT QUARTZ MILLS.

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that is claimed for it and give entire satisfaction.

MARSHUTZ & CANTRELL.  
Send for Circulars and Price List.

## RUPTURE!

A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort night and day. Gives universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDBER, (Druggist) 701 Market Street, cor. Third, San Francisco.



A Good Opportunity for a Machinist.

A variety of good Tools, Patterns, etc., with business for sale cheap by a party retiring from business. A splendid opportunity for an enterprising mechanic.

Address A. B. O., care of this paper.



**NOTICE TO  
MINING MEN,  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.**

**Engineers' Tables of Progress**

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, etc., address:

**INGERSOLL ROCK DRILL CO.,**

REPRESENTED BY

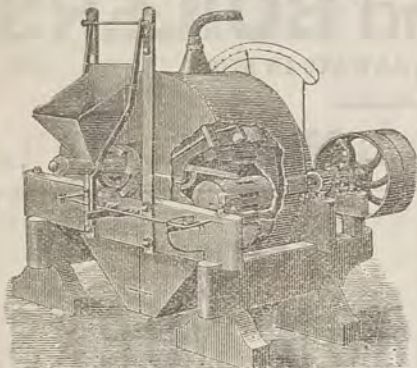
**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

**Tustin's Pulverizer  
WORKS ORE WET OR DRY**

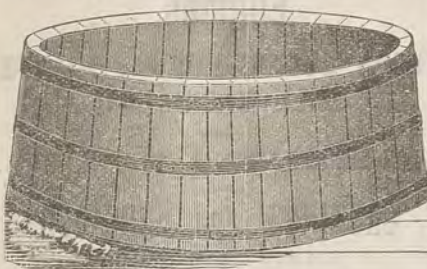
FULTON IRON WORKS, S. F.



MANUFACTURED BY

**HINCKLEY, SPIERS & HAYES,**

**Mining Vats and Tanks.**



**LEACHING VATS with FALSE BOTTOMS.  
PRECIPITATING VATS,  
SOLUTION and WATER TANKS**  
For Mining Purposes.

**WELLS, RUSSELL & CO.,**  
Mechanics' Mills, San Francisco.



The California  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

**FLOUR AND OTHER MILLS.**  
Quartz Mill Screens a Specialty.  
147 Beale Street, San Francisco

**Engraving** Superior Wood and Metal Engraving,  
Electrotyping and Stereotyping  
done at the office of this paper.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

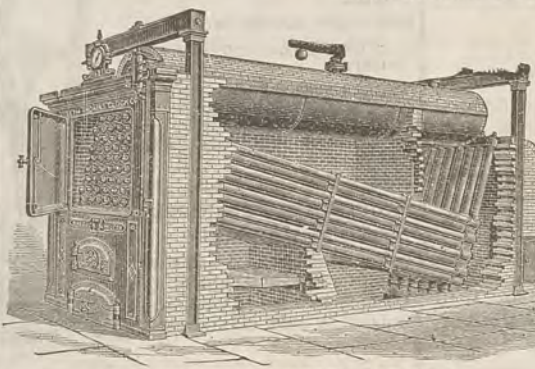
The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**  
316 California St., San Francisco.

## FULTON IRON WORKS, HINCKLEY, SPIERS & HAYES, Proprietors.

(ESTABLISHED IN 1855.)

Office, 220 Fremont St., San Francisco.  
MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

## ENGINES AND BOILERS

OF ALL KINDS,  
Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure  
or Compound, Stern or Side-wheel En-  
gines.

MINING MACHINERY—Hoisting En-  
gines and Works, Cages, Ore Buckets,  
Ore Cars, Pumping Engines and Pumps,  
Water Buckets, Pump Columns, Air Com-  
pressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for  
Dry or Wet Crushing, Amalgamating  
Pans, Settlers, Furnaces, Retorts, Con-  
centrators, Ore Feeders, Rock Breakers,  
Furnaces for Reducing Ores, Water Jack-  
ets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MA-  
CHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines  
and Boilers, Dredging Machinery, Pow-  
der Mill Machinery, Water Wheels.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.

— ALSO —

## HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/2 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**

## FRASER & CHALMERS.

CHICAGO, ILL.  
U. S. A.

General Office;  
Fulton and Union Sts.  
CHICAGO, ILL.

PERFORATED METALS FOR  
REVOLVING and SHAKING-SCREENS,  
JIGS & STAMP BATTERIES.

DENVER  
Office:  
No. 248  
18th Street,  
Denver,  
Colo.

NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.

MEXICO  
Office:  
No. 11  
Calle  
de Sanchez  
de Chihuahua,  
Mex.

UTAH OFFICE—SALT LAKE CITY, UTAH.

## Iron and Machine Works.

### California Brass Foundry,

No. 125 First Street, Opposite Minna.  
SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbit  
Metal Castings, Brass Ship Work of all kinds, Spikes  
Sheathing Nails, Rubber Braces, Hinges, Ship and Steam  
boat Bells and Gongs of superior tone. All kinds of Cocks  
and Valves, Hydraulic Pipes and Nozzles, and Hose Cou-  
plings and Connections of all sizes and patterns, furnished  
with dispatch. PRICES MODERATE.

J. H. WEED. V. KINGWELL.

THOMAS THOMPSON THORNTON THOMPSON

### THOMPSON BROTHERS, EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

— BUILDER OF —

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines  
Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. ORDERS SOLICITED.

### UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

### STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front Street, Between N and O Streets,  
SACRAMENTO, CAL.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Sts.

### N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Cata-  
logue. 17 and 19 Fremont St., San Francisco.

**RICHARD C. REMMEY, Agent,**  
**Philadelphia Chemical Stoneware Manufactory,**

1100 East Cumberland St., PHILADELPHIA, PA.

Manufacturer of  
all kinds of  
Chemical Stoneware  
— FOR —  
Manufacturing  
Chemists.  
Also Chemical Brick  
for Glover Tower.

### THE RUSSELL PROCESS COMP'Y.

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

INVENTORS, TAKE NOTICE

L. PETERSON, MODEL MAKER,

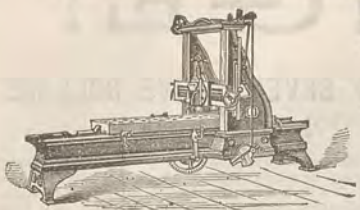
258 Market St., N. E. cor. Front (up stairs), San Francisco.  
Experimental machinery and all kinds of metal, tin,  
and Brasswork.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.

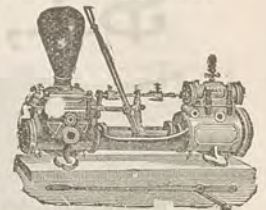


Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Knowles Steam Pump  
The Standard.

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.

# CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

## WIRE ROPE



Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.



**WIRE** Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK  
YOUR  
DEALER  
FOR



TRADE MARK.

**Barbed Wire.**

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

**WIRE CLOTH.**

Brass, Copper, and Steel, all kinds, and meshes from 1 to 10,000 to the square inch, for Quartz Screens, Flour Mills, Gravel Screens, etc.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent

L. R. MEAD, Secretary.

# THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

**QUARTZ MILLS**—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
**AIR COMPRESSORS**—Rope Power Transmission.  
**HYDRAULIC PUMPING** and Hoisting Machinery.  
**WROUGHT-IRON WATER PIPE** a Specialty. Note.—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.  
**SAW-MILL MACHINERY** of all kinds.  
**STEAM ENGINES**—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
**SOLE MANUFACTURERS** for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.  
**MACBETH PATENT STEEL-RIM PULLEYS**—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

**REFRIGERATING MACHINERY** for Steamships, Breweries, and Cellars.  
**WILSON'S PATENT GAS-PRODUCER.**  
**STEAM BOILERS** of all descriptions.  
**SUGAR MACHINERY**—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.  
**STEAMSHIPS**—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.  
Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company  
Send for Circular and Price Lists.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.  
J. C. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market &amp; Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

**STEAM, AIR, AND HYDRAULIC MACHINERY.**

**Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

**UNION IRON WORKS.**

Successors to PRESCOTT, SCOTT &amp; CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

## THE GLOBE IRON WORKS CO.

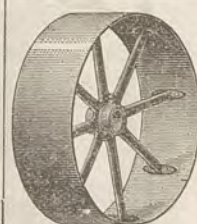
Manufacturers and Repairers of all kinds of

**MACHINERY AND CASTINGS**

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS  
LOGGING, PORTABLE, STATIONARY, MARINE  
AND LOCOMOTIVE ENGINES,

AG'TS DYER CANNON BALL QUARTZ MILL  
222 & 224 FREMONT STREET, SAN FRANCISCO.

**Chicago Prices Beaten!**  
ESTABLISHED 1860.  
**S. F. PIONEER SCREEN WORKS,**  
221 & 223 First St., cor. Tehama, S. F.  
**J. W. QUICK, Prop'r.**  
Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).  
Orders Promptly Executed



## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

**CLOT & MESE,**

Sole Licensed Manufacturers of the

**Medart Patent Wrought Rim Pulley**

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

PAT. OCT. 25, 1881.

**SHAFTING, HANGERS AND APPURTENANCES.**

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 &amp; 131 Fremont Street,

San Francisco, Cal.

**San Francisco Cordage Factory.**

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.  
Extra sizes and lengths made to order on short notice.

TUBBS &amp; CO.

611 and 613 Front St., San Francisco.

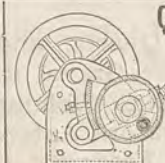
## QUARTZ BREAKERS!

—AND—

**Pulverizers Combined.**

To Run by Hand or Power.

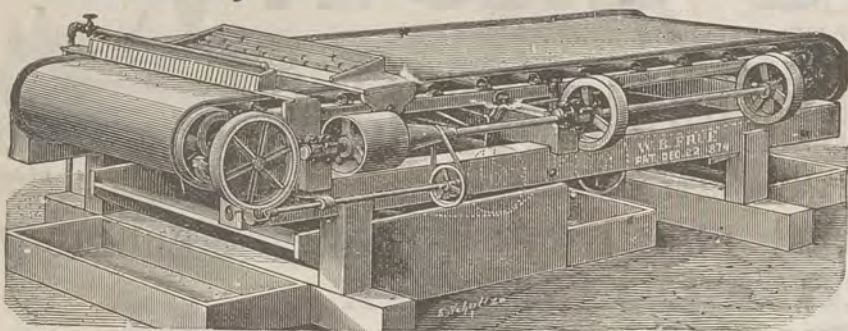
Mining Machinery of Every Description; Drawings, Plans and Specifications.



E. I. NICHOLS, 316 Mission Street, S. F.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS.**  
(\$575 00), F. O. B.

**OVER 1,000 ARE NOW IN USE.** Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

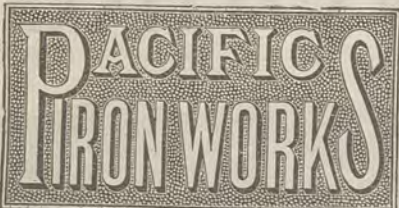
Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.



1850.

1885.

**RANKIN, BRAYTON & CO.,**  
BUILDERS OF  
**MINING MACHINERY.**

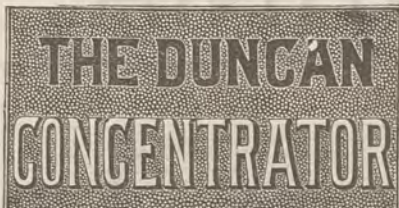
San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

## WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, A MOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER OF INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



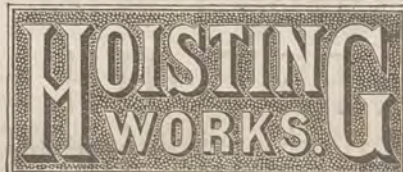
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



**Baker's Mining Horse Power.**

Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



# JOSHUA HENDY MACHINE WORKS.

(INCORPORATED SEPTEMBER 29, 1882.)

Nos. 39 to 51 Fremont Street,

San Francisco, Cal.

**MANUFACTURERS OF  
NEW and Dealers in SECOND-HAND BOILERS, ENGINES and MACHINERY  
OF EVERY VARIETY.**

Steam Pumps of all Makes,

CENTRIFUGAL PUMPS,

MINING PUMPS.

BLOWERS AND EXHAUST FANS.

LEATHER and RUBBER

**BELTING.**

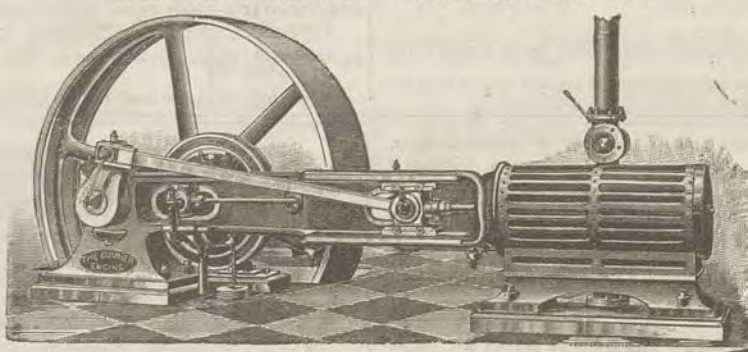
LUBRICATING COMPOUNDS and OILS  
OF THE BEST MAKES.

PIPE and PIPE FITTINGS.

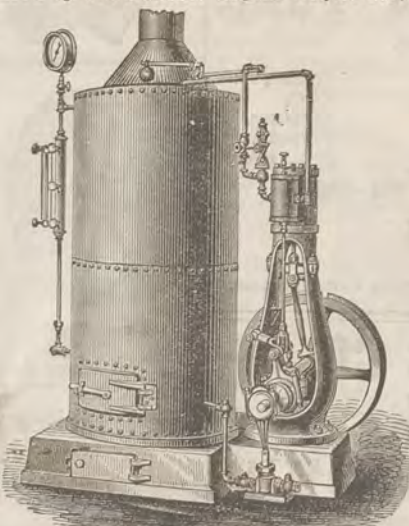
Brass Goods

AND  
FITTINGS.

Hydraulic Mining, Quartz, and Saw-Mill Machinery, Hydraulic Gravel Elevators, Hydraulic Giants, "Triumph" Ore Concentrators, Automatic Ore Feeders.



SPECIAL AUTOMATIC ENGINES.  
[Manufactured by the Cummer Engine Co., of Cleveland, Ohio.]



Upright Engines and Boilers Connected.

Stationary, Portable, and Hoisting  
ENGINES and BOILERS.

Shafting,  
Pulleys,

Boxes,

Hangers.

**WOODWORKING  
MACHINERY,**

—COMPRISING—

BAND SAWS, STICKERS,  
PLANERS, SHAPERS,  
SHINGLE MILLS, Etc.

**IMPROVED  
Single and Double Circular Saw-Mills.**

AGENTS FOR THE SALE OF

"Cummer" Engines, from Cleveland, Ohio,  
Porter Manufacturing Co.'s Engines and Boilers.  
"Baker" Rotary Pressure Blowers.  
"Wilbraham" Rotary Piston Pumps  
"Boggs & Clarke" Centrifugal Pumps.  
The Volker & Felthousen M'fg Co.'s  
Buffalo Duplex Steam Pumps.  
P. Blaisdell & Co.'s Machinists' Tools.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, JULY 17, 1886.

VOLUME LIII.  
Number 3.

## California Quicksilver Ores.

California is the only State in the Union where quicksilver ores are found and mined. Here the only quicksilver ore of great importance is cinnabar, although metacinnabarite, the black sulphide, is rather abundant in a few mines, and metallic quicksilver sometimes accompanies the deposits of its compounds. The metacinnabarite described by Dr. G. E. Moore was amorphous, but according to Mr. Goodyear it also occurs as minute crystals. Cinnabar is found in a great number of localities in the Coast ranges for 100 or 150 miles north and south of San Francisco, always, so far as known, in metamorphic rocks of cretaceous age. Dr. Geo. F. Becker, in his geological sketch of the Pacific Division, in the census reports, states that the metamorphism is generally peculiar, and the so-called quicksilver rock is readily recognizable. It is a silicified chert-like material often reddened by iron-oxide, and usually accompanied by serpentine or serpentoid matter. In almost all cases pyrite or marcasite and bituminous matter accompany the cinnabar, and mispickel and copper pyrite are reported in a few instances. At Sulphur Banks, on Clear lake, native sulphur occurs in quantities with the quicksilver ore, and native gold has been found on water-worn masses of cinnabar not far from the same locality. The usual gangue minerals are quartz, calcite and magnesite.

Cinnabar does not occur in well-marked veins, but generally in irregular bodies distributed through the rock. In the New Almaden mine, which has been more extensively worked than any other in the State, these bodies appear to lie on a curved surface, indicating a geometrical relation between the position of the several ore bodies, though an obscure one. At this mine the masses of ore are usually connected by tiny seams of the same material. There is a strong similarity between this mode of occurrence and that of many lead-ore deposits in limestone, and it may be, Dr. Becker thinks, that their true character is the same.

The quicksilver country north of San Francisco is a volcanic region, while to the south volcanic rocks are subordinate in some localities and wanting in others. To the south, too, there is no indication of recent deposition of the ore, while to the north deposition is still actually in progress. No general inference to the genesis or age of the deposits can therefore be drawn without fuller investigation (which is now going on under the direction of Dr. Becker, of the U. S. Geological Survey), while the great similarity in the association of minerals suggests a similar origin for most of them.

It is reported that the railroad company has bought a third interest in the recently-discovered coal mine on Clover creek, Shasta county, and if, after running a 70-foot tunnel, it continues to hold out as good as present prospects, they will put in a branch railroad.

## Improvement in Rock Drills.

It is usual in machine or power drills to hold the drill constantly to the base of the hole. Where the rock is seamy the drill has a tendency to go off at an angle and then cramp or bind itself. This is caused by the seam which makes the rock immediately adjacent to or in front of it break off at an angle, and the end of the drill-bit being always against the base of

drill, whereby it is adapted to be thus retracted without interfering with its rotary movement; in a peculiar chuck on which the drill is mounted, and in the general combination of operative parts.

LICK OBSERVATORY.—In regard to the Lick Observatory it is stated that it is expected that the great dome and telescope will be completed some time next summer, and the whole im-

Fig. 1. Section through YZ.

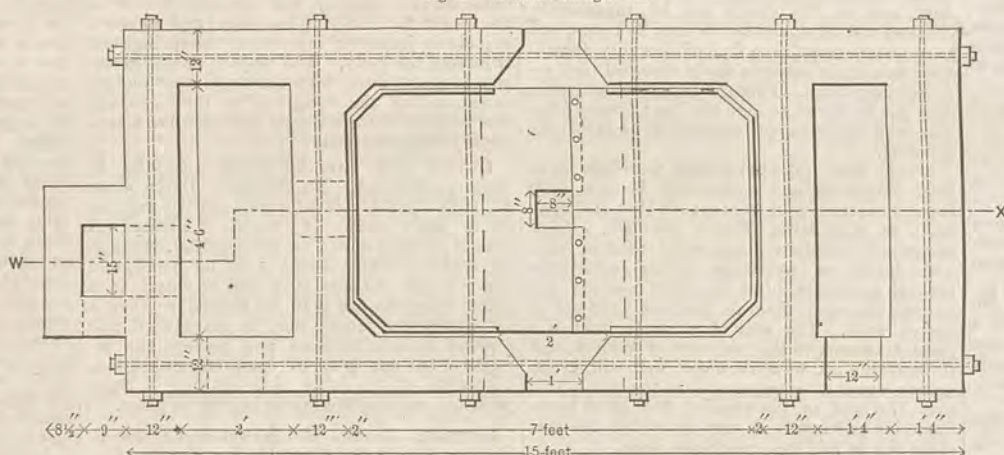


Fig. 2. Section through WX.

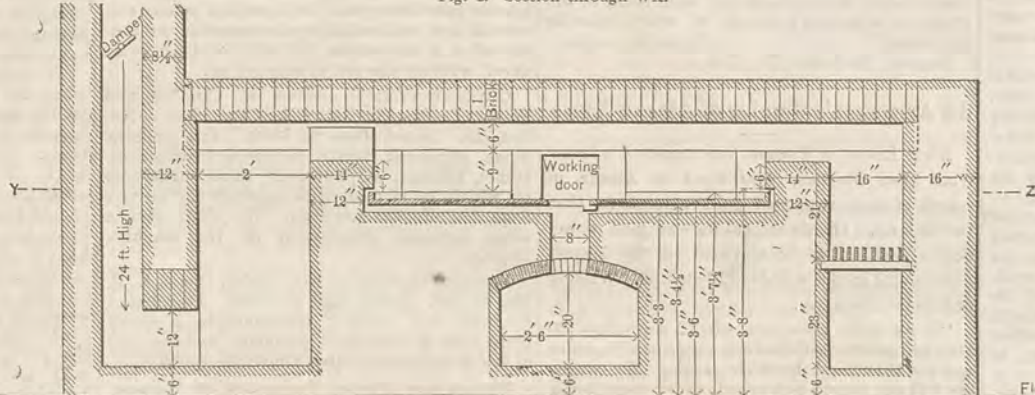
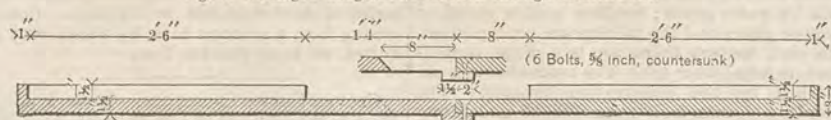


Fig. 3. Enlarged Longitudinal Section through Hearth-Plate.



## FURNACE FOR ROASTING BULLION.

the hole, has no opportunity to correct this and straighten the hole, its ordinary rebound not being sufficient for this purpose; but by positively retracting the drill, it is enabled to come back in contact with the high point of the hole just behind, and thus to straighten it. Again, where a down-hole is being made, it is very difficult to reduce the pulverized and broken pieces of rock to a pulp; but by positively withdrawing the drill a short distance between blows it will permit the water which is poured into the hole to get to the bottom, and reduce the debris to a pulp of such consistency that it can readily be discharged.

Chas. O. Barlow of this city has just patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, a device to overcome these difficulties. It consists in a novel means by which the drill-bit is positively retracted from the bottom of the hole, and allowed to spring forward again between the intervals of the blows. It consists further in the peculiar means for mounting the

mense establishment be ready to turn over to the University of California in a little over a year from this date. Of the original \$700,000 devised by James Lick for the construction of the telescope and observatory, it is thought that about \$500,000 will have been expended, and the remaining \$200,000 will be turned over to the University Regents as a partial endowment for its maintenance. This amount will be insufficient for the purpose, as the salaries of a score of competent astronomers and their assistants and the other expenses will amount to at least \$20,000 per year. A considerable deficit will, therefore, have to be provided by the State or by private munificence.

HERR KRUPP has contracted to supply China with 1500 tons of rail at a price, including freight, 25 s. below the lowest English offer.

JOHN W. MACKAY, the mining millionaire, has returned to this city. He will remain on the coast for some little time.

## Furnace for Roasting Bullion.

On page 35 of this number of the PRESS is an article descriptive of the process used for refining copper bullion on the Comstock. The iron Chili mill for crushing said bullion is described in the PRESS of June 19th, on page 405. The roasting furnace, a small reverberatory used only for bullion in this process, is shown on this page. Its construction is shown in Figs. 1 and 2. The hearth (Fig. 3) was composed of two cast-iron plates bolted together and bedded in sand. The furnace walls were recessed on all sides of the plates, as indicated in the drawing. This construction allowed the expansion and contraction of the hearth and prevented the charge from spilling over the edges of the plates. Iron plates were used, in order that no bullion should be left on the hearth after a charge had been drawn, a matter of importance in making tests and in refining for other companies, some of which, as the Bonanza firm, were very particular in their requirements. The space between the hearth and the chimney served as a dust chamber and proved of ample capacity, the amount of "dust" formed being small.

Red bricks were used, except for the parts directly exposed to the flame. The mortar for all inside work was a mixture of sand and clay (materials, by the way, to be had for the hauling), lime being used only for the masonry not affected directly by the fire. The arch was built of one layer of brick set on end and covered with a bed of sand. Air-holes (not shown in the sketch) were originally provided for admitting air through the fire-bridge and the arch to the hearth, and also through the wall into the fire-place, but they seemed to serve no useful purpose, and in time became obliterated. The chimney was 9" x 15" in section and 24 feet high.

The fire-place for the sulphurizing kettle was built against the chimney, into which its draft was led. When the kettle was in operation any escaping sulphur fumes were conducted into the chimney by means of an arrangement of wood and pipes of very light sheet iron which could be raised or lowered at pleasure.

NOGALES.—A dispatch from Nogales, Arizona, dated July 13th, says: The Nogales and Sonora Mining and Smelting Company start their smelter in operation to-morrow morning. They now have about 40 carloads of ore here from their mine, situated near Llano. The Mexico Company have put a number of 12-mule teams hauling ore from their mine to Llano station, and expect the smelter to run without interruption.

DURING the month of June shipments of quicksilver were made from Calistoga to San Francisco by the following mines: Great Western, 137 flasks; Napa Consolidated, 131 flasks; Sulphur Bank, 67 flasks. Total for the month, 335 flasks, or 25,460 pounds. The metal is worth \$36 per flask, and the month's shipments were therefore worth \$12,060.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

## Natural Gas.

EDITORS PRESS:—In a former letter from this point I alluded to natural gas. This phenomenon, for it deserves that name, is growing in importance, and impresses one as the greatest fact in this busy city.

Pipes are being laid in all directions, some of the mains 24-inch diameter, and it will only be a short time when the soot and grime of Pittsburgh will be a thing of the past.

The influence on manufactures will be enormous, especially in the glass interest, where the absence of soot and its contamination is a matter of much more importance than convenience and saving in expense.

Already there are being made here varieties of glass, for mirrors for example, that it has been impossible to produce with bituminous coal for fuel.

The influence on general manufactures throughout the country is another problem.

In so far as iron working and iron making, the effect will not be so great as in some other industries involving high heating.

A steel manufacturer said to me to-day: "How can gas much cheapen my work when I melt four pounds of steel with one pound of slack?" Sixty cents for fuel to melt a ton of steel cannot be much improved, certainly!

I visited the Edgar Thompson Steel Works recently and found the soot and smoke had disappeared.

These enormous works, now producing over 600 tons daily, are being extended, and as the price of rails, the only article made there, is \$10 per ton higher than last year, there is, of course, a large profit.

Reverting again to gas, who would suspect that "smoke" has been the main cause of that backward policy in Pittsburgh which contrasts so unfavorably with Cleveland, its near neighbor, and many other cities that could be named? People sometimes call it an "Old Virginia" town when they pay a cent toll to cross the bridges, stumble over the cobblestone pavements and look up, in vain, for street names to guide them.

It was smoke—the smoke of despair. No one felt like building a fine house in such a place, and no one dreamed of keeping a house or other thing clean. Enforced dirt begets slovenliness and an indifference to surroundings.

Now, all is changing. New buildings of vast size and beauty are being erected, Pittsburgh has reached a *renaissance*, and in my opinion her manufactures will soon extend beyond "iron bars, plows and wheelbarrows." There are, of course, some "exact" manufactures here, creditable ones, but not what the natural advantages suggest.

What if the gas supply fails? is the natural and first question of people who come here. Only this: That Pittsburgh will be the first city to generate and distribute gas; nothing more. That this is to be the future method of supplying cities with light, heat and power, is, in my opinion, a certainty of the future.

Think of sending the product of a coal mine 50 miles distant in the form of gas and contrast that with transporting and distributing the coal! The cost of transporting would be almost eliminated, and when we consider the dirt, expense and inconvenience, the wonder is that coal has so long been hauled to market here. The gas system has come to stay, in some form.

The people here are of the sturdy old Scotch-Irish Presbyterian type, with a liberal admixture of the German or "Pennsylvania Dutch." The physique of the people forms a study, and, in my opinion, is unequalled in America outside of the Pacific Coast. I claim nativity here, and have fulfilled a long-cherished desire to revisit after 40 years the old haunts of boyhood.

Except one man, I found nearly all familiar names in the churchyard. The work of 40 years in this country means elimination.

Pittsburg, June 25th. J. RICHARDS.

## Stamp Mills and Pulverizing Machines.

EDITORS PRESS:—There is considerable discussion at the present time regarding the merits of the rolling, pulverizing and grinding machines as compared with stamp mills. It seems to the writer that there is too much prejudice shown on each side of this question.

The centrifugal, cannon-ball, pulverizing, rocking and rolling machine, in whatever shape it comes, or by what name known, as soon as it meets the eye of the "old pioneer," is greeted with a contemptuous snort, and after looking at its operation for 15 minutes the stiff-necked adherent to the theory that "there is nothing like stamps" turns on his heel and predicts that the machine will wear itself out in three days, and declares to the first man he meets that "these new-fangled humbug grinding machines are ruining the country."

And yet there are many places in this State as well as Nevada where different kinds of these

"new-fangled crushers" are working on ores, and when increased crushing capacity is required, more of the same kind of machines are bought and added to the original plant. This looks as if they gave satisfaction in some parts of the country, anyway.

Mr. Thos. Machell, who is probably one of the best practical amalgamators in the State, and a staunch champion of the stamp mill, paid a visit to an adjoining county to start up a "new-fangled" rolling crusher. After running it three weeks, he states the machine to be fully equal to a stamp battery as a gold-saver and for some kinds of rock superior to stamps as a crusher; the machine runs with less power and costs only one-third as much as a stamp mill of the same capacity. Opinions of this kind are worth considering. Some amalgamators say, "It's all right about your grinding machines crushing quartz—they crush all right, but they don't save the gold; there's nothing like the battery to save gold."

The reason better results are sometimes obtained from stamps than by grinding machines, may be owing to there not being enough amalgamating surface for the amount of rock crushed. It is possible to overcrowd even a stamp battery.

The writer, some years ago, while prospecting in Colorado, visited a stamp mill at the request of the superintendent, and was asked if he could explain why the rock did not pay better. It was then paying only \$4 per ton; the mill had double discharge mortars and all the rock crushed passed over one apron plate only about four feet long; the superintendent was advised to close one discharge and run with one screen only. As soon as this was done the rock jumped to \$7.50 a ton.

Quartz that is porous and in which the gold is loose can be "crowded;" so can most of the slates which carry gold. Sometimes as high as four tons to the stamp can be successfully crushed and amalgamated in each 24 hours, but hard quartz containing fine gold evenly distributed through it must be finely stamped, and requires more time. Perhaps amalgamating pans may yet be found to give the best results after the rock has been run through these revolving grinders.

Many new quartz-crushing machines have been denounced and condemned because they failed to extract gold from quartz that had none in it to start with. This is not fair. Many stamp mills, modern stamp mills at that, have been built on worthless mines, sometimes through ignorance, often for other reasons; but no one expected them to hammer gold out of barren rock. The cost of a stamp mill is a great drawback to the majority of miners, and if anything can be constructed that will crush quartz equal to stamps, and at the same time save the gold, in the name of the great horn-spoon let us know it at once, provided the machine can be had for a moderate price.

If those who are now using these different rolling, crushing, rocking and grinding machines would write their experience with them to the PRESS, it would be a benefit to every miner in the State.

CHAS. L. LANG.  
Sonora, Tuolumne Co., Cal.

## An Arizonian's Opinion of Alaska Mines.

Alex. Levin, of Tucson, has received a letter from Fred Stevens, who went to Alaska in search of some supposed gold placers in that far-off land. On his arrival he was glad to accept a position as batteryman in the largest quartz mill in the world—120 stamps. Writing of this mill he says:

"I have to take care of 12 batteries (60 stamps) and the self-feeders, keep them in order and see that they do their work. My wages are \$90 per month and board, every room being well furnished and provided with hot and cold water for two men to each room. The mill is run by water power; the free gold is saved on copper plates and the tailings are concentrated. To each battery there are two Frue concentrators (altogether 48). The concentrations are worked by the chlorination process. The monthly cleanup is between \$80,000 and \$100,000. The ore is low-grade, but there is so much of it and so handy that it pays first-rate. The mine is worked just like a quarry. It is 650 feet through the ledge. This work is done by Chinamen and natives; strangers find it very difficult to obtain work of any kind."

In conclusion he remarks:

"This is a nasty, wet and cold country; a man's wardrobe is not complete without a pair of rubber boots reaching to the hip, a slicker, and a 'sou'wester'; all the travel being in open canoes, you are liable to be drenched at any time. I am just now on night shift if you can call it so, because, on a clear day, we only light the lamps in the mill from 11 P. M. to 2.30 A. M.; the sun sets at 10.30 P. M., but it never becomes real dark. I sleep in a close room in daytime, under two pair of heavy blankets (can't use Tucson blankets here).

"I wish I were back in Arizona, but I have to get even first on Alaska."

A SPECIAL committee on railroad axles have reported that iron axles are safer than steel axles; that all cranks should have the webs hooped; that as iron cranks appear to fail after running some 200,000 miles, and steel after 170,000, it is highly desirable that they should be taken off and not again used on passenger engines.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ELECTRIC LIGHT REFLECTORS.—Wm. A. Jones, S. F., assignor of one-half to George W. Percy. No. 344,532. Dated June 29, 1886. It is the main object of this invention to correct the unequal distribution of the light peculiar to the electric arc light, and at the same time to increase the projected power of the rays by relieving them from the law of angular projection. This will enable it to illuminate portions of the distant field with greater effect. Secondary objects are, by the proper disposition of intervening reflectors, to catch the rays and divert them, so as to illuminate the shadow of the annular reflectors in the lower field.

LINIMENT.—J. W. Laner, Mountain View, Santa Clara Co. No. 344,051. Dated June 22, 1886. This is a composition which is intended as a corn remedy. In using the composition it is applied with a brush to the corn several times successively, if necessary, and the corn is heated to dryness by some suitable means, as by holding it near the fire, or by forcing hot air upon it by means of a bellows. The corn becomes soft and it is then filed or sand-papered down until it has entirely disappeared. If there is any soreness it is removed by the application of the composition, and the treatment is entirely painless. It may be used for corns on the lower animals as well as on human beings.

TWO-WHEELED VEHICLE.—Milton Newell and Joseph O. Litten, Fresno City. No. 344,129. Dated June 22, 1886. These improvements consist in the peculiar arrangement of springs, a frame carried thereby, and thorough-braces on the frames for carrying the body, and in novel adjustable jacks for supporting the springs and adjusting the body. The object of the invention is to do away with the unpleasant motion occasioned by the "jogging" of the horse, and also to provide for a simple and effective means for adjusting the body.

DEVICE FOR TAPPING CANS.—Charles E. Quigley, Oakland. No. 344,199. Dated June 22, 1886. This device is for conveniently tapping oil or other cans. It consists of a thickened boss of suitable metal or composition, through the center of which a hole is to be bored, and secured upon the side of a can or vessel at a point where the can is to be tapped, so that a screw-threaded faucet may be introduced and screwed in until its inner end reaches the interior of the can so as to open communication therewith, at the same time making a tight joint and holding the faucet rigidly in place.

SETTLER.—Joshua E. Clayton and Simon F. Mackie, Salt Lake City, Utah. No. 344,519. Dated June 29, 1886. This invention relates to that class of machinery used in silver mills and known as settlers; and the invention consists in certain new and useful improvements in the construction of the settler, difficult to describe in detail without the aid of engravings.

CONCENTRATOR.—Joshua E. Clayton and Simon F. Mackie, Salt Lake City, Utah. No. 344,520. Dated June 29, 1886. This machine is an improved device for concentrating ores, slimes, tailings, sulphurets or other substances in which it is desired to separate the heavier from the lighter portions. We shall give a more detailed description of the machine shortly.

DESIGN FOR BRIDLE BIT.—Wm. Davis, S. F. No. 16,758. Dated June 29, 1886. This design for bridle bits consists essentially in a cheek piece with ornamental "conchas," and the bar of the mouthpiece located above the conchas.

DESIGN FOR METAL INGOT.—F. B. Morrow, S. F. No. 16,762. Dated June 29, 1886. This design for metal ingots consists of a series of short cylinders or frustrums of cones, arising from a common base, by which they are united so as to stand in line.

CLOVER CREEK PROSPECTS.—Quite a mining boom is taking place on Clover Creek, near Millville, Shasta county. A few weeks ago a party of six prospectors went up there and went hard to work seeking out a gold and silver quartz lead; they have kept actively at work and now have an incline of 35 feet run in on a good two-foot wide ledge and are highly pleased with the outlook. An assay will soon be made. Also quite recently a fine coal vein was discovered in the same locality and a party of 12 men are now prospecting it. The mine has been bonded to San Francisco parties. The coal proves, so far, to be a good grade of stone coal. If these discoveries prove to be valuable, the latter especially, there will be a good inducement for a branch railroad to be put in from some point on the main line; and such a road, of necessity, would pass through Millville.—*East Side Times*.

THE first bullion produced by the Tomichi Valley smelter, at Gunnison, assayed 318 ounces silver and 60 ounces gold per ton. The smelter is reported to be treating 50 tons per day, and is erecting another stack.

APEXES don't go in the Frying Pan District. The boys over there say that they have a brass band under contract to come over at a minute's notice to escort the first apex man out of camp.—*Denver Republican*.

## School Experts and Practical Miners.

Apropos of the remarks we made in last week's PRESS on the subject of "Mining Engineers," the following, from the *Denver Tribune-Republican*, is of interest: Judging from articles frequently seen during the past few weeks in exchanges from mining camps, the old-time war between experts from school and "practical" men of the hammer and gad is about to be declared anew. This contest, like the wrestle of the ministers with the devil, bids fair to continue forever.

The "practical" man points to thousands of ruins of mills which dot the hillsides and rot on the banks of mountain streams, and other thousands of worthless and abandoned mining claims, as monuments of expert folly. In reply the school man points to ridiculous failures in metallurgical work as the monuments that condemn the "practical" man. It is difficult to tell which has the best of the other in scoring failures. But these failures prove the superiority of neither. They simply prove that the individuals who undertook them were not fitted for their work. There is not a trade or profession known which is not constantly scoring as many or more failures as are made in mining or ore treatment by either school men or practical men. The difference is that mining failures remain as tell-tale monuments, while others leave no mark. The failures of the doctor are buried from sight, and the failures of the lawyer leave no record and are soon forgotten and never understood.

Really the error, so far as the school man is concerned, is as much on the part of the public as on that of the expert. The public persists in considering every boy who comes from school with his brand-new degree of M. E. as an expert. Really he is only a boy who has been taught how to study, what to study and where to look for information. He is no more fit to be called an expert than a boy fresh from a law school is fit to go upon the bench as a Supreme Court judge. If he passes himself off to be anything else but a student he is an egotist who is not likely to ever know much, or else a rascal. On the other hand, the "practical" man, as a rule, has no conception of the vast amount there is to be learned in the science of mining and metallurgy of which the books treat, and the alphabet of which the schools teach. There are some exceptions to the rule. There are practical men of education and culture who have never attended a mining school, but who have systematized ideas and are as well posted on the contents of books and are as skillful in the use of the crucible and beaker as the best of school men. But such men, of course, are rare, just as able men are rare in every profession and calling. The truth is, that the average practical man makes an ass of himself when he attempts to deal with the theoretical and scientific part of the work, about which he knows nothing; but in that which he has learned from experience he is a real expert.

The school man also makes an ass of himself when he sets up his judgment on the many points upon which good judgment is formed only by practical experience and time spent in labor. Both classes have their place in mining work. If either is to be more blamed than the other for blunders, it is the school man, for he should know enough not to blunder; he should know how little is knowable and how little he knows. There is but one real expert in mining matters; he is the man who combines theoretical and practical knowledge; who has got his lesson by studying the accumulated knowledge of all who have gone before him, and handling the pick, gad, hammer and drill in shaft and drift and stope, and who combines with such knowledge that rarest of all gifts—common sense.

"FOG" IN A MINE.—The Bangor (Maine) *Industrial Journal*, in speaking of the Rozier mine, says: Zinc ore has been discovered in the drifts above No. 3 shaft. It is about four feet wide and has the appearance of leading to a large body; it does not follow the tunnel but diverges to the west. It is very near the surface and a few days' work has opened it up; it is now looking finely. Work on No. 1 is suspended on account of foul air. The superintendent and two men went down Sunday and built a fire for the purpose of driving out the bad air. They then started to ascend; when up between 100 and 200 feet, they came into the gas which filled the passage like fog. They forced their way through it and barely reached the surface in a very exhausted state. The shaft is now down about 420 feet and will have to remain till machinery can be put in to purify the air.

A DEGREE AND NOTHING ELSE.—A well-posted mining man said to a Colorado newspaper man that the State is full of mining engineers who have got a degree and not much else. He said that not one in ten of them can tell the different geological periods and the order of their occurrence, or have the faintest idea of "Schmidt's rule," or can name the metals belonging to each of the six groups and their deportment in the presence of different standard reagents. Some of these fellows inflict themselves upon a suffering community as experts and receptacles of scientific knowledge.



## Refining Coppery Bullion Produced by Amalgamating Tailings.\*

NUMBER I.

## The Process Used on the Comstock.

The process to be described, whatever other merits (or demerits) it may have possessed, certainly proved a financial success under the conditions of the locality where it was introduced and where a refining process had been sought previously in vain. I have ventured to bring it to the notice of the institute in the hope that it may prove of some interest as a solution of a practical problem, such as is often presented to the metallurgist in the remote mining regions of the West.

The method was used first at the Lyon mill at Dayton, Nev., and has been adopted at other tailings mills on the Comstock. These mills treat two classes of tailings: "sand," or material which has passed previously through the pans of the ore mills; and "slimes," or the fine clayey material, which, coming from the battery, is too light to settle in the tanks inside of the mills but is caught in large reservoirs outside. The slimes, never having been worked, are naturally richer than the sands; but the assay-values of each class vary considerably among themselves. At the Lyon mill the sand assayed from \$5 to \$7 and the slimes from \$15 to \$25 per ton.

The tailings are amalgamated in combination pans (of wood and iron) with the aid of salt and bluestone. The best results have been obtained when, through the free use of sulphate of copper, the bullion produced has been very base. At Dayton the fineness of the bullion was kept designedly at from 150 to 250.

## The Amalgam.

The amalgam is taken from the canvas strainers and retorted in cylindrical iron retorts, during which process, when properly conducted, the resulting bullion separates into two distinct parts. Next to the retort-body there is a shell of compact and partially fused material, nearly white in color (and hence called locally "white bullion") with more or less of a reddish tinge. On top of this last, in the more central part of the retort, there is a reddish-brown, porous and comparatively brittle mass of what is called (by comparison) "base bullion." The latter is easily crushed and had been roasted and treated with sulphuric acid. But the white bullion had resisted all attempts before made to refine it. It was too dense to allow of crushing, and its composition, about one-half silver and one-half copper, did not permit the successful use of any of the separating processes which had been tried.

The problem presented was to refine the material mentioned by some simple, cheap and quick process which did not require the establishment of any expensive plant or the services of any specially trained workmen, and which would not cause loss of precious metal. For, although the heavy and constantly increasing discount on the value of the silver in this product and the total loss of the copper (which was not paid for) rendered a refining process very desirable, yet on account of the losses incurred in previous trials the general management of the Lyon mill had become very cautious and skeptical in the matter, and disinclined to incur any more expense in experiments. After some demur, at the end of 1873 a trial on one month's mill-run was allowed. No apparatus or material was used except that already on hand. The retort-bullion was assayed in advance and the assay returns handed in. At the end of the experiment (during which no attempt was made to keep the fine silver separate) there was a very careful cleanup and the return in melted bullion bars was compared with the assay reports.

Attached to the mill were sulphuric acid chambers and a bluestone factory. There were on hand a small, decrepit five-stamp battery for crushing wet the base bullion, a small roasting furnace, dissolving tubs, crystallizers and an old refining kettle. I afterward substituted an iron Chili mill for the battery, and added two silver precipitating vats (using old settlers lined with lead), two or three filter-tubs and a precipitating room; and, when the furnace was burned out, rebuilt it in a more convenient situation in a room of its own. This comprised all the new plant ever erected. I give here the result of the first trial as copied from my books. Assays were repeated many times and made very exactly.

The process may be summarized as follows:

The base bullion is crushed and roasted dead in a reverberatory furnace to form oxide of copper and metallic silver (and gold).

The white bullion is treated with sulphur in a closed vessel at a low heat, forming sulphide of silver and of copper. This is crushed and roasted to form oxide of copper and sulphate of silver (Ziervogel process).

## The Roasted Products.

The roasted products are treated (separately as a rule) with hot dilute sulphuric acid (chamber acid). All of the copper (oxide) is thus converted into soluble sulphate. The silver sulphate also goes into solution. Moreover, as

## Assay Returns.

Date.	Ounces.	Assay Fineness.			Ounces of Pure Metal.			Ounces of Pure Metal.		
		Ag.	Au.	Total.	Ag.	Au.	Total.	Ag.	Au.	Total.
White Bullion, Nov. 15, '73...	6,400.7	480.55	0.65	481.2	2,755.8	4.2	2,760.0	.....	.....	.....
Dec. 2, '73...	6,473.5	483.0	0.5	483.5	2,803.0	3.3	2,806.3	.....	.....	.....
Dec. 22, '73...	5,511.2	477.75	0.55	478.3	2,633.0	3.0	2,636.0	.....	.....	.....
Dec. 27, '73...	2,624.4	485.75	0.55	486.3	12,74.8	1.4	1,276.2	9,466.6	11.9	9,478.5
Base Bullion, Dec. 9, '73...	9,380.5	87.15	1.95	89.1	630.5	18.3	648.8	.....	.....	.....
Dec. 26, '73...	16,038.0	70.05	2.15	72.2	1,123.4	34.5	1,157.9	.....	.....	.....
Jan. 1, '74...	11,069.2	69.55	1.75	71.3	769.7	19.4	789.1	.....	.....	.....
Jan. 6, '74...	15,032.0	69.7	1.8	71.5	1,047.7	27.0	1,074.7	.....	.....	.....
Jan. 9, '74...	10,242.5	68.55	1.75	70.3	702.1	17.9	720.0	4,278.4	117.1	4,395.5
								13,740.0	129.0	13,869.0

## Return in Melted Bullion.

Bar.	Date.	Ounces.	Assay Fineness.			Ounces of Pure Metal.			Ounces of Pure Metal.		
			Ag.	Au.	Total.	Ag.	Au.	Total.	Ag.	Au.	Total.
868-869	Dec., '73	2,120.0	960.3	24.7	985.0	2,035.8	52.4	2,088.2	.....	.....	.....
870	Jan., '74	997.0	960.25	2.25	962.5	944.0	3.2	947.2	.....	.....	.....
871	Jan., '74	715.0	885.5	32.6	918.1	638.1	23.3	661.4	.....	.....	.....
872-873	Jan., '74	2,023.0	964.85	3.15	968.0	1,962.0	6.3	1,968.3	.....	.....	.....
1-2	Jan. 19, '74	1,066.0	917.75	14.45	932.2	1,804.3	28.4	1,832.7	.....	.....	.....
3-4	Jan. 19, '74	1,766.5	959.75	2.15	961.9	1,905.4	3.8	1,909.2	.....	.....	.....
5-6	Jan. 19, '74	2,075.0	976.1	2.1	978.2	2,025.2	4.4	2,029.6	.....	.....	.....
7-8	Jan. 19, '74	1,650.0	957.4	2.2	959.6	1,679.7	3.6	1,683.3	.....	.....	.....
9-10*	Jan. 19, '74	1,812.0	554.2	1.4	555.6	1,053.6	2.5	1,056.1	.....	.....	.....
Total of bullion returns.....									13,728.1	127.9	13,856.0
Total by assay, as above.....									13,740.0	129.0	13,869.0
Difference (practically nothing).....									11.9	1.1	13.0
*Cleanup bars.									0.086	0.85	0.99

dilute nitrogenous sulphuric acid dissolves metallic silver to a considerable extent, an additional amount of silver sulphate is obtained in solution. Some of the silver apparently remains oxidized after roasting, and dissolves in common sulphuric acid; that is, acid which has been concentrated. The Omega refinery used such acid (diluted), but the amount of silver sulphate obtained from the base bullion was much less than at Dayton, where chamber acid was used. A large part of the silver in the roasted products and all of the gold are left as residues in the dissolving tubs, and (after leaching, drying, etc.) are melted in black-lead crucibles to refined dore bullion.

All the sulphate solutions are removed to tanks containing metallic copper, where metallic silver is precipitated. This product melted gives fine silver bars.

The copper sulphate solutions, after being freed from silver, when of sufficient strength, as was almost always the case, are drawn into crystallizing vats, whence is obtained a fine quality of merchantable bluestone. Weaker solutions are first concentrated and then crystallized. Very weak solutions (wash waters, etc.) are run into vats holding iron to recover the copper, which is melted into bars and used to precipitate silver. The mother liquor from the crystallizers is concentrated and recrystallized, the acid second mother liquor being utilized in the dissolving tubs.

Inasmuch as I have found the correct details of any metallurgical operation, when obtainable, of great value in my practical work, I take the liberty of describing the process in full. If I have fallen into the error of too voluminous description, I have at least avoided the fault of giving favorable estimates in the place of actual working results—a fault not wholly unknown in the annals of the profession. In one place only am I open to the charge of "fudging." In the amount of fine silver produced in 1876 I have included quite a number of ounces which really contained a little gold—sufficient to compel its being noted when stamping the bars. This I have done to avoid injustice to the process and to the workmen employed, who took a pride in turning out good work, and who were sorely troubled at the time at the presence of gold in the "fine silver"—a thing due in the case in question solely to what might be included in the Spanish term *Fuerza Mayor*; to that superior power with which one does not contend willingly. I think my brethren of the profession who have worked under well-meaning and interested, but not always thoroughly-informed high officials, will understand without further explanation.

In all other cases, including the statement of costs, I have given not what might or ought to have been, but what actually was. The expenses of the refinery were increased by the fact that the retorted bullion from the mill was treated of necessity as it was produced, in small and varying amounts. Again, the price of certain materials, as acid, for the year 1876, owing to various causes, was higher than usual. But having chosen this year simply because the full data for this period happen to be handy, while those of other years are temporarily beyond my reach, I feel bound by my limitations to record the exact case.

All data given are those of the Lyon mill, unless otherwise specified.

The terms "white bullion" and "base bullion" are used in their local signification.

Each separate operation was controlled by a system of check tests and weights, which made it practically impossible for any error in working to escape detection.

## Retorting.

The retorts were usually charged with about 1700 pounds each of amalgam. The fires were started about 4 o'clock in the morning, and

[By this is meant sulphuric acid containing one or more of the nitrogen oxides. There is much difference of opinion among those who have written on the theory of chamber acid concerning the precise oxides of nitrogen thus occurring; and it is not intended here to express any opinion on that point. The capacity of such sulphuric acid to dissolve silver is an important matter which has been ignored in almost all the text-books.]

the last fire was given about 8 o'clock in the evening. The temperature was raised gradually from the beginning until the quicksilver distilled freely, and was then kept as steady as possible until the distillation was nearly finished, gently increasing toward the end, when a hot fire was made, and allowed to burn out. Variations in temperature are to be avoided after a proper degree of heat has been obtained; also a too hot fire in the earlier stages of the operation, when the charge seems to melt more easily than it does later.

When the retorts are opened (on the following morning) there are found a dense shell of white bullion and a porous mass of base bullion, as before mentioned. The proportions of these two classes (white and base) vary, partly according to the relative amount of silver in the amalgam, and partly according to the manner of retorting (firing). At first efforts were made to lessen the proportion of white metal, in order to diminish the amounts to be sulphurized. But thereby the proportion of fine silver, and the consequent concentration of the gold in the dore bullion, was diminished correspondingly. After considerable experience it was found peculiarly advantageous to retort thoroughly, and produce as much fine silver as possible without sulphurizing the base metal.

The amalgam was weighed before, and the bullion, both white and base, after, retorting. Averaging all the retorts during 1876 and 1877, we have the following figures:

## 100 POUNDS OF AMALGAM YIELDED

	lbs. white.	lbs. base.	lbs. total.
In 1877, from slime pans.....	4.6	9.0	13.6
In 1877, from sand pans.....	2.77	11.97	14.74
In 1877, from all pans.....	3.24	12.32	14.46
In 1876, from all pans.....	3.0	12.2	15.2
Average from all pans.....	3.1	11.7	14.8

The expenses of retorting were charged to the mill.

## Sampling.

The bullion was afterward removed in one coherent cake from each retort to a low box lined with sheet iron. From each cake three slices, one at the middle and one near each end, about three inches wide, were obtained by cutting the cake completely through with cold chisels in six lines across it. Care must be taken to get with each slice everything, dirt and all, belonging to it. This was secured by laying six bars of iron, in three pairs, under the six cutting-lines; everything falling between the two bars of each pair belonged to the corresponding slices. These slices formed the sample.

The samples were cut up into small pieces, the base and the white being kept separate, and sampled down to six pounds of white and five pounds of base, these amounts respectively forming a charge for the small black lead crucibles in which the samples were melted and from which granulations were taken and treated as in the regular bullion assays. All such assays were made fourfold.

Repeated tests, made at intervals during two years and checked in every possible manner, showed this method of sampling to be satisfactory when done carefully, and when the retorted bullion was substantially free from quicksilver. In order to control all operations of working the tailings, as well as those of the refinery, the bullion was sampled and assayed regularly during my stay at Dayton.

After sampling, the remainder of the retort was broken up into small pieces, and the base and the white carefully separated. All dirt went naturally with the base.

## Assaying.

The fineness of all the bullion from the various mills varied greatly, in accordance with the richness of the material amalgamated and the method of treatment. At the Lyon mill, as before stated, a comparatively steady grade of fineness was sought. The gold followed the copper in its separation in the retort to a great extent, but small fluctuations had no effect. I extract the following from my assay book for the two years already mentioned:

## WHITE BULLION.

Highest silver assay... 652 fine (gold here 0.2 fine).  
Lowest silver assay... 482 fine (gold here 0.4 fine).  
Highest gold assay... 1.3 fine (silver here 571 fine).  
Lowest gold assay... trace (silver here 606 and 616 fine).  
Average assay, 565 silver, 0.4 gold.

## BASE BULLION.

Highest silver assay... 89 fine (gold here 1.9 fine).  
Lowest silver assay... 17 fine (gold here 1.5 & 0.7 fine).  
Highest gold... 3.2 fine (silver here 74 fine).  
Lowest gold... 0.4 fine (silver here 49 fine).  
Average assay, 37 silver, 1.16 gold.

## TOTAL BULLION.

Average assay, 148 silver, 1.0 gold.

I found it quite impossible to get satisfactory results from testing the retorted bullion for quicksilver with the means at my disposal. At times there was a very considerable quantity of this metal, especially in bullion received from other mills, rising apparently up to three or four per cent, and perhaps higher. But on this point I am unable to speak with satisfaction to myself.

## Preliminary Calcining.

For preliminary calcining the bullion in lumps from the retorts was thrown into the hot roasting furnace after a regular day's work therein, and left until the next morning. This was done for two reasons—primarily to facilitate the subsequent crushing, and subordinately to drive off any contained quicksilver, a thing generally unnecessary with our own material, but requisite usually when treating other bullion, in order to protect the roaster. As this entailed no special expense, it grew to be the regular practice with all bullion. The hearth could be filled up to the top of the arch.

The base bullion thus treated was oxidized to a very considerable extent. The average gain in weight for each year, 1876 and 1877, happened to be exactly the same, viz., 17.4 per cent.

The white bullion underwent less change. The average gain in weight for 1876 was 2.8 per cent; for 1877, 2.3 per cent. But there was a certain amount of mechanical effect produced, whereby a greater or less proportion was rendered brittle, so that it could be crushed.

(To be continued.)

## Yield of Comstock Mines.

Only six mines in Storey county returned bullion for taxation for the quarter ending March 31, 1886. The ore output, assay value of the same, and the gross value of the bullion returned are annexed:

	Tons.	Average.	Bullion.
Belcher.....	10,409	\$11 34	\$118,104
Con. Cal. and Virginia.....	30,003	11 60	340,370
Crown Point.....	11,268	12 62	142,275
Kentuck.....	2,989	13 20	39,458
Overman.....	1,740	10 31	17,955
Yellow Jacket.....	11,789	12 66	149,303
Totals.....	62,288	\$12 00	\$816,465

The Consolidated California and Virginia is the only one of the north end Comstock mines that produces any bullion for taxation in the above quarter. The Belcher, Kentuck, Crown Point and Yellow Jacket mines are at Gold Hill, at the other end of the great Lode, and the Overman is a good distance south of the Belcher. It is well to bear in mind that there was no bullion produced in the first quarter this year by any of the mines north of Yellow Jacket, except the one already named. In this boundary are the Utah, Sierra Nevada, Union Consolidated, Mexican, Ophir, Best and Belcher, Gould and Curry, Hale and Norcross, Savage, Chollar, Potosi, Bullion, Exchequer, Julia, Alpha and Imperial. The product of the Belcher and Yellow Jacket mines cost \$6000 and \$22,000 more respectively than the value of the bullion. Crown Point made a profit of \$6000, and Consolidated Virginia had a margin of just \$912. Kentuck lost \$7000, and Overman about \$1000.

The yield for the quarter is 8000 tons greater than for the previous quarter ending December 31, 1885, and the amount of bullion is about \$100,000 larger. For the first quarter of 1885, silver mines on the Comstock produced 57,031 tons ore, averaging \$13.77 per ton, or \$785,594. The mines contributing last year were the same as this year, with the exception of Lady Bryon and Monte Cristo in place of the Overman. A year ago the ore from the Consolidated California and Virginia mine assayed \$15.53, against \$11.60 this year. For February and March, 1885, the mine was partly worked under a lease to Senator Jones. The cost of reducing ores is less than it was in the first quarter of 1885, but it is found impossible, as a rule, to make expenses on \$10 to \$12 per ton ore that carries as much silver as that from the Comstock mines does at present. The Belcher and Crown Point mines were shut down a short time, for needed repairs to machinery. So long as these mines can collect enough assessments, together with the value of the bullion produced, to meet expenses, they will be kept open in the hope that something may be found that will pay better. The bullion product for the quarter ending June 30th is expected to show an increase over that of the first quarter. The gross yield has been estimated at \$1,000,000.—*Bulletin.*

THE probabilities are that two more furnaces will be added to those in blast at the Leadville smelters within the next fortnight, and that before the close of July 20 furnaces will be in operation.

IRON car wheels average about 40,000 miles, while the life of the steel-tired is 200,000.

\*Read before the American Institute of Mining Engineers, by A. D. Hodges, Jr.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.

Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, July 17, 1886.

## TABLE OF CONTENTS.

**EDITORIALS.**—California Quicksilver Ores; Furnace for Roasting Bullion, 33. Passing Events; "Promoting" Mines; Mining Terms; Gold Mining in Japan, 36. Common Sense Geology—No. 2; Foundry Notes; A Miners' Organization Proposed; The Hill "Triumph" Roller Quartz Mill, 37.

**ILLUSTRATIONS.**—Furnace for Roasting Bullion, 33. Coal Veins in British Columbia, 37.

**CORRESPONDENCE.**—Natural Gas; Stamp Mills and Pulverizing Machines, 34.

**MECHANICAL PROGRESS.**—Hand Holes in Boilers; Combinations of Metal and Glass; Rest in Iron; Generating Steam by Slag; No Dead Center; Hot Boxes on Planing Machines; American Hardware Abroad; Machine for Sawing Rails; Experiments with Belts; How Long our Coal will Last; Large Locomotive Wheels; Improved Manipulation of Natural Gas; Steel Nails, 38.

**SCIENTIFIC PROGRESS.**—Meteors and Their Scientific Value; The Origin of Man; The Earth as a Time-keeper; The World Must Move; Extinction of Races; Phosphoric Acid from Slag; An Electrical Tree; Mildew Destroyer; The Flight of Swallows; The Detonation of Meteors, 38.

**USEFUL INFORMATION.**—Importance of Practical Education; Singular Use for Electricity; To Prepare an Iron Casting for a Pattern; A New Fire Danger; How to Prevent the Rusting Fast of Screws; For Cementing Iron; Paint for Iron; Artificial Whalebone; To Silver Iron; What Natural Gas has Done, 39.

**GOOD HEALTH.**—Food; Soft, White Hands; Inoculability of Yellow Fever; Strangely Poisonous Lizards; Dengue Fever; Imaginary Ills; Antidotes for Certain Poisons, 39.

**MISCELLANEOUS.**—Notices of Recent Patents; School Experts and Practical Miners, 34. Refining Copper Bullion Produced by Amalgamating Tailings; Yield of Comstock Mines, 35. Mono Lake Water; Gold in Madagascar, 39.

**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 40-41. **MINING STOCK MARKET.**—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 44.

## Business Announcements.

Machinery—Tatum & Bowen.  
Assay Office—Thomas Price.  
Mechanics' Institute Fair.

See Advertising Columns

## Passing Events.

Silver has gone down to a very low price indeed, and no wonder that silver miners on this coast are becoming discouraged. The discount on bullion is a very heavy drain on mining operations and makes the difference between profit and loss in many cases.

In addition to the strike at the Union Iron Works, another one has occurred in this city at the Risdon Iron Works, thus inconveniencing the two largest iron works on the coast. There is no quarrel about wages, but this last strike is an outgrowth of the Spreckels boycott, and is more fully referred to in another column.

There is little to report of note concerning mining matters. Active prospecting is going on in the mountains in all directions. In this State the miners are developing their quartz and drift mines with great vigor, confident in the fact that gold mining pays better than any other kind in these days.

The finding of a \$7000 nugget in a Sierra county drift mine shows the possibilities of mines of this character, and that the era of good nuggets has by no means passed away in California.

The Anaconda Mining Company, of Montana, gives employment directly and indirectly to about 2000 men, and the pay-roll is about \$200,000 per month.

## "Promoting" Mines.

Foreigners who purchase mines in this country generally pay a great deal more for them than they are worth; and, failing to pay good interest on the investment, the mines themselves are held to blame. With very few exceptions, the American mines "floated" on the English market have been put there at exorbitant figures, though the people at this end get only a small proportion of the money. A mine bought here for \$50,000 is placed on the market there for \$250,000 or \$300,000, or even a greater advance. The difference in original cost and selling price goes into the pockets of the "promoters." A delusive prospectus is issued, calculated to inveigle people of small means to buy in hopes of getting large returns from small investments.

A case of this kind has just come to notice where certain Colorado mines in Gilpin county are being put on the London market. The company is known as the Sapphire, and was organized to purchase the Frontenac and Searle mines, in Elkhorn gulch. The capital is £130,000 and £20,000 debentures. The prospectus states that £125,000 in cash and debentures is to be paid for the mines. The Colorado papers are showing up the scheme in rather an unpleasant light for the promoters, for they do not think the mines worth any such price.

The Denver *Tribune-Republican*, in speaking of the prospectus says: "The fact of the matter is that the prospectus was written by an ignoramus, or with the intent to deceive. In either event it is an injury to Colorado, and should be condemned by Colorado miners. Great Britain is in the right spirit to purchase a great many American mines just now, but the spirit will not last long if the investing public is to be treated with allopathic doses of nonsensical falsehoods, or catches a few small mines at prices enormously greater than their actual value. It is plain to be seen that financial circles are everywhere getting something of a mining fever. It is too much to expect that there will be any failure on the part of ignorant pretense and swindling dishonesty to grasp the opportunity; but it is not too much to expect that honesty will sit down as solidly as possible on them at every opportunity."

The Idaho Springs *News* speaks of the mines in question as follows: "The two mines are excellent pieces of properties, and have been producing considerable ore under the leasing system, which has paid well. But they are certainly not worth the outrageous price asked. Years ago they belonged to an English company and were worked under Mr. W. W. Ramage's management, but those times being high-priced times, the properties did not yield satisfactory returns; judgments and other causes finally wound them up. The Frontenac is what was once the old Clifton mine. We hope our English friends will look well into their investments in this country, or else we fear it will turn out to be the 'same old story.'"

Occasionally the English investors are warned in this manner, but as a general thing the mischief is done abroad before the people who buy are well informed by disinterested parties. It is a bad thing for American mining interests to have such schemes organized. There are good mines to be had for moderate prices, but there seems no way to get rid of the objectionable middle-men under the present system of mine bonding and buying.

**HOME MANUFACTURES.**—At a meeting of the California Manufacturers' Association, on Monday, a committee report was received stating that a form had been prepared to be signed by the members of the association and business men of this city and State, requesting all customers to abstain from purchasing goods of foreign manufacture when the same class of goods of home manufacture can be purchased as cheaply. The association has protested against the short notice given in advertising for Government supplies for the coast in the East. In order to make the office of the association a bureau of information, a special form of authorization has been adopted requesting Government officials to assist the authorized representative in procuring necessary information.

The receipts from the North Star mine, of Grass Valley, for the fiscal year ending April 30th were \$129,996, and the disbursements \$115,220.

## Mining Terms.

## "Chutes and Shoots."

The proper use of common mining terms cannot be too strongly recommended, particularly among the English-speaking mining communities of the world. It is not only convenient, but absolutely necessary, to prevent confusion and mistake, that the terms used in describing, reporting on, and even in the keeping of mining accounts should consist of those in common use by practical miners and which do not admit of a double meaning. In conversation on this subject with Mr. Melville Attwood, the well-known mining engineer, he expressed himself as follows on the question of the terms referring to chutes and shoots in mines:

Subterranean mining requires two very distinct classes of workings, the preparatory and those for extraction. The preparatory consists in shafts, levels, crosscuts, and drifts on the course of the vein, from the latter at intervals of say 50 feet more or less, according to the width of the vein—rises, or *chutes*, are made on the vein to the height required to be stoped, so that the vein matter when broken and thrown into the chute may slide down to the drift. The wooden portion of the chute is in the form of a spout, projecting for a short distance into the drift, to which is fixed a sliding door that, on being raised, allows the vein matter to drop into the cars.

Some experts and mining lawyers have taken upon themselves to write "pay chute" instead of shoot. The following authorities, it is thought, are sufficient to settle the question: The Cabinet Cyclopædia, 1839, Treatise on Geology, by John Phillips, F. R. S., Professor of Geology in King's College, London, Vol. II, page 133:

"Another peculiar appearance in mineral veins noticed by William Fox, Henwood and others, and which, from personal inspection, the author knows to be frequent both in primary and secondary mining tracts, is the segregation of the metallic contents of a vein into portions inclined at various angles in different veins, but nearly parallel in the same vein. These are called 'pipes,' or 'shoots,' and their occurrence is of such importance as to mark, in a long vein, a series of parallel spaces more than usually metalliferous. The relation of these pipes of ore to the natural structures of the neighboring rocks is a subject of research strongly to be recommended to intelligent mine agents, both for its practical and scientific value. Mr. Fox observes, from the information of Mr. K. Tregaskis, that when veins are nearly at right angles to the beds of killas, the masses of ore which they contain are generally conformable, in their underlie, to the direction or dip of such beds; in other words, they usually take an oblique direction in the veins, and form what the miners call 'shoots' of ore; and when the directions of the beds and veins are nearly parallel to each other, the ore has not usually any independent dip or shoot in a lode; it is then termed a 'pipe' of ore."

"Glossary of Mining Terms," by R. W. Raymond: Chute (sometimes written shoot)—1. A channel or shaft underground, or an inclined trough above ground, through which ore falls or is "shot" by gravity from a higher to a lower level. 2. A body of ore, usually of elongated form, extending downward within a vein (ore shoot). The two forms of orthography of this word are of French and English origin, respectively. Both are appropriate to the technical significations of the word.

An ore-shoot, for instance, may be considered as a branch of the general mass of the ore in a deposit, or as a pitch or fall of ore.

(Germ. erzfall.) In England the orthography shoot is, I believe, exclusively employed, and this is perhaps the best, the other being unnecessarily foreign.

"Webster's American Dictionary of the English Language," 1875:

Chute (shoot), n. [Fr., chute; O. Fr., chente, from cheer, choir, chair, to fall, from Lat. cadere, to fall; It., caduta; Pr., cazuta, chaeguda.]

1. A rapid descent in a river.
2. An opening in a river dam for the descent of logs, etc.
3. A framework or tube through which articles are made to slide from a higher to a lower level.

Shoot, n. 6. (Min.) A vein running in the same direction as the strata in which it occurs.

## Gold Mining in Japan.

According to Japanese historians, gold was first found in Japan in the year 749 A. D., about 80 years after the discovery of silver. During the 90 years in which the Portuguese exported gold from Japan in such large quantities, this export averaged \$3,300,000 per year, and during one single year amounted to as much as \$12,000,000. The annual export of the Dutch between 1649 and 1671 averaged nearly \$3,000,000.

Most of this great yield was obtained from placer workings, which, being shallow and of small extent, were quickly exhausted, and the attention of the miners was then turned to the quartz veins, which yielded smaller but more constant returns. At the present time mines producing gold alone are not, as a rule, worth working. The average of the best placer beds is not over five and a half cents per cubic yard.

The quartz veins are generally very poor, rich quartz being found only in small, thin deposits. The average value of the quartz is one-half to one-third of an ounce per ton, although, in exceptional cases, the yield has been as high as \$90 to \$100; but where the quartz is as rich as this the veins are so extremely thin as to render extraction exceedingly expensive.

The methods of extraction are very interesting. The gold-bearing quartz is first crushed and then ground with water, repeatedly and in small quantities, between heavy millstones moved by hand until reduced to an impalpable slime. This slime, as it issues from the mill, is largely diluted with water and conducted over a series of short and narrow boards covered with numerous diagonal saw-cuts. These boards, which collect the gold and other heavy metals very perfectly, are frequently cleaned in a tank, and the concentrated material so collected is washed with great care and skill on the board of the gold-washers.

The first working of the ore by this process extracts 65 per cent of the assay value, and by repeated treatment the proportion of gold saved is brought up to fully 90 per cent.

In working gravel deposits, ditches are cut in such a way that the water flows over the bed-rock through the gravel deposit, a certain amount of gravel being brought into the ditch by undermining the bank.

The larger stones are carefully washed by hand and thrown out of the ditch, the smaller ones being separated by the aid of proper tools. The rapid current washes out the clay and fine sand, leaving a bed of fine gravel in the ditch.

When this bed has reached a thickness of about a foot, two or three small straw mats are placed side by side in the bottom of the ditch, and the gravel, little by little, hoed over them. As the gravel is swept over the surface of the mats by the force of the current, the heavy gold and the iron-sand sink between the strands of straw and are retained.

From time to time the mats are moved a few feet down the stream, and the new material so exposed is hoed over their surface, until finally all the gravel has been several times subjected to treatment.

As the mats become charged with gold they are taken from the stream and others substituted. The concentrated material collected by the mats is finally washed with great care on the washing-board, for the purpose of separating the gold.

The Richmond Con. Mining Company, Eureka, Nev., made a net profit for the last half year of \$200,000, of which stockholders were paid \$67,500 in dividends. The product for the year was 13,163 ounces of gold, 444,308 ounces of silver and 2045 tons lead. The lead sold for more money per ton than in the previous year. The receipts from the product sold were \$1,106,000. The value of the bullion unsold, in transit and at the works, at the close of the fiscal year, was \$767,000. This makes a total of \$1,873,000 for the year. But from this sum must be deducted \$770,000 for bullion carried over from the previous year. The expenses for the year were \$357,000, leaving the net value of the bullion produced at \$746,000.

MINING assessments delinquent in July aggregate \$433,400. Of this, \$285,000 is due from Nevada mines, \$114,500 from California, \$30,000 from Arizona, and \$3000 from New Mexico.

The Elk Horn Mining Company, of Montana, has paid 24 dividends in the past two years.



## Common-sense Geology—No. 2.

[Written for the Press by JUSTIN CHENOWETH.]

About three-quarters of a mile southerly from the shaft of which I have spoken, a seam of coal was found outcropping on a flat surface and dipping toward the bay or harbor at Nanaimo. An opening was made and the mine first operated by means of the slope shown in Fig. 4. Subsequently an opening was made a mile distant from the first one, on the same seam of coal, and a working slope carried down parallel to that shown in Fig. 4, as it appears in Fig. 5. In so far as these two figures exhibit the position of the coal, they are exact copies of the working plans in the Vancouver Coal Co.'s office at Nanaimo. Being placed side by side, and in the same scale, they show at a glance the different shapes in which the same continuous seam of coal may lie at points separated by the distance of only one mile. In both figures the heavy lines marked *A* represent the coal. The lines marked *B* the datum lines on the same level as the top of the slopes, that of Fig. 5 being 100 feet above high water in Nanaimo harbor. The irregular lines, *C*, represent the contour of the surface.

In Fig. 4, near the upper end of the slope, there is shown the appearance of a fault. The superintendent in charge of those mines at the time of my visit could not give me any definite information concerning it. I have examined the ground carefully. Neither on the surface nor within the slope is there any appearance of fracture or dislocation of the inclosing rock. I therefore conclude that the fault (if it really be one) is the result of irregular deposition rather than disruption. Elsewhere the coal was continuous and unbroken, as shown in the figures. The inclosing material, as it appears on the surface, or is revealed in the works, is chiefly hard gray sandstone intercalated with strata of hard conglomerate and shale, all solid, without appearance of fracture wherever penetrated.

There is no conceivable combination of circumstances by which a mass of solid rock 500 feet in thickness (the depth to which the coal has been extracted) could be bent from a regular horizontal position to the shapes in which the seam of coal existed as shown in Figures 4 and 5, leaving the coal intact, and the containing rock in the condition of sandstone. Had the rock by means of heat become sufficiently plastic to be bent into such shapes without fracture, it would have certainly assumed a crystalline form on cooling, and the contained coal entirely consumed. But if the system of geology as now taught be true, this Nanaimo seam of coal, originally deposited on a horizontal surface, must have been transformed into the position shown in Figures 4 and 5, by the flexure of the crust of the earth when having a thickness of 20 or 30 miles. The absurdity of a system that requires for its maintenance the presumption of an occurrence so palpably impossible must be clearly apparent to any intelligent mind whenever directed to the consideration of it, if not hopelessly sunk in the ruts of prejudice and preconception.

Geologists teach that the aggregate thickness of aqueous rocks taken collectively is about 10 miles. On the eastern border of Puget Sound in Washington Territory, near the northern extremity, there is a continuous bluff, wave-worn shore of sandstone about 15 miles long, being unmistakably a homogeneous formation without a single stratum of any other kind of rock intervening. There are partings at intervals which, according to geological teachings, would indicate lines of stratification dipping to the northward at an angle of about 45°. This rock unquestionably belongs to what in geological parlance is termed the carboniferous series, as on its northern extremity is situated the Bellingham bay coal mine. Estimated by geological rules this single formation would have a thickness of about 11 miles, equaling that of all aqueous formations collectively estimated under the system.

THERE are some three and a half million pounds of foreign lead in bond in New York.

## Foundry Notes.

Work continues very dull at the city foundries. For some months past large orders have been scarce. There is not as much mining machinery being built this year as usual, and all of our foundries run this class of trade.

The labor troubles in this branch of business continue. This week the Risdon Iron Works have had trouble. The boiler-makers, to the number of 110, left the shops in a body, an occurrence due to the boycott ordered by the Federated Trades against the Spreckels steamship lines. Some time previous to this the Risdon Iron Works contracted with the Spreckels to manufacture several new boilers for their vessels. These orders were reached in their routine a few days ago, but when the men learned who the boilers were intended for they stopped work and marched out in a body from the shop. Although the contract was made long before the boycott against the Spreckels went into effect, the men refused to do the work, and if non-union men are employed a general strike will occur in all departments of the foundry. The strikers themselves say they are perfectly willing to go to work on any and all orders save those for the Spreckels, as in other respects they are fully satisfied with their positions and wages. Robert Moore, the superintendent, in speaking on the subject

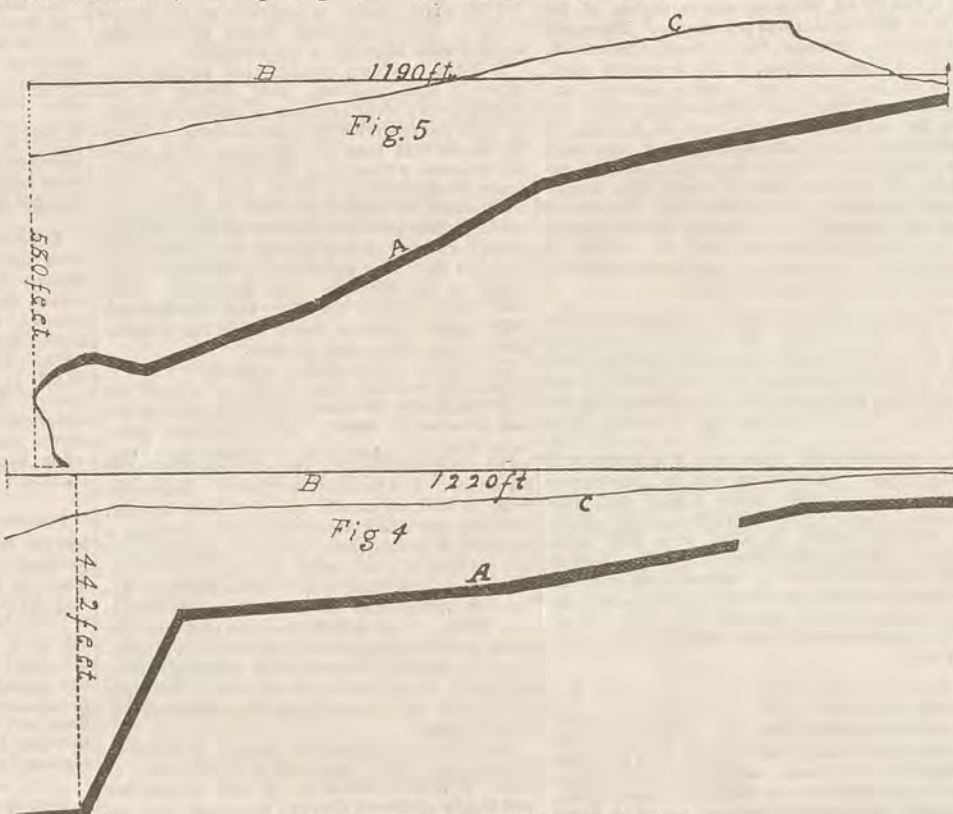
boiler-makers walked out and we are not doing it."

John G. Ills, of the Jackson Stove Foundry, has made application to the Molders' Union for men, but that body has requested him to discharge his non-union men first, saying none of the members of the Molders' Union will work until this is done. Ills has heretofore had trouble with the union, owing to the employment of non-union men, and some months ago a strike occurred in his foundry.

At a meeting of the council of the Federated Trades a committee was appointed to visit the various labor unions and state the position in which the federation is placed in regard to the strike of the iron-workers at the Union Works, and with the boycott on the Spreckels steamers, and solicit assistance. The action of the Risdon Works strikes was also sustained, it being held that they had acted in accordance with the union principle.

## A Miners' Organization Proposed.

To the Miners of California:—It has long been apparent to the writer that the mining interest and population of California must awake to their rights and bestir themselves, or the whole area of mineral lands will be absorbed by the rancher and the "Immigration Society," working in the interest of every foreigner and immigrant who lands in our State, and desires



COAL VEINS IN BRITISH COLUMBIA.

says: "We have got work to do for the Spreckels firm on contracts which we entered into three months ago, before there was any trouble between them and the Federated Trades unions, and it must be done. The material for the work arrived only a few days ago, and when I told the men to go to work on it they walked out. They said that they were sorry they had to go, but the Federated Trades unions would not allow them to do any work for vessels belonging to the Spreckels. The trouble was caused entirely by the differences existing between the trades unions and Spreckels Bros. I attended a meeting of the trades unions about two weeks ago, and told them we had contracted to do the work for the Spreckels and would be obliged to do it. As I explained when I appeared before them, they are not injuring the firm of Spreckels Bros. by their strike, but are hurting us, because if we cannot do the work it will be given to some one who can. The work will certainly be done, and the Spreckels steamers will always leave on time, despite all strikes."

Captain Taylor, President of the Risdon, says: "We are working all departments with the exception of the boiler shops and it is not our fault that we are not working them. There is no issue between our firm and the men heretofore employed here. We have always been on the most friendly terms and we have not had occasion to discharge any person in our employ. Certain work came to us and as business men we were obliged to accept it. When the time came for the performance of the work our

Government lands. In every mining county of this State this evil is apparent. Mineral lands, even where quartz lodes plow through them glaringly, and gravel beds which show the mineral, are daily taken up under a solemn oath as not mineral-bearing, until rank perjury seems to be no crime. The Land Office of every district of mining counties shows so much of this perjury that, were just punishment meted out to the perjurers, the State would have to build a new penitentiary to hold the guilty ones. Such is the fact, clear to every miner in every mining county of the State.

Now, the purpose of this article is to say that this business must be stopped; that every one interested in mining must take a hand, assert his rights to the mineral domain, overturn the fraud practiced, and bring to justice every perjurer who has shown himself to be such. To this end there must be organization, and I suggest that every mining county of the State organize a society, allowing as members every operating miner.

Mining districts had better organize separately, appointing, say three of its members as members of a county committee. The county committee to then appoint three of its members to form a State executive committee. As soon as two counties organize, let them appoint a committee to formulate the State organization.

The importance of this move needs no further argument. The requisite is action. In organization is power.

In connection with this land interest comes also the water question, the first contest being the overthrow of the riparian decision of the Supreme Court.

Every vital interest of this State is organized for its protection, except that of mining, and this is the all-important time. What district will be the first to act?

THE OLD MAN OF THE MOUNTAINS,  
Nevada, Cal., July, 1886.

## The Hill "Triumph" Roller Quartz Mill.

There is a very general interest displayed at present among miners and millmen as to the comparative merits of stamps and the various roller mills for crushing quartz, and anything that bears on the results of actual trials is of value to all concerned. One of the Hill Triumph quartz mills has recently been placed in operation in the Bully Chooch mining district, at Cleveland, in Shasta county, by the Joshua Hendy Machine Works of Nos. 39 and 51 Fremont street, this city, for the purpose of demonstrating the practical effective operation, durability and capacity of this style of mill. Learning of this, a representative of the Press asked to be informed of the results obtained, and whether this practical trial had developed the expected conditions. We will let the superintendent of the mill speak for himself, by publishing the following extracts from letters received from him:

Under date of June 25th he writes as follows: "I started the mill on the 23d inst. All of the machinery works well and the (Hill) mill could not possibly do any better work or give any better satisfaction. It is now crushing 10 tons per day and has required no attention except the ordinary work of oiling."

Under date of June 29th we quote: "The mill is running very nicely, and I have had no delay since my last to you of the 25th."

Under date of July 2d he writes as follows: "The mill was shut down last night and cleaned up to-day. In the last 101 hours, or a little more than four days, we have crushed 75 tons of ore, or say 17 tons per day. Every one who has seen the mill running is pleased with it. In the cleanup made to-day I found, somewhat to my surprise, about 75 per cent of the amalgam within the mill, which speaks well of its capabilities for saving amalgam. One roll has been split, but was replaced with only slight delay."

We are further informed by the "Joshua Hendy Machine Works" that another of these mills is in successful practical operation on the property of the Zebra Mining and Milling Company, at or near Bates Station, in Fresno county, California, and we append the following extract from a testimonial letter, dated May 25, 1886, from a former superintendent of that company, in which he writes:

"Having had supervision of the operation of the 'Hill' roller mill, I have this to say in relation to it: That the ores delivered to the mill were of a hard, flinty character, but I found it capable of crushing 15 tons per day of 24 hours. The mill was charged with 45 pounds of quicksilver, and there was no observable flowing of quicksilver or amalgam through the screens; and in cleaning up I was surprised to find that over four-fifths of the amalgam was taken from the mill and the remainder from the outer plates. The operation of the mill was complete, and the power required to drive same was about 8-horse power. The consumption of fuel was one and one-half cords of inferior wood per day."

In a letter dated July 11th, from the present superintendent of the same property, we find as follows, viz.: "I save about 95 per cent of the amalgam in the mill."

The above works have had recently placed on the property of the Central Mining Company, controlled by A. Eastman, S. B. Fowler, and others, situated near Grass Valley, Nevada county, this State, a complete plant comprising ore crusher, automatic feeder, "Hill" roller mill, "Triumph" concentrators, etc., and it will probably be ready for operation on or before the 22d of this month. As the mining districts in the vicinity of Grass Valley and Nevada City have long been celebrated for their large bullion yield and the acknowledged center of the quartz mining industry of our State, we look forward with interest to the reports of the operation of the "Hill" roller mill upon the ores from the mines of that section.

Those who believe only in the superiority of stamp mills for the reduction of ores should consider these facts and give the new machine credit for its work. For the extraordinary percentage of amalgam which these mills are alleged to save within themselves, and the consequent assurance of but a small loss in escaping waste, bring this form of mill in strong contrast with the usual results obtained in the general operation of stamp mills.

If the above stated facts are fully substantiated by the performance of the mill at Grass Valley we shall be pleased, and we believe it will be of interest to our readers, to present at a future date a concise report of the actual practical workings, covering capacity, durability and economy of power, and cost.



## MECHANICAL PROGRESS.

**HAND HOLES IN BOILERS.**—Some manufacturers of boilers, says the *Locomotive*, object to putting a hand hole in the back head of the ordinary tubular boiler, giving as a reason therefor that the hand-hole plate is exactly the same thing in such a location as a soft patch, and is equally liable to give trouble. We do not share in this opinion. A hand-hole should always be put into the back head of a boiler unless there is a man-hole in the front head below the tubes. In this case the hand hole will not be absolutely necessary, but it will do no harm. The idea that it will give trouble is a wrong one. Properly cared for and packed so that no leakage can occur, there never will be the slightest trouble with a hand-hole in this location. Four inches by six inches is the best size for a hand-hole; this allows very effective cleaning to be done through it. Very small sizes are difficult to clean out through, and should always be avoided in tubular boilers of the larger and better kind. In small vertical boilers 3x5 inches is a very good size to put in at the bottom of the water leg and at the level of the crown sheet. But each boiler should have three hand-holes at bottom of water leg and three at the level of the crown sheet. The distance to be reached for scale in these cases is so short that small hand-holes answer very well to work through.

**COMBINATIONS OF METAL AND GLASS.**—At last year's Gorlitz Exhibition specimens were exhibited of a new ware, partly of metallic luster and partly yellow and red, like amber, topaz, or ruby-colored glass. In this new patent process (described in the *Eisen Zeitung*) network of soldered bronze wire, exactly fitting the vessels to be prepared, are pressed into the wooden or iron casting molds, and the mass of glass is then blown in, so that it not only fills up the meshes of the wire netting but partially surrounds the metallic substance, a durable union of the two component parts being thus effected. The articles are decorated with an elegant and tastefully arranged filigree work. In some places the wire netting is brought into contact with small plates of the same metal. The difficulty of the process is the discovery of a suitable metallic mixture, the properties of which are commensurate with the great heat to which the glass has to be exposed. After the casting the metal is completely black, and has to be gilded to restore its luster.

**REST IN IRON.**—A curious bit of experience has been had recently at one of the leading steel mills in the country. A lot of material for a bridge was rejected by the inspector for the buyers, much to the surprise of the producers. After the inspector had left the manufacturers decided to make an independent investigation, which resulted in showing that the rejected material did not come up to specifications. Further research followed and developed the fact that for a given number of hours after the material had left the rolls its physical qualities gradually changed, reaching a period of rest only after a certain time had elapsed. So far as we know, no such observations have yet been made anywhere, and if the facts are borne out by the experience of others, a good deal that is "mysterious" in steel may be explained.

**GENERATING STEAM BY SLAG.**—In most furnaces for separating the metals for their ores a vast amount of heat is lost in disposing of the slag. Mr. Brotherton, superintendent of the American smelter, at Leadville, Col., has patented a plan for generating steam for motive power at the smelters through the use of slag. By this method the slag is dumped into large shallow vessels, which are afterward run under boilers, and the heat used in generating steam. An experimental test of the method resulted in maintaining 75 pounds pressure on a vertical boiler for seven days. If the plan proves practical, it will result in a saving to the smelter of \$1200 to \$1500 a month.

**NO DEAD CENTER.**—A German engineer is reported to be the inventor of an improved construction of steam engine, the peculiar feature of which consists in the dead center point being obviated. In this arrangement a block is secured to the piston rod, this block being provided with a diagonal slot, through which the crank pin passes. The slot has concave edges facing each other, and is provided with a recess at each end. The slide valve is attached to a rod provided at the lower ends with tappets, against which the ends of the sliding block strike, thus reciprocating the slide valve rod. The levers from which the rods are suspended are provided with spring arms for giving the desired degree of expansion.

**HOT BOXES ON PLANING MACHINES.**—In answer to a query in regard to some means for preventing hot boxes on a large, double-cylinder planing machine, a cotemporary says: A tendency to heat in the journals of this class of machinery arises from several causes, but the most common are unbalanced bits, rough or eccentric shaped journals and tight belts. Have a first-class machinist make a thorough examination instead of wasting money in different kinds of lubricating oil. The cause will, undoubtedly, be found in some fault in the construction of the machine.

**AMERICAN HARDWARE ABROAD.**—London *Iron* remarks as follows on this subject: Our American contemporaries have every cause to be surprised at the astonishing fact that thousands of tons of scrap iron are every year taken to the United States and there converted into the simplest of American manufactures, the sad or laundry iron, and then exported back to Europe at no small profit. There is not a corner of Europe where American small cast hardware is not on sale. The toolmakers and machinists of Europe—such as Krupp, of Germany, Whitworth and Armstrong, of England, and Hotchkiss, of France, with their vast resources—are unable to produce a Monkey or screw bar wrench equal to the American wrenches, and consequently they have to import these tools from the States. It is stated that there are no less than 80,000 dozen of them exported to Europe alone every year. It is interesting to note that Charles Moncky, the inventor of this screw-bar wrench, received only \$2000 for his patent, and is now living at Williamsburg, Brooklyn, in a small cottage bought from the proceeds of this sale. In the matter of the common pocket boxwood rules, also, the American manufacturers so far excel all others that, if not all European nations, certainly all nations outside of Europe, are supplied from America. The manufacturers there print on the rule whatever system of measurement is followed by the country for which the goods are intended. American augers and auger bits are used the world over, no other nation being able to compete.

**MACHINE FOR SAWING RAILS.**—A correspondent of the *Scientific American* describes a saw for sawing rails which is in use at Grand Island. It is run by an 80-horse power engine at the rate of 3000 revolutions per minute. The saw is 40 inches in diameter, five-sixteenths inch thick, made of Bessemer steel, with a smooth edge. Two one-half inch pipes keep a constant current of water on it, notwithstanding which the rail for one-eighth inch in front of the edge is made red hot by friction. The saw was made for iron rails, which it cuts in from 20 to 45 seconds. It has been tried on steel rails, though it did not work. It is believed by the present general foreman, B. C. Howard, that the reason is that the feed is too fast, and he intends to demonstrate by a series of experiments whether or not steel rails can be cut by it.

**EXPERIMENTS WITH BELTS.**—Experiments on the amount of power that can be transmitted by a belt of given size show many discrepancies, and to this circumstance are due many of the difficulties encountered in connection with the subject. These discrepancies, it seems, arise from the fact that belts of different qualities are often experimented upon, and it is pretty well settled that, while rules can be constructed that will show what power a good belt may transmit under given conditions, they cannot be implicitly relied upon to show how much power a particular belt does transmit. A question of this kind can be answered only by experiment, although the rules may frequently enable an experienced mechanic to gauge the result in advance with a fair degree of accuracy. —*Iron*.

**HOW LONG OUR COAL WILL LAST.**—The following interesting figures, indicating the length of time the anthracite coal supply of Pennsylvania may be expected to last, have just been compiled. The total anthracite area before mining commenced was 320,000 square miles. Allowing 1000 tons to the acre, a foot in depth would give 320,000,000 tons. Assuming that the depth averages 30 feet, it gives a grand total of 9,600,000,000 tons. At the present time the consumption averages about 30,000,000 tons a year. So it will be seen that at the commencement of mining operations the supply was sufficient for 320 years. About 508,000 tons, or about 17 years' supply, have been mined, leaving sufficient to supply the demand for over 300 years to come. —*Philadelphia Times*.

**LARGE LOCOMOTIVE WHEELS.**—There has been for some time an inclination to increase the diameter of locomotive wheels to secure increased speed. They have for some time been growing larger and larger. The largest yet built is a mammoth engine for one of the French roads. This locomotive has six coupled wheels 8½ feet in diameter. The tender and coaches are to have wheels of the same dimensions, and the calculation is that with such a train a speed of from 72 to 78 miles an hour can be obtained. The coaches will be swung inside and between several pairs of wheels.

**IMPROVED MANIPULATION OF NATURAL GAS.** Manufacturers who are depending largely on natural gas, and those who expect to be provided with it at a long distance from the wells, have been, within two or three days, interested in the announcement of a patent which will carry it safely any desired distance. It is a process of mixing air with gas in such proportions that, while the danger of explosion is taken away, all the heating quality still remains. It will also leave the air of the rooms in which it is used in a healthy condition. —*Pittsburg Times*.

**STEEL NAILS.**—Establishments for the manufacture of steel nails and steel-nail plates are on the increase in this country. These nails, it is alleged, are produced much more cheaply than those of iron, owing to the cheaper process—the Bessemer—in preparing the metal, but their grip is less than that of iron nails.

## SCIENTIFIC PROGRESS.

## Meteors and Their Scientific Value.

We are all more or less familiar with the heavenly visitants to our earth commonly known as "shooting stars." As a general thing these visitants are completely vaporized on coming in contact with our atmosphere, or reduced to impalpable dust by its friction. They are always visible, in greater or less numbers, every clear night, and sometimes they appear in almost innumerable numbers.

These bodies are similar in constitution to "aerolites" or "meteorites," the only difference being in their bulk. When one is of sufficient size to withstand the frictional action of the atmosphere and reach the earth it is called an aerolite. These bodies, no doubt, move about in the heavens much like comets—indeed they are generally supposed to be fragments of comets. Biela's comet presents a notable instance of such disruption. It is now represented only by a stream of meteors, which follows what was once that comet's path.

The bottom of the ocean in many places seems to be covered with meteoric dust—the finely-divided fragments of meteors which have fallen upon the sea. There is said to be a region of the sea between Honolulu and Tahiti, where the ocean is about two and one-half miles in depth, where the sea bottom is completely covered with this dust, as is proven by the material which the lead brings up when soundings are taken along this region. Falling upon land, this pulverized material is not distinguishable from its intimate mixture with the ordinary soil, but the accumulation of centuries in sea depths forms a wondrous story, which is read and studied with interest by the scientist.

Meteors vary very considerably in their constitution and make-up, and furnish to the scientist very clear evidence of the composition of other heavenly bodies than our own. Analysis shows that they do not bring with them any mineral which is not found upon the earth. Some 22 elements have so far been observed in the process of analyzing these foreign bodies, among which iron, magnesium, nickel, sulphur, phosphorus and carbon are the most prominent. Meteors vary very considerably in their character, as do minerals upon the earth. They have been carefully classified and divided into four classes or groups, based upon the proportion of iron which they contain.

Those of the first group constitute what is known as meteoric iron, which is always alloyed in nearly the same proportions with nickel and a few other metals. It is of a steely character and extremely hard. Meteoric iron is always recognizable by a singular peculiarity of structure. If a polished surface is moistened with an acid, numerous straight lines appear, crossing each other at various angles, forming a network of geometrical figures, as regular and clean cut as if made with an engraver's tool. These lines are known as Widmanstaetten figures, so named from the man who first discovered them. They result from the fact that the metal is not homogeneous, and that it is crystalline in formation. Meteorites of this description are called *holosiderites*—or all iron. They are much more rare in occurrence than either of the other groups.

Another variety consists chiefly of silica in combination with magnesia and peroxide of iron. If these silicates are in small proportion and thinly scattered through the mass, they are known as *syssiderites*.

Meteorites in which the iron is in relatively small proportion, appearing only in isolated grains, are called *sporadosiderites*.

There are a very few meteorites in which no metallic iron occurs. Such are called *asiderites*. They are usually of a dull black color, stony in character, and in appearance much like peat or lignite. They contain carbon in combination with hydrogen and oxygen. It is in this class of meteorites alone where any hope has been indulged of finding the remains of organic or animal beings, but thus far the most careful examination has failed to reveal anything of the kind. Even if such had existed, the intense heat excited while passing through the atmosphere would no doubt have obliterated all traces of the same by reducing them to their purely earthy or mineral condition.

Meteors have for many years formed a most interesting study, and are always of intense interest to even the casual observer. Many are known to be of immense size, and it is a most interesting, not to say alarming, fact to reflect that such huge masses are constantly moving about in space with incredible velocity and at all times liable to come in contact with the earth. Where they originated or how they came to exist in such vast numbers, as is evidenced by the earth encountering them by hundreds and thousands every few hours, in every portion of its orbit, is a question of great interest. Their existence forms a wondrous story in heavenly lore, and their continuous bombardment of our mundane sphere a theme of constant interest to its inhabitants.

**THE ORIGIN OF MAN.**—It is generally thought that Darwin suggested that man was descended from the monkey. But such is far from the fact. What Darwin's hypothesis suggested was, not that man was descended from the monkey, but that both man and the monkey may be descendants of a common progenitor, a common type, now extinct, and of which no indisputable traces have yet been found. From

this common type, or ground form, so to speak, the process of development may, according to Darwin, have resulted in two distinct branches or offshoots—the one branch of development ending in the monkey tribe, the other branch ending in man.

**THE EARTH AS A TIME-KEEPER.**—A problem which is attracting to its study astronomers, relates to the earth as a time-keeper. We measure time by dividing either the period during which the earth revolves around the sun, or that in which it turns on its own axis. By the first method we measure a year; by the second, a day. The earth, according to some astronomers, is losing time. Through two causes, the sun's attraction and the friction, so to speak, of the tides, the earth each year revolves more slowly on its axis. The speculative question which these astronomers are discussing is whether in the end the earth will stop its revolution upon its axis, and will present always the same face to the sun. When that event occurs, there will be perpetual day in one part of the earth, and perpetual night in another. But there is no occasion for immediate alarm. The rate at which the earth is supposed to lose time only shortens the year by half a second in a century. There are more than 31,500,000 seconds in a year. Therefore, if the earth ever does cease to revolve on its axis, it will be more than 6,000,000,000,000 years before it will stop.

**THE WORLD MUST MOVE.**—In 1877, electric lighting by the incandescent system was declared by many to be contrary to scientific principles. The same was said of the use of iron, and later, of steel, in bridge building. The Suez canal was once denounced as a wild and foolish scheme. Less than 50 years ago educated mechanics asserted that steamships could never carry enough coal for a long voyage. Leading ship-builders told us that iron ships could not swim, and when one or two floated it was said that they would not hold together permanently. Rolls for flour making were once hooted and derided. The world will not stand still for any one.

**EXTINCTION OF RACES.**—Attention has lately been called to two races of men that must soon become extinct. At the present rate of decrease, the Moors, of New Zealand, now reduced to less than 40,000 from 100,000 in Capt. Cook's day, must have disappeared by the year 2000. The Laplanders are estimated to be 30,000 in number, and are gradually becoming fewer. To the above might be added the North American Indians, who are rapidly growing fewer, and the time is probably not far distant when they will entirely disappear from this continent and the world.

**PHOSPHORIC ACID FROM SLAG.**—Prof. Scheibler, of Berlin, has invented a process for the production of phosphoric acid from the slag made in the Thomas-Gilchrist method. The slag, having been roasted in an oxidizing flame, is pulverized and sifted. The powder is dissolved in hydrochloric acid and the solution saturated with lime-water. The resulting product contains from 35 to 37 per cent of phosphoric acid in the form of bibasic phosphate of lime, and a second roasting yields a substance in which the content of phosphoric acid is as high as 45 per cent.

**THE FLOWERING PLANTS KNOWN TO BOTANISTS.** says the *New York Independent*, are, in round numbers, about 100,000 species, but it is not improbable that, by the time all the recesses of the earth have been explored, the number will be largely increased, if not, perhaps, doubled. The whole interior of China is, so far, comparatively unknown; and, so far as the borders are occasionally penetrated, continually gives new species.

**AN ELECTRICAL TREE** has been found in New Guinea by two German explorers. When the explorers reached a spot 12 days distant from the coast they found their compass useless, owing to the presence of a tree which so completely possessed the properties of a highly charged electric battery that one of the travelers was knocked down when he touched it. Analysis showed the tree to consist of almost pure amorphous carbon, and it has been named *elsassia electrica*.

**MILDEW DESTROYER.**—Sulphide of potash has proved in our practice all that has been claimed for it by the English press as a destroyer of mildew on roses, chrysanthemums and some other greenhouse plants. A quarter of an ounce dissolved in a gallon of water and thrown on the affected foliage with a fine rosed syringe will wholly destroy the fungus, and the leaves will not be injured. —*Vick's Magazine*.

**THE FLIGHT OF SWALLOWS.**—An experiment was made at Pavia, in Italy, with two swallows, to determine their speed. Two hen birds were taken from their broods, carried to Milan and there released at a given hour. Both made their way back to their nests in 13 minutes, which gave their rate of speed at 87½ miles an hour.

**THE DETONATION OF METEORS.**—Signor Bombicci supposes the detonation of meteors to be that of an explosive gas formed during the surface heating of the mass in the atmosphere, and accumulating chiefly in the vacuum space left behind the mass in its very swift flight.



## Mono Lake Water.

At the last meeting of the San Francisco Microscopical Society much interest was excited by the exhibition of some collections of animal and vegetable life found in and around Mono lake by Dr. H. W. Harkness during his recent trip to that locality. Notable among the latter class were specimens of the rare bacterium which has been provisionally classed as *Bacterium rubescens*, although Dr. Harkness believes there are strong grounds for regarding it as specifically new. It is found in immense quantities in Mono lake, and aggregated masses of it are of a beautiful rose color. It seems to have both a still and a motile stage. No spore formation has been discovered in the preliminary examinations, but culture experiments are now being carried on, which will no doubt disclose its complete life cycle. Numerous very active infusoria were found associated with the bacteria, and Dr. Harkness reports having found many species of diatoms, some aquatic insect larvae, minute crustaceans, and also fresh-water algae, in this remarkable lake, the water of which is so intensely alkaline that it was formerly thought incapable of supporting either animal or vegetable life. An official analysis of the water of the "Dead Sea of California," as it has been called, has just been received from Washington and is as follows:

Silica.....	0.28
Chloride of potassium.....	2.23
Chloride of sodium.....	18.22
Sulphate of sodium.....	10.07
Borate of sodium.....	.20
Carbonate of sodium.....	10.49
Carbonate of calcium.....	.68
Carbonate of magnesium.....	.36
Water.....	948.47

Total.....1,000.00

Thus showing the remarkable proportion of nearly 52 parts of solid constituents in each 1000.

Specimens were also shown of the evaporated alkaline sediment from Owens lake, stained a bright red by the presence of enormous numbers of the above-mentioned bacterium. Some further communications regarding the flora and fauna of the Mono lake region have been promised by Dr. Harkness.

## Gold in Madagascar.

Mr. Baron, one of the London Missionary Society's agents, has carefully studied the geology of the inland provinces of the African island. He states that the Malagasy Government has recently obtained gold from Ampasiria, a place about half-way between the villages of Malatsy and Mevatana, on the road to Mojanga from the capital. From this last-named place there is navigable water communication to Mojanga (90 miles). The valley of the Ampasiria is in the district north of Malatsy, and south of the confluence of the Ikopa with Botsiboka rivers, and is one of the numerous similar dales lying between hard clay ridges, sprinkled with quartz gravel. In these green valleys are groves of rofia palm, bamboo canes, and a species of fig-tree called adabo. Overlooking this happy valley on the north is the high named Kalomainty, at an elevation of 1290 feet above the sea. On the south side it is bordered by another ridge, beneath which flows the river Andranolite, entering the Ikopa just above the great rapids; another locality, where gold is found in the bed of a stream, has been indicated at Itompoanandrariny, west of Valalafotsy, at an elevation of 4480 feet, close to the watershed between the western and northern river systems, and north-west of the volcanic area of Ifanja and Itasy. Yet even close to Antananarivo, at Tanjombato, within a mile or two south of the capital, has gold also been detected, and perhaps in other localities as well. The gold is of excellent quality, but at present the native laws are very stringent in forbidding not only the sale but the search for the precious metal, as the Government wisely retain the monopoly of working the ore. Nevertheless, by no means does all the gold found reach the national treasury, and it is said that gold nuggets are smuggled out of the country in the cakes of caoutchouc and gums collected in the forests nearer the coast.—*London Mining World*.

**CONCENTRATOR FOR BLACK SAND.**—Messrs. Wm. A. Woods and C. C. Garcelon, of this city, have invented what is known as a centrifugal concentrator, a contrivance for separating gold from crushed rock or sand. A patent has been secured on this machine, which has required a year of study and labor in its construction, and is a success. Last week the machine was in operation at the residence of Mr. Wood, on Ocean View avenue, and out of 400 pounds of black sand, hauled from the Aptos beach, \$3 in gold was taken. It is estimated that in one ton of this sand from \$5 to \$10 can be taken out, and the concentrator is capable of running through 25 or 30 tons per day. It will be taken to Aptos and put in operation.—*Santa Cruz Sentinel*.

**THE AIR OF THE SEA.**—The air of the sea, taken at a great distance from land, or even on the shore and in ports where the wind blows from the open sea, is an almost perfect state of purity.

## USEFUL INFORMATION.

## Importance of Practical Education.

A correspondent of the *Atlanta Constitution* makes some suggestions in a plain but practical way, which are good for both boys and men to bear in mind. We quote as follows: I believe in schools where boys can learn trades. Peter the Great left his throne and went to learn how to build a ship, and he learned from stem to stern, from hull to mast, and that was the beginning of his greatness. I knew a young man who was poor and smart, and a friend sent him to one of these schools up North, and he stayed two years and came back as a mining engineer and a bridge builder, and last year he planned and built a cotton factory, and is getting a large salary. How many college boys are there in Georgia who can tell what kind of native timber will bear the heaviest burden, or why you take white oak for one part of a wagon and ash for another, or what timber will last longer under water and what out of water? How many know sandstone from limestone, or iron from manganese? How many know how to cut a rafter or brace without a pattern? How many know which turns the fastest—the top of a wheel or the bottom—as the wagon moves along the ground? How many know how steel is made, and how a snake can climb a tree!

How many know that a horse gets up before and a cow behind, and the cow eats grass from her, and the horse eats to him? How many know that a surveyor's mark on a tree never gets any higher from the ground, or what tree bears fruit without bloom?

There is a power of comfort in knowledge, but a boy is not going to get it unless he wants it bad, and that is the trouble with most college boys, they don't want it. They are too busy, and haven't got time. There is more hope of a dull boy who wants knowledge than of a genius, for a genius generally knows it all without study. These close observers are the world's benefactors.

**SINGULAR USE FOR ELECTRICITY.**—A savant named Henri Roget, hailing from Lyons, has, it is stated, a new use for electricity. He has a patent to apply it as a substitute for the cat-o'-nine tails in corporeal punishment. The culprit, having been undressed, is securely strapped to a steel triangle, which is connected with one pole of a powerful battery. The other pole is connected with the whip, which consists of a number of steel wires covered with a sponge. This whip is dipped in water before the stroke is administered and wherever the wet wires touch an electric discharge takes place. The inventor claims that the chastisement can be made so mild as not to injure a schoolgirl, while, on the other hand, by increasing the power of the battery, a punishment can be administered beside which the knout would be mere child's play, and at the same time no injury is inflicted, the disgusting spectacle of a lacerated back is avoided, and the culprit, instead of having to be sent to the hospital to have his wounds healed, can be put to work in five minutes after the flogging is over. M. Roget intends petitioning Gen. Boulanger, the French Minister of War, to allow his patent to be used experimentally on the next soldier sentenced to the cat. Flogging is not in existence in the French army, nor is it likely to be introduced to test the machine.—*Electrical World*.

**TO PREPARE AN IRON CASTING FOR A PATTERN.**—The *Manufacturer and Builder* suggests the following: To properly prepare an iron casting of any object to serve as a pattern has been the subject of considerable experiment. The method of procedure is varied, according to the size of the object to be reproduced. Large iron patterns are generally pickled in the usual way, and then are well sand-papered, and one or more coats of varnish applied. Small iron patterns must first be pickled; when dry, a coating of sal-ammoniac water is put on them to rough the surface. They are then well sand-papered and heated, so that wax will run freely on them. After the surface has been covered with wax, remove the surplus and rub the balance well into the surface with a piece of cork. For very fine castings, "Bayberry wax" is preferred. On brass casting spermaceti wax is the best.

**A NEW FIRE DANGER.**—Fire originating from heated asbestos intended as sheathing is noticed by a patrol inspector in Philadelphia. In one of two recent instances the combustion chamber of a regenerative gas lamp was too near certain woodwork, and asbestos was inserted between, but the heat soon penetrated the stratum of asbestos and set fire to the wood. In the other case the sheet-iron top of a portable heater was within a few inches of the joists of the first floor; asbestos was placed on the heater, but heat passed through and the joists took fire. Heat was always above 300° F., and confined. No fires were noted from steam-pipes sheathed in asbestos. The inspector recommends as a safeguard from the heating of the non-inflammable fibrous stone an unobstructed air current between the source of the heat and the asbestos covering.

**HOW TO PREVENT THE RESTING EAST OF SCREWS.**—A method which will, it is said, be found quite effective against dampness, either inland or on the seacoast, is to dip the screws, before putting them in place, in a paste formed

of a mixture of oil (or grease) and fine graphite. This mixture will certainly be much more effective than the use of the fat alone; but in any case where a machine is much exposed, especially to salt air, the screws should be occasionally removed—say once a year—and returned to their places after making a fresh application.

**FOR CEMENTING IRON.**—The following recipe for cementing iron is given by an English mechanical journal: Take equal parts of sulphur and white lead, with about a sixth of borax; incorporate the three thoroughly. When about to apply it, wet it with strong sulphuric acid and place a thin layer of it between the two pieces of iron and press them together. In five days it will be dry, all traces of the cement having vanished, and the iron will have the appearance of having been welded together.

**PAINT FOR IRON.**—A cotemporary throws out the following suggestion: "Required to produce a perfect paint for the preservation of iron and steel. It must have a high mechanical adhesive property, and be composed of material electro-negative to iron and mixed with some tenacious fluid vehicle containing no oxygen, if possible, and not liable to be decomposed by the iron beneath." Inventors would do well to give the subject their consideration.

**THE BIGGEST BUILDING IN THE UNITED STATES** will be the City Hall of Philadelphia, now in process of construction. Between \$11,000,000 and \$12,000,000 have been expended upon it since 1872. It is estimated to cover 2800 more square feet than the Capitol at Washington. The tower on the north side will be surmounted by a statue of Penn., and its extreme height when completed will be 535 feet. It has now reached a height of 270 feet.

**ARTIFICIAL WHALEBONE.**—The scarcity of whales is seriously felt in reducing the supply of whalebone, which has advanced several times its price of a few years ago. To meet this deficiency several substitutes have recently been introduced; the latest is a mode of producing a substitute for the quills of geese and turkeys. A factory has recently been put in operation in Michigan to furnish the article.

**TO SILVER IRON.**—One of the most ingenious processes which have lately come into vogue in the treatment of iron—an Austrian invention—is that of giving to the metal a silver surface, this being effected by first covering the iron with mercury and then silver by the galvanic process. By heating the iron to 300° C. the mercury evaporates and the silver layer is fixed.

**WHAT NATURAL GAS HAS DONE.**—Since the introduction of natural gas into Pittsburg, Pa., the output of the mills and factories has been increased 20 per cent, a large number of new plants have been erected, and nearly 10,000 additional men have been given employment.

## GOOD MEALTH.

## Food.

Our bodies are made of what we eat.

An article to be suitable for food must contain at least one of the elementary substances of which the body consists, and this must be capable of a ready separation from all other elements. The latter, if not poisonous, will be rejected from the system without harm.

The best kinds of food are such as contain the most of the bodily elements. Milk contains all, and is hence a perfect food.

A proper diet is such a combination of articles as together furnish all the elements in due proportion, while at the same time these articles please the taste and gratify our love of variety. Starvation would result in time if a single one of these elements were lacking. Not only must muscle, bone, etc., be provided for, but, still more, brain, nerve and every secretion.

The modern fancy for the whitest bread is at fault, for such bread is deficient in the elements that make brain, nerves and bones. Hence the tendency to nervous diseases, dyspepsia and decaying teeth. Absence of vegetable food gives rise to scurvy; the too exclusive use of animal food to gout.

But food must be digested. For this no less than five digestive fluids are secreted by appropriate glands—saliva, for starch and sugar; gastric juice, for flesh, fish, eggs, etc.; bile and pancreatic juice, for fat, the latter also aiding in the digestion of starch; and the intestinal secretions, to complete the process. A deficiency in any one of these results in some form of dyspepsia.

The digested food must pass from the intestines into the circulation. Hence myriads of hungry mouths seize it from the former and pour it through countless minute vessels, which constantly unite and form larger, into the right side of the heart. Should these vessels be closed up by inflammation the body would waste away, however good the appetite and vigorous the digestion.

This imperfect blood does not, however, yet go into the full circulation, but passes round through the lungs with the venous blood and then into the left side of the heart, whence it is sent out into the arteries a pure fluid, rich in every element.

But the process of nutrition is not yet finished.

Those sleepless workers, the ultimate cells, whether of brain, or bone, or muscle, or membrane, throwing off each moment the waste debris, take from the same arterial fluid each what it needs.—*Ex.*

**SOFT, WHITE HANDS.**—A woman, whose pretty hands are being ruined by washing in hard water, writes to *Good Housekeeper's* to ask a remedy. That journal answers: "Water can be easily softened with a few drops of ammonia, or, what is better, a small piece of lump borax. Warm water into which enough borax has been dissolved to make the water feel a little slippery, when pressed between the thumb and finger, is very good for washing the hands. Hands kept dirty are never smooth and white. Absolute cleanliness is necessary. Many people who do not work wash their hands but seldom. The day's accumulation of dirt is allowed to remain on the hands at night. Upon rising the hands are washed in cold water. The possessor wonders why, when she does no work, her hands do not look any better, if as well, as her chambermaid's. The hands should always be washed in warm soapsuds before going to bed. White soaps are safest. Highly scented and colored soaps are almost invariably made from rancid and ill-smelling fats. After the hands are thoroughly dried, use a few drops of mixed glycerine and camphor, which the druggist can prepare for you. Drop into the palm of the hand and rub on the hands. This will be all that will be necessary to show decided improvement."

**INOCULABILITY OF YELLOW FEVER.**—The Brazilian doctor whose discoveries in inoculation for yellow fever were recently alluded to in this column, according to the *London Lancet*, seems to have a rival in Havana. The *Lancet* says: Dr. Carlos Finlay, of Havana, has published the results of several experiments he has made on the inoculability of yellow fever. He performed the operation, or rather got it performed for him, by mosquitoes, which he caused first to sting a patient suffering from yellow fever and shortly afterward a healthy person who was to be (with his own consent, of course) the subject of the experiment. He found that the disease was only inoculable from the third to the sixth day. When two mosquitoes were employed, so that a double dose was given, the symptoms of the experimental disease were somewhat more severe than when only a single mosquito was used. Of 11 cases of inoculation, six were efficacious, one doubtful and four negative. The period of incubation varied from 5 to 14 days; the symptoms consisted of headache, pyrexia, injection, with sometimes an icteric tint of the conjunctiva, and in some cases albuminuria. The fever lasted, as in the ordinary form, from 5 to 21 days. The author believes that this method of producing artificial yellow fever will ultimately be found very valuable as a prophylactic against the natural and dangerous form of the disease.

**STRANGELY POISONOUS LIZARDS.**—The heloderma is the only poisonous lizard in the world, as far as known, and is confined to Mexico, Lower California and Arizona. The common name is the Gila monster. The poison comes from poison glands and the teeth are channelled to accelerate its passage into the wound. Brandy and whisky are generally antidotes to rattlesnake poison, but fail in the case of a bite from this reptile. The poison of the heloderma is entirely different from that of a snake. The latter kills by paralyzing the respiratory center, while the poison of the Gila monster paralyzes the heart. Experiments have been made showing that subcutaneous injections cause no local injury, while the action of the heart was seriously affected, becoming slowly contracted, while the spinal cord is paralyzed.—*Salt Lake Tribune*.

**DENGUE FEVER.**—At the recent meeting of the State Medical Association of Texas, Dr. McLaughlin, of Austin, read a paper claiming that he had made a remarkable discovery in regard to dengue fever. He claims to have found the microbes of the disease, and from his experiments he believes that the same discoveries are to be made in small-pox, yellow fever, hydrophobia, hog typhus, chicken cholera and Texas cattle fever, all of which can be mitigated or avoided by vaccinating with attenuated virus.

**IMAGINARY ILLS.**—A Philadelphia physician says that a great deal of what passes for heart disease is only mild dyspepsia; that nervousness commonly is bad temper, and that two-thirds of so-called malaria is nothing but laziness. Imagination, he says, is responsible for a multitude of ills; and he gives, as an instance, the case of a clergyman, who, after preaching a sermon, would take a teaspoonful of sweetened water and doze off like a babe, under the impression that it was a *bona fide* sedative.

**ANTIDOTES FOR CERTAIN POISONS.**—It is said that a standing antidote for poison by poison-oak, ivy, etc., is to take a handful of quicklime, dissolve in water, let it stand half an hour, then paint the poisoned parts with it. Three or four applications, it is said, will cure the most aggravated case. Poison from bees, hornets, spider bites, etc., is instantly arrested by the application of equal parts common salt and bicarbonate of soda, well rubbed in on the place bitten or stung.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Alameda.

**OPENING A COAL MINE.**—Livermore *Herald*, June 8: Jenkins Richards is engaged in running a drift north on the Fortuna vein between Nos. 1 and 2 veins six feet. Vein in the face looking better than at last report. In winze 135-foot level we have been contending with bad air most of the week. Have overcome the trouble, however, and made an advance of four feet.

**THE STANDARD CON.**—Number of men employed in and about the mine: Engineers, 2, pumpman 1, shift bosses 1, carpenter 1, blacksmith 1, miners 24, stationmen 4, carmen 5, timbermen 1, laborer 1; total employed, 41. Ore bodies without special change. Mine closed from Monday, 5th, until Tuesday, 6th, A. M., since which time work has been steady at both. Ore shipped to mill during week, 266 tons.

## Amador.

**QUARTZ PROSPECT.**—Amador *Ledger*, July 10: Hugh Mason is opening up a promising quartz prospect, located about half a mile west of the Downs mine, near Volcano. He is running a tunnel into the side hill, a distance of 60 feet, showing a well-defined quartz ledge containing gold in good paying quantities. T. Gillick started his mill last week on from 75 to 100 tons of exceedingly rich ore, which he had accumulated on the dump. The Volcano Gold Gravel Co. have made no thorough cleanup as yet this season. The partial cleanups of the bedrock have been much more satisfactory than in previous seasons, and the opinion is general that the surrender of gold this year will reach paying figures. At the Tellurium at Pine Grove the pump has been taken out of the shaft and other machinery packed up ready for shipment. The mill has been running lately, finishing up a small quantity of ore on the dump. The indications point to the complete abandonment of active operations by the present company. At the Downs mine the work of putting in the pumps is still in order. It will be perhaps another month before sinking will be commenced. The St. Julian at Middle Bar has come to a standstill. In upraising to make connection between the tunnel and winze a lack of funds necessitated a suspension of operations for an indefinite period. The shaft of the Zeile mine is being deepened. The capacity of the reservoir is also being increased by a thorough cleaning out of the sediment which has been accumulating for over a year past. Drifting for the ledge is still the work in hand at the Moore mine.

## Calaveras.

**IRON.**—Mt. Echo, July 9: There are, perhaps, few persons who are aware that there is one of the most extensive iron mines in the State within less than a mile of Murphy, in this county. It is the property of J. L. Sperry, owner of the celebrated Big Tree Grove. This property will be valuable some day.

## Contra Costa.

**STEWARTVILLE.**—Cor. Concord *Sun*, July 10: The future prospect of our mines is bright. A large body of coal on the west side, that was supposed to have been worked, is found to be untouched.

## El Dorado.

**THE O. K.**—Georgetown *Gazette*, July 8: We visited Dr. Spencer's mine, the O. K., last Tuesday, finding his sons Cad. and George at the windlass and Ad. Porter in the shaft, all busy handling ore which will mill \$10 to \$12 per ton, about 80 tons of which is already on the dump. The shaft is upward of 40 feet in depth, and the lode is about 10 feet wide, and prospects very evenly throughout. It is noticed that the ore improves in richness as they go down. We made several tests with the pan, both from the dump and from ore we took from the ledge while in the shaft, and we can assure all who have not visited this mine that Dr. Spencer has a mine which, if the ore body continues to extend and prospect as well for the next 100 feet, will prove one of the best mines in California. George Handy is furnishing the Taylor mine with lumber, of which a large amount will be used. The State Mountain mine mill is busy as ever turning out handsome dividends for its lucky owners.

## Fresno.

**CLEANUP.**—Fresno *Expositor*, July 9: It is stated on good authority that the last cleanup of the McNally mine amounted to about 90 pounds of gold, and that about \$48,000 have so far been extracted from the mine in two runs. It seems too bad that the Hildreth mine, an equally good property, could not be gotten into energetic hands and developed as it should be.

**MUSICK.**—Fresno *Republican*, July 9: At last reports the owners of the Musick mine, about 12 miles from here, had, as the saying is, "struck it rich." At present they are working two shifts, three men in a shift. They have an incline down 120 feet, and are running a double tunnel. The ore averages from 7 to 15 inches thick, and assays about \$65 per ton, although by the arastra process only about \$25 per ton is obtained from it. The hoisting works are run by horse power. J. J. Musick's family moved up to the mine about two weeks ago.

## Mono.

**THE CON. PACIFIC.**—Bodie *Miner*, July 12: In drift north on the Fortuna vein between Nos. 1 and 2 veins six feet. Vein in the face looking better than at last report. In winze 135-foot level we have been contending with bad air most of the week. Have overcome the trouble, however, and made an advance of four feet.

**THE STANDARD CON.**—Number of men employed in and about the mine: Engineers, 2, pumpman 1, shift bosses 1, carpenter 1, blacksmith 1, miners 24, stationmen 4, carmen 5, timbermen 1, laborer 1; total employed, 41. Ore bodies without special change. Mine closed from Monday, 5th, until Tuesday, 6th, A. M., since which time work has been steady at both. Ore shipped to mill during week, 266 tons.

## Nevada.

**PENNSYLVANIA MINE.**—Foothill *Tidings*, July 9: The Pennsylvania Con. quartz mine is situated on Kate Hays Hill, and is a parallel lode to the Empire mine, and in all of its characteristics closely resembles that remarkable property. It is provided with good hoisting and pumping machinery, and the incline shaft is sunk to a depth of 240 feet. Only one level has been opened and this at a depth of 175 feet. This level has produced considerable good ore that has milled from \$25 to \$30 per load. The lower level is now being opened and an air chute from it to the upper level run on the trend of the ledge was completed yesterday. In running this chute some quartz was found worth from \$20 to \$30 a pound, and from all appearances the Pennsylvania, or Penn. Con., as it is called, will soon be a regular dividend payer. Being below the Empire, in the same ridge, it can be easily worked by water-power, which adds still more to its value as a property.

## Plumas.

**BIG FLAT MINES.**—Greenville *Bulletin*, July 7: The mines that have been opened on Big Flat are yielding large returns, considering the force employed. About a year ago work on the Glazier commenced. A great deal of the time was spent in opening the mine, yet during the period named over \$11,000 has been taken out. In June three men were employed in drifting and extracting gravel. For the month \$1700 was realized. A great deal of the gold is very coarse, some of the pieces weighing more than an ounce. In the drift claim owned by Messrs. Ellis, Firststone and Bressler, work has been progressing very satisfactorily. We learned that they have proceeded across the channel 100 feet without reaching the opposite rim. The bed of gravel is large, easily worked, and pays well, though figures have not been given us by the parties interested. It is safe to say that it is paying \$20 to the man.

## San Bernardino.

**STRUCK IT RICH.**—Calico *Print*, July 8: We reckon that George Silveria and Frank Williamson are two of the happiest men now living in San Bernardino. Some time since Mr. Silveria went to Holcomb valley, where he and Mr. Williamson have a placer mine and a quartz ledge. This morning a reporter was shown four nuggets, weighing \$20, taken from this placer mine, and specimens of quartz from their ledge that showed large blotches of gold. To say that Silveria and Williamson are happy would give but a faint idea of their feelings. They have struck it, and it is rich.

**THE MORONGO PASS MINES.**—Los Angeles *Herald*, July 9: Judge J. G. Nichols arrived yesterday from a pleasant prospecting trip in the Morongo Pass, about 30 miles east of San Bernardino. The judge says there is plenty of water and timber in the mountains, and plenty of gold that can be had by the outlay of enough capital to erect machinery and open the mines. Probably no person has ever prospected Morongo Pass as thoroughly as Judge Nichols. Many years ago he was driven out of the Pass by the Indians, and all his personal property and cabin burned by them. These natives are now in the mountains along the Colorado, and no disturbance is likely to arise again from that source. Holcomb valley he also pronounces as very rich, and predicts that great mining enterprises will soon be in active operation in that region and in Bear valley.

**PLACERS.**—San Bernardino *Index*, July 9: Geo. Silveria and Frank Williamson some time since went to Holcomb valley, where they have a placer mine and a quartz ledge. A reporter was shown four nuggets, weighing \$20, taken from this placer mine, and specimens of quartz from their ledge that showed large blotches of gold.

## San Diego.

**NEW MILL.**—San Diego *Sun*, July 9: D. R. Frankel, of San Francisco, one of the proprietors of the Owens mine, near Julian, reports that the new 10-stamp mill was put in active operation on last Saturday. Twenty-five men find employment in the mine, and all indications are flattering for an excellent run. Mr. Frankel left for home on the Santa Rosa this evening.

**JULIAN AND BANNER.**—San Diego *Union*, July 9: In a brief interview with Mr. Milton Santee yesterday, we gleaned some facts and opinions that will possess interest for our readers. The gentleman referred to has recently returned from a trip to the Julian country. The party traveled by way of El Cajon to the Stonewall mine near Julian, where they tarried for some time inspecting that mine and others in the vicinity. The character of the Stonewall as a paying mine is well established. The last milling yielded \$39 per ton. There is a large body of ore and every evidence that it will increase in richness as it has been doing ever since the owners have been working it. It is an easy mine to work. It is claimed that there is much mineral wealth in that country which will ultimately be developed. From the Stonewall mine the party proceeded to Julian. In looking over the hills near this town, Mr. Santee picked up a piece of quartz which showed so much gold that he staked a claim at the place of finding. The quartz was brought to the city, and on being assayed yielded at the rate of \$411.33 1/2 to the ton. Other samples have been sent to an assayer at San Francisco. The fine timber in the Julian country excited Mr. Santee's admiration. It is a beautiful country in summer. The forests of oak and pine make ample shade, and the ground is carpeted with green grass. The timber will furnish sufficient fuel for mining purposes for many years.

## San Luis Obispo.

**CHALK ROCK.**—Cor. San Luis Obispo *Tribune*, July 9: Messrs. Jas. Sheerer & Co., of San Francisco, who are running the Tar Springs Asphaltum Mines, have begun the shipment of chalk-rock from Arroyo Grande, which will be used to mix with the asphaltum for paving purposes.

## Shasta.

**THE TELLURIUM MINE.**—Shasta Co. *Democrat*, July 8: Mr. Scheerer has at last closed arrangements with Mr. D. L. Calahan for erecting reduction machinery on the Salt creek tellurium mine. The machinery consists of a roaster of a daily capacity of ten tons, settlers, amalgamating pans, etc. The material for the roaster was ordered last week, and a San Francisco foundry is getting up the machinery. Mr. Calahan writes that there will be no further delay, and that the plant will be completed as speedily as possible.

**SQUAW CREEK ITEMS.**—The latest news from Squaw Creek is cheering. At the Snyder mine three eight-hour shifts are driving the main tunnel ahead about six feet per day in a fine body of rich sulphurets; the quartz also shows up finely in free gold. They now have a pay chute about 160 feet in length with nearly 200 feet of backs. At the Clipper they crosscut the ledge 78 feet from the mouth of the tunnel and show very high grade of ore 28 inches wide, and are still driving ahead the main tunnel. At Riley, Mathews & Co.'s both mills were shut down last week to make necessary repairs and give the boys a show to celebrate. They started up again yesterday full handed. At the Balacalla, Ellis & Murray are facing up for a new tunnel. This is undoubtedly one of the finest mining properties in Northern California; a few dollars judiciously expended would give it the boom it really deserves.

## Sierra.

**A \$7000 NUGGET.**—Sierra *Tribune*, July 9: Dick Steelman and Phil Hayes' drift mine is located about 15 miles north of Sierra City, in Gold valley. This has always been supposed to be a good-paying mine, but just what it yields no one but those directly interested seems to know. A *Tribune* reporter has heard, on what he considers reliable authority, however (in fact, there is no doubt about the truthfulness of the report), that one of the largest gold nuggets ever discovered in the State was found in that mine last week. This huge specimen, with the quartz that clung to it, weighed 37 pounds, and the solid gold alone tipped the scales at 32 pounds—amounting to about \$7000. The nugget was brought to town last Saturday evening. The matter was kept a secret so far as possible. Five years ago a chunk of gold valued at \$2200 was picked up in these same diggings.

**THE OSCEOLA MINE.**—T. H. Smith, the owner of the Osceola mine, near Alleghany, was in town Monday. Mr. Smith has engaged the Downieville foundry to erect a Forbes mill at the mine. He has about 2000 tons of quartz on the dump, which competent judges estimate will yield over \$30 per ton. Mr. Smith was recently offered \$50,000 for his mine, but only laughed at the proposition and said that three times that amount would not "touch the mine." He was then asked to set his price, but refused to, saying that he did not want to sell. Mr. Smith has pounded out enough gold with a hand-mortal to pay all his expenses.

**THE SUNFLOWER MINE.**—Sierra *Tribune*, July 9: The Sunflower quartz mine is located about 2000 feet south of the Alaska mine, at Pike City. We are informed that the company has obtained sufficient results to justify it in erecting hoisting and reduction works on the claim, and that 100,000 out of the 500,000 shares have been placed on the market for the purpose of raising the necessary money to provide these works. It looks very much as though Pike City is going to be one of the best gold districts in this, California's greatest mining county.

**MONTHLY CLEANUPS.**—The Young America cleaned up for the last month's run between \$22,000 and \$23,000. The Cleveland mine yielded \$2500 for the month.

## Siskiyou.

**SCOTT BAR.**—Yreka *Union*, July 8: The quartz excitement has somewhat subsided, although the mines all pay good wages.

**KLAMATH RIVER MINES.**—The Centennial Company is working full time and is taking out big pay. The John Knapper claim is being profitably worked by a Chinese company. The Fort Jones Company started its derricks last Saturday, and will run night and day until the season closes. Hoisting commenced in the Phil Mott claim Monday, and the owners are counting on a profitable run. The Kana Company has been hoisting for several days, with favorable results.

## NEVADA.

## Washoe District.

**CON. CALIFORNIA AND VIRGINIA.**—Virginia *Enterprise*, July 10: Work going on actively ahead as usual, with the regular daily yield of about 400 tons per day. The mill assays have shown considerable improvements over those of the last two or three months, all of which was needed. The drift explorations on the 1400 and 1650 levels are making good progress, and the old south drift on the 1950 level is being reopened. The official report of the mine for the month of June says: The number of tons of ore worked was 11,983, and the assay value of the bullion produced, subject to discount on silver, was \$105,116.27 against 12,040 tons worked in May, yielding bullion of the assay value of \$141,161.27. Although about the same quantity of ore was worked in June as in May, the bullion product was \$3,045 less. This was on account of the low grade of the ore. The yield in bullion of the ore worked at the Morgan mill in June averaged \$10.27 per ton against an average battery assay of \$13.47 per ton, the balance of the precious metals passing off in the tailings. The yield in bullion of the ore worked at the Eureka mill averaged \$7.79 per ton against an average battery assay of \$11.25, the difference, or \$3.46 per ton, passing off in the tailings. The expense account for June has not yet been received at the local office from Virginia City. The expenses of the corporation in May, when 12,040 tons of ore were mined and milled, were about \$140,000; therefore June, with 11,983 tons of ore mined and milled, they could not have been much less. If the \$105-

146.27 in bullion produced in June were sold, with silver at its present rates of discount, it would net the company \$91,451.16 in gold coin, and if the expenses in June have been as large as those of May, when about the same number of tons of ore were worked, there would be a loss to the company of \$48,549 for mining and milling ores in June.

**BEST AND BELCHER.**—Preparations are now being made to put in a substantial stone bulkhead on the 2319 or bottom level to shut off the heavy flow of water which comes in from the north country—very little comes in from the south. This north drift was commenced with the intention of being carried through to connect with the 2500 level of the C. and C. shaft, but was suspended at 300 feet. When this bulkhead is completed the sump will be pumped and cleaned out, and deeper sinking inaugurated. This sump or continuation of the shaft is 60 feet deep below the lower level.

**CHOLLAR.**—No advancement westward has been made in the new station on the 3200 level, owing to the opening out and starting of the lateral drift north to connect with the drift south from the bottom of the Hale and Norcross deep winze. This drift is now out 28 feet and being pushed ahead for all it is worth, commencing on the east side of the new ore vein and following along the east side.

**HALE AND NORCROSS.**—On the 3200 level the new lateral drift north from the bottom of the deep winze is advanced 32 feet toward the Savage line, making a total of 58 feet. Material in the face, vein porphyry, clay and quartz, giving low assays. On the 2900 level the west crosscut from the main north lateral drift is still following up the diamond drill hole, and showing well in good streaks and bunches of ore.

**SAVAGE.**—The principal work during the week has been confined to getting in the drain boxes throughout the main south lateral drift on the 600 level, and the requisite retimbering and similar work found necessary by the badly swelling ground passed through by the drift. The face of the east crosscut is still in favorable vein material.

**YELLOW JACKET.**—The old stopes and breasts from the 1500 level up continue their regular aggregate yield of about 140 tons per day, keeping the Brunswick mill steadily supplied. Further exploration work goes steadily ahead, opening up more ore resources to keep up the supply.

**SIERRA NEVADA.**—On the 520 level the north lateral drift from the west crosscut has gained 27 feet; total length, 251 feet. Material in face, vein porphyry, clay and a small proportion of poor quartz. A few tons of good gold ore per week are being taken from the croppings on Cedar Hill.

**GOULD AND CURRY.**—The west crosscut 50 feet above the 500 level has been extended 20 feet, making a total of 120 feet. The whole face is in mineralized quartz giving low assays. The north lateral drift has been extended 12 feet; total, 49 feet. No change in material.

**POTOSI.**—Nothing done beyond reaming out the long diamond drill hole, east on the 3100 level, preparatory to shoving the drill further east, to prospect and ascertain the dimensions of the great quartz vein demonstrated to exist at that point.

**ALTA.**—On the 700 level the west drift or crosscut from the main north lateral drift is making good progress toward intersection with the Keystone ledge, having nearly 100 feet further to go in order to reach it.

**CROWN POINT AND BELCHER.**—Full work going ahead at the regular old rate of 400 tons per day, as before the breakdown. The broken crank of the single hoist or north engine is repaired and all right.

**KENTUCK.**—About 40 tons per day is the regular yield of ore from the old workings above the 1300 level. This ore is all low-grade and being reduced at the Rock Point mill.

## Bernice District.

**BETTER PRICE WANTED.**—Silver *State*, July 7: In Bernice, Bothwell's mill is closed down. Messrs. Williams & Hoyt, the principal mining operators there, have refused to produce any more ore until a better price is paid for silver.

## Cottonwood District.

**QUIET.**—Silver *State*, July 7: For a combination of reasons, quietness reigns at Cottonwood, but good times are expected there before a great while. The Bell nickel and cobalt mine has been sold to an English syndicate, representatives of which are expected to arrive on the ground shortly. The ledge is six feet wide and of high grade. Before active work is resumed pumping machinery must be erected in order to rid the mine of water. Senator George Hearst and W. S. Keyes have bonded the Lovelock nickel and cobalt mine to an English syndicate. The ore of this property carries a higher per cent of cobalt but less of nickel than the Bell. Three thousand five hundred dollars have been paid on the bargain, and a cash sale, it is believed, will be effected in a few days. To the southwest of Cottonwood, some 30 miles, John T. Calvert has made a valuable discovery of a three-foot ledge of silver ore, assaying \$600 per ton.

## Eureka District.

**ORE SHIPMENTS.**—Eureka *Sentinel*, July 10: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Richmond Works—Alexandria mine 1 1/2 tons; Phoenix, 17; Putnam, 8; Rothschild, 2 1/2; Delaware, 10; Eureka Star, 2; Red Jacket, 1; Hoosac, 43; Lone Pine, 1; Bullwhacker, 1; Geddes & Bertrand, 6; Jones, 1; Mt. Hope, 13. To the Eureka Con. Works—Cottontail mine, 1 1/2 tons; Reveille, 4; Morey, 6 1/2; Diamond, 3; Dunderberg, 31 1/2; Irish Ambassador, 11; Pioneer, 1 1/2; Jackson, 20; Alexandria, 6 1/2.

## Granite District.

**SUCCESSFUL.**—White Pine *News*, July 10: Ex-Senator Doolin and Thomas Kenny are meeting with deserved success in Granite district. They have now been working over a year on a lease on Fred Gotchett's gold mines. We learn they have exposed a fine body of ore and are likely to make a little fortune between now and the time snow flies.

## I X L District.

**TUNNEL.**—Silver *State*, July 7: In I X L district, Messrs. Sanford, Allen & Co. own on the west side of the district a mine into which they are run-



ning a tunnel 80 feet long to crosscut their ledge at a depth of 75 feet. At the bottom of an incline sunk into the ledge the ore assayed over \$200 a ton. These gentlemen own a two-stamp mill, but the ore is rebellious, and must, if worked properly, be roasted. Should the ledge hold out in extent and richness, roasters will be erected close to the mine before long. On the east side of the district C. S. Kellogg has two men employed in the Black Prince mine, running a tunnel to crosscut the ledge. They have 15 feet further to go. An incline sunk into the ledge is in ore that will work about \$40 a ton. Some of the assays run up to \$150. The Bay State Company is not doing anything at present.

#### Mount Rose District.

PARADISE VALLEY.—*Silver State*, July 13: Ore produced by Paradise mine for week ending July 7: Milling ore, 168,500 lbs; first-class ore, 6000 lbs. Ore delivered to the mill, 174 tons, 500 lbs. Number of tons of ore milled, 140. Average assay value, per ton, 69.95 oz. silver; 0.49 oz. gold. Bullion produced, from 31,859 lbs. concentrations, \$70,708.12 par value. Shipped to Boston & Colorado S. Co., 358 sacks of ore, valued at \$10,708.12. Mill work—Three Huntington centrifugal roller mills and six Triumph concentrators. Number of men on pay-roll, 121, of whom 46 are miners; on dead work, 25; ore extraction, 21; ore sorters, sack sewers and rock breakers, 12.

#### Park Canyon District.

GOOD WORK.—Belmont *Courier*, July 8: The furnaces in the Giant mill, Park canyon, Nye county, are now doing good work, and the ore is chlorinized up to between 85 and 90 per cent of its assay value. Superintendent John Truman is confident that there will be no more trouble with the furnaces. There is enough ore in sight in the mine to keep the mill running for years. There are about 30 men on the pay roll.

#### Reveille District.

GILA MINE.—Belmont *Courier*, July 8: The mine is looking well and shows ore in good paying quantities ready to stope. In the new find in the mine, a winze has been sunk 75 feet in good ore all the way. This winze is now connected with the main workings of the mine by a tunnel. The ore is of a good grade, assaying as high as \$900 per ton. Foreman W. Norris informed Ed. Cavanaugh that the mine was in a condition to work several more men, and that after the arrival of Governor Jewett W. Adams, about July 15, the force would be largely increased. Reveille will be a live camp this summer and fall.

#### San Jacinto District.

TRYING THE LEACHING PROCESS.—*Silver State*, July 8: Martin and Andrewartha, two practical miners and ore dressers, left here yesterday for San Jacinto district, west of Rye Patch, where they contemplate starting leaching works for the reduction of the ores of that district. If they cannot succeed in leaching the ores they will reduce them for shipment by the Cornish jigger process.

#### Tuscarora District.

NORTH BELLE ISLE.—*Times-Review*, July 9: The crosscut near the old shaft, 150-foot level, has been extended 18 feet.

NAVAJO.—South drift on the west vein, 150-foot level, has been extended 12 feet. No. 7 upraise on the east vein, same level, has been carried up seven feet. The stopes on this level have yielded the usual amount and grade of ore. During the week the station at the shaft, 150-foot level, has been retimbered. Mill running as usual.

#### Ward District.

BULLION SHIPMENTS.—White Pine *News*, July 10: The Martin White Mining Company at Ward shipped this week through Wells, Fargo & Co.'s Express, bullion valued at \$5900. The Monitor Mining Company shipped this week through Wells, Fargo & Co.'s Express, bullion valued at \$7000.

#### White Pine District.

THE SWEETWATER.—Eureka *Sentinel*, July 8: All the workings in connection with the Sweetwater Mining Co. at Hamilton are reported to be running along smoothly. Some two weeks ago a bullion shipment was made by the company, and yesterday a bar valued at \$972.20 was shipped by them through Wells, Fargo & Co.'s express here. The principal mine, the Stafford, is looking well and is keeping up its regular output of ore. The company employ, all told, some 60 or 70 men in and about the mill and mine, including the Wheeler tunnel, which is looking quite flattering. It is said that a big development may be expected in that quarter ere long, the face showing up ore that will go as high as \$2000 per ton. The tunnel is now getting under the "Original Hidden Treasure," and a month's more work will determine whether the company is to have an old-time bonanza or not.

#### ARIZONA.

RICH ORE.—Prescott *Courier*, July 10: George H. Wickler tells us that his Challenge mine is yielding rich ore in abundance. It is in Hassayampa district, about 14 miles from Prescott. Carloads of the ore will soon be shipped to some Colorado smelter. Mr. Turner, of Upper Big Bug, is in Prescott and tells of rich strikes in the Morning Glory and Middleton mines. The last-named mine is in Big Bug district, the former in Turkey creek. Rock from both ledges shows a great deal of free gold. Five men keep the Morning Glory mine supplied with all the rock it can crush. A gentleman from Bradshaw says there are in the district some 12 mines from which rich ore is being mined. The Lynx Creek mill is making a very successful run, and the Del Pasco is grinding out plenty of gold. John Lawler is making new strikes in Eureka district, near the big copper mines.

MOHAVE COUNTY.—*Miner*, July 10: Messrs. Ayres and Kennedy have struck a large body of galena ore on the old Union mine, and have a carload on the dump, besides about 40 tons stripped ready to take down. The ore is said to average about 35 ounces in silver and 1½ ounces in gold to the ton and about 50 per cent lead. Mr. Ayres thinks he has a fortune in sight and we hope it may prove to be so. On the Prosperity mine Messrs. Layne and Sullivan are taking out some \$300 ore from a winze

in the south drift. James Smith has taken a contract to sink an air shaft on the Golconda mine near Todd Basin. Win. Sherman and Johnny Granfield are working on the old Morgan mine at Cerbat and will soon have a carload of galena ready to ship. Jim Mulligan has three or four tons of high-grade ore on the dump of the Flagstaff mine, the result of his labor for a few weeks past. Messrs. McLean and Roberts are pegging away at their tunnel on the Mariposa mine, and are in about 75 feet in three weeks' work. The rock is getting harder and some water is already coming in.

GLOBE.—*Silver Belt*, July 10: Salter & Co. will start the Centennial mill next week on 30 tons of ore from the Centralia mine. Frank Burke, W. A. Holmes and Jim Lewis will send them 10 or 12 tons for reduction. Work was resumed at the Old Dominion Company's mine and smelter on Tuesday.

RICH.—Garlinghouse is taking ore out of the old Democrat mine at McMillen that is said to go as high as \$10 per pound.

#### COLORADO.

GOLD.—*Tribune-Republican*, July 10: The production of gold is receiving more attention in Colorado this year than usual. There is scarcely a gulch or bar in the State, which gives promise of pay, that is not being worked. Regions that have not, in past years, added many golden grains to the total product, will yield their quota this season, providing they contain it to yield. The Hahn's Peak placers are bidding fair to turn out \$100,000 this year, which is nearly double their past product. San Miguel, which has been dead and quiet for years, will see dirt flying before fall. In Park county, about Hamilton, giants are cutting away banks where only the pick and shovel have worked before, and on the Sovereign mine there is fair promise of a large yield from newly-discovered ground. The news from Junction City, La Plata county, is favorable and the gold-bearing gravel is said to be rich and yielding well. The latest discovery in the placer line is reported to be in Conundrum Gulch, in Pitkin county. The *Herald-Democrat* gives the following account of it: Last season a number of placer claims were located in Conundrum Gulch. Upon some of these claims work was done then. Late in the season Mr. Wm. Harris found the Kansas claim in a small gulch running up from the east side of Conundrum proper a short distance above Red Hill and near the properties of Messrs. Webber, Lee and others, but owing to the lateness of the season and the near approach of snows concluded not to locate the property until this year. On the 19th inst. he located it. Mr. Frank Burno, deputy sheriff, is associated with him. On Saturday and yesterday some dirt from the surface was panned with most encouraging results. One pan (a common wash basin being used) yielded \$1.50 in value. The gold is of a superior quality. From the washing of a few pans of dirt Mr. Burno has a vial partly filled with nuggets, one of which is worth more than \$1. The owners of the Kansas claim will put in a flume at once and begin work to extract the precious metal that only awaits their taking. A stream of water runs through the claim sufficient for washing. The news of this rich find spread through the town on Saturday evening, and yesterday a number of prospectors turned their heads Conundrumward to try their luck. This new find will stimulate work on the other properties in Conundrum Gulch.

FREELAND.—Idaho Springs *News*, July 9: Work at the Freeland goes on as regular as the rising and setting of the sun, under the foremanship of old Jack Prout. The usual large reserves of ore are kept open for a year or two's supply, and from 70 to 80 tons are sent daily to the concentrator, which, in turn, is hauled to the railway switch at the mouth of Trail creek, where it is sampled and purchased by Mathews & Webb, ore and bullion brokers. Sinking has been resumed in the Freeland.

#### MONTANA.

THE GRANITE MOUNTAIN.—*Inter-Mountain*, July 8: In St. Louis yesterday the Granite Mountain Mining Company paid a dividend of \$100,000, being 25 cents per share, and making \$620,000 of profits divided this year to date. The Granite Mountain is not only the most valuable silver property in Montana, but it is the richest on the continent, and is paying heavier dividends than any other. When it is considered that the company is maintaining its present vast output with but a 30-stamp mill in operation, the record must be regarded as a marvelous one. But the end is not yet. The erection of a new mill containing 40 stamps is in contemplation, and while the new enterprise will not double the output, because some ore of a lower grade will be worked, the bullion product will yet be materially increased, and the profits divided will, of course, be correspondingly larger. That we are safe in making these promises is evidenced by the fact that recent reliable reports of the ore in sight in the Granite Mountain estimate its value to be not less than \$20,000,000—a claim that can be urged on behalf of but few mines in the known world.

#### OREGON.

QUARTZ AND PLACER.—Jacksonville *Times*, July 9: A cleanup is being made at the Sterling mine, which will be completed in about a month. Baume, Klippel & Co. are figuring on a new quartz mill, which will in all probability be put up soon. Wimer & Sons are cleaning up at their mines near Waldo, and we expect to hear a good report from there. Considerable prospecting is going on in Josephine county and several good placer mines will be opened there in the near future. J. C. Ruck is still engaged in rocking at his diggings in Willow Springs precinct. He has abandoned his quartz mines for the present. Chris. Kretzer, who has a good mine on Shiveley gulch, recently found a nugget, containing gold and silver, worth about \$60. John Haviland, who has a hydraulic claim near Kerbyville, is crushing the cement, which is abundant there, with good results. He has done well during the past season. The California company which proposes running a ditch from Sucker creek to the Illinois river, with the intention of working some rich mines, commenced operations a short time ago. B. A. Knott, of Willow Springs precinct, has about 200 tons of ore from his mine on the dump near L. D. Brown's mill, which is now being crushed. It is much harder than that

obtained from Swinden's ledge, but is said to prospect fully as well. L. D. Brown is now in Portland for the purpose of purchasing a five-stamp mill, which will be put alongside the one at present working at the Swinden ledge in Rock Point precinct. The ore is so rich and easily obtained that the full capacity of both mills can be taxed. A company, composed of Wm. Naucke, Wm. Bybee, John Hall and A. Brown, has inaugurated a new enterprise and will engage in mining on Canyon creek on a large scale. A ditch will be dug, hydraulic pipe and a giant purchased and nothing left undone to make its diggings pay. C. C. Beekman is having his quartz mines on Jackson creek surveyed, and will probably have tunnels run and shafts sunk on them before long. We believe that good ore exists there in paying quantities, and hope to see the matter thoroughly tested soon. B. B. Beekman and Frank Huffer are engaged in making the survey.

#### NEW MEXICO.

BULLION.—*Silver City Enterprise*, July 9: The bullion shipments for the month of June from this point by the Wells, Fargo & Co. express amount to \$50,901.30. Of this amount \$25,000 was in gold dust and gold bricks, which came in from several different gold camps. One thousand dollars was in bullion shipped by Meredith & Ailman, who purchased it in small quantities from various producers. Fifteen thousand sixty-eight dollars and fifty-five cents was shipped by Thos. B. Pheby, of Georgetown, and the balance, \$9832.85, by Payne, Washington & Co., of Georgetown. J. K. Wagner, of Wells, Fargo & Co.'s express, states that the past month was one unusually light for Georgetown, which, as a general thing, ships about \$40,000. Seven silver bricks, worth about \$1000 each, were shipped on Saturday by Payne, Washington & Co., of Georgetown, through the express office of this place. The bricks were the production of the McGregor mine, which is now owned by the Parapet Mining Co. Owing to the dry spell the company has been compelled to close down the mill for the present, but will continue developing the mines and taking out ore, which will be stowed away until there is a sufficient flow of water to start the mill. The company recently purchased the hoister formerly in use at the Ivanhoe mine, which will soon be put in place on the McGregor. The sale of the Atlantic mine at Pinos Altos is now understood to be off. It was to have been consummated upon the first of the present month, but because of a failure to arrive at an understanding that would be mutually satisfactory nothing was done, nor does it now appear likely that there will be. All of the conflicting interests of the owners of the Peerless mine have been compromised and a corporation formed. J. Will Boyle, vice-president of the Merchants' Exchange bank of St. Louis, is largely interested in the property. As soon as several little matters are adjusted work upon the property will be resumed with a result that cannot fail to be satisfactory to the company.

#### UTAH.

MILFORD.—Cor. Salt Lake *Tribune*, July 7: The Star Concentrating mill has run steadily all the past week under the able management of John Kerby. Wall's patent rolls have proved a success, and about 30 tons of hard ores are put through every ten hours. The mill is to be run night and day after the glorious Fourth. The mill is a success and if the ore bodies hold out, which they now bid fair to do, Star Precinct will take the lead of mineral producers in Southern Utah. Outside of the concentrations (which average 60 per cent lead, 35 ounces silver and from \$6 to \$20 gold per ton) extensive shipments of first-class, or ores going over 35 per cent lead, have been sent to the smelters north. The sampling mill is kept busy most of the time sampling ores for different parties. Among the mines now shipping 1 note the Elephant, leased by Wm. T. Milton, which is now showing well. This mine is owned by the Davenport Mining Co., of Iowa. The Burning Moscow, Golden Era, Rebel Flora, Wild Bill, Monitor, Florence Adelia, Hickory, Hidden Treasure, Congo, Blue Cloud and a number of others are also shipping.

REVIEW.—Salt Lake *Tribune*, July 9: The week has seen no important transaction in mining circles. The weather has been dry and sultry, and the output of ores free. The June report of the Ontario product showed 68 bars of bullion, 39,676.35 fine ounces, and nine lots of ore sold for \$77,463.67; an aggregate value, approximately, of \$117,140.02, making the product of the Ontario for the six months of this year, \$886,718.42. Out of this six regular monthly dividends of \$75,000 each have been paid, a total of \$450,000. The product of the Daly for June was \$56,062.66 of fine bullion, and four lots of ore sold, aggregating \$82,819.53. For the five previous months the Daly product was \$228,851.52; thus the six months' product was \$311,729.05. The shipment of ores out from this city for the week ending Saturday, July 3d, inclusive, was as follows: 36 cars bullion 869,832 pounds; 14 cars ore, 403,400 pounds; 5 cars copper ore, 143,400 pounds; total 55 cars 1,416,632 pounds. The shipment of ores abroad was light compared with the total receipts, which for the week ending July 7th, inclusive, were value of \$110,349.63. For the same period the receipts of bullion were \$152,664.8. Aggregate value of receipts of bullion and ore, \$263,013.11. For the previous week the receipts were \$160,178.55, of which \$101,602.98 was bullion, and \$58,575.57 was ore. The Ontario output for the week could not be got; it is probably about the difference between the "fine bars" and the Daly product. The Daly product for the week was six bars of bullion, \$7982.25; ore sales, \$8692.71; total, \$16,674.96. All goes well with this fine property. Base bullion receipts for the week were valued at \$19,200; fine bars, \$44,600. The Hanauer smelter product for the week was \$29,895; the Germania, nine cars, \$19,205.62; the Pascoe, \$3105. The Stormont sent up two lots of silver during the week, \$4555. Five hundred shares of this stock sold in New York on the 2d at 12 cents. Ore receipts for the week were \$27,145 by Wells, Fargo & Co.; \$45,075 (including \$2700 from the Queen of the Hills and \$1260 from the Overland), by McCormick & Co.; and \$38,129.63 by T. R. Jones & Co. Nothing new from the Horn Silver; no way of working its base, low-grade ores is yet found, the experiment recently at Campbell's concentrator having proved a failure.

#### List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING JULY 6, 1886.

344,892.—ROCK DRILL—C. O. Barlow, S. F.  
344,896.—TRIGGER ATTACHMENT FOR DOUBLE GUNS—C. E. Burgans, Oakland, Cal.  
344,950.—DISK SEEDER—B. C. Dorsey, Porterville, Cal.  
344,830.—GANG FLOW—P. Hansen, Fresno, Cal.  
344,915.—BLOW GUN—Lang & Hart, Stockton, Cal.  
344,916.—GAS CUT-OFF—Chas. Leech, Oakland, Cal.  
345,075.—FENCE POST—J. L. Quackenbush, Portland, Oregon.  
345,177.—MIDDINGS PURIFIER—R. A. Rew, Pomerooy, W. T.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

#### Mining Share Market.

The mining share market is not by any means so active as to keep all the brokers busy. In the middle Comstock mines there is little forward movement, although the situation is represented as good, with a prospect for development of good ore in Savage, Chollar and Norcross.

The following statement shows how the companies stood financially on July 1st—the amounts named being cash on hand: Alta, \$20,452.26; Alpha, \$13,891.97; Best and Belcher, \$4637.08; Benton, \$783.53; Chollar, \$36,576.97; Consolidated California and Virginia, \$23,951.76; Exchequer, \$3098.27; Gould and Curry, \$362.29; Hale and Norcross, \$16,631.79; Mexican, \$3735.75; Occidental, \$1648.27; Ophir, \$1229.76; Sierra Nevada, \$12,151.87; Utah, \$5273.94.

#### Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Mt. Diablo (for June), \$40,440; Ontario (for June), \$117,140; Consolidated California and Virginia (for June), \$105,116; Daly (for June), \$56,062; Mt. Diablo, July 6, \$5076; Lexington, July 8, \$25,900; Moulton, 8, \$16,800; Dexter, 8, \$3072; Alice, 6, \$47,776; Marget Ann, 9, \$3416; Hanauer, 7, \$18,200; Pascoe, 7, \$1600; Stormont, 7, \$2325; Overland, 8, \$1260; Germania, 8, \$6363; Germania, 9, \$6488; Alice, 9, \$12,447; Queen of the Hills, 9, \$1135; Germania, 10, \$4336; Hanauer, 11, \$6130; Crescent, 11, \$9,530; Germania, 11, \$2137; Queen of the Hills, 11, \$1350. Shipments from Salt Lake City, for week ending July 20, were 33 cars of bullion, 799,506 pounds; 12 cars ore, 380,800 pounds; one car copper ore, 23,100 pounds; one car sulphur, 27,000 pounds.

#### New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

KIRBY MILLING AND M. CO., July 10. Capital stock, \$1,000,000. Directors, Martin Erickson, A. W. Huggins, John O. Wilkins, William Coker, J. J. Aiken.

CHICAGO M. & M. CO., July 10. Capital stock, \$2,000,000. Directors, P. A. Doane, C. H. Eaton, J. M. Bryan, R. C. Cheeseborough and G. W. Watson.

SOUTHERN PACIFIC MILLING CO., July 14. Object, buying and selling wheat and making flour in San Luis Obispo and Monterey counties. Capital stock, \$200,000, in \$100 shares. Directors, M. C. Ellis, R. M. Shackelford, F. L. Parker, P. Fellows and C. O. Alexander.

AUTOMATIC CARBURETING GAS AND LAMP CO. Object, to make and sell automatic lamps and deal in patent rights. Capital stock, \$100,000. Directors, J. G. Colmesnil, J. H. O'Dell, R. T. Shannon, W. H. Shannon, H. C. Willis and E. Jesuran.

#### Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

#### Don't Fail to Write.

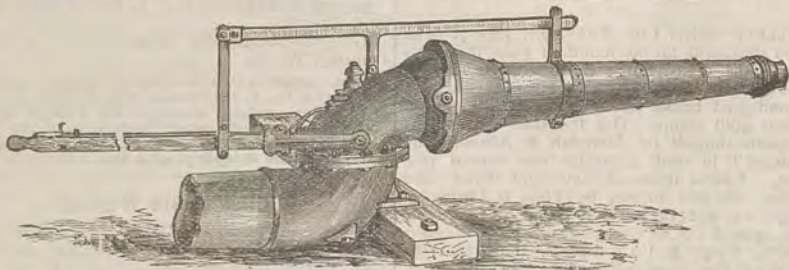
Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.





**Chicago Prices Beaten!**  
ESTABLISHED 1860.  
**S. F. PIONEER SCREEN WORKS,**  
221 & 223 First St., cor. Tehama, S. F.  
**J. W. QUICK, Prop'r.**  
Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Churns, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).  
Orders Promptly Executed

### IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the **IMPROVED FORM OF HYDRAULIC GIANTS**, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

**JOSHUA HENDY MACHINE WORKS,**  
39 to 51 Fremont St., San Francisco, Cal.



This cut represents our  
**IMPROVED HYDRAULIC MACHINE.**  
IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.  
**HOSKIN & CO., Marysville, Cal.**

### THE JENKINS STANDARD PACKING

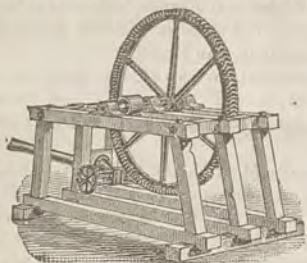


IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the **Jenkins Standard Packing** can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing," and is for sale by the Trade generally.

Manufactured only by

For Sale by **DUNHAM, CARRIGAN & CO.,** San Francisco, Cal. | **JENKINS BROS.** 71 John St., New York.

### KNIGHT'S WATER WHEEL MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

**All Estimates Guaranteed.**

SEND FOR CIRCULAR.

**EDWARD A. RIX & CO.,**

Sole Agent,

18 and 20 Fremont Street, San Francisco.

**RICHARD C. REMMEY, Agent,**  
**Philadelphia Chemical Stoneware Manufactory,**  
1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of all kinds of **Chemical Stoneware** — FOR — **Manufacturing Chemists.** Also Chemical Brick for Glover Tower.

INVENTORS, TAKE NOTICE

**L. PETERSON, MODEL MAKER,**

258 Market St., N. E. cor. Front (up stairs), San Francisco  
Experimental machinery and all kinds of metal, tin and Brasswork.

### MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

**F. A. ROBBINS,**

...MANUFACTURER OF...

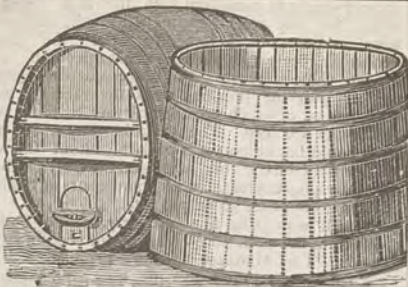
Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.



**WATER TANKS! WINE TANKS!**  
**CALIFORNIA WINE COOPERAGE CO.**

**FULDA BROS.,** Proprietors,

30 to 40 Spear St., San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

## H. P. GREGORY & CO.

Nos. 2 and 4 California St., San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

# MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING MACHINERY.

FRANK & CO.'S WOODWORKING MACHINERY.

NEW HAVEN MANUF'G CO.'S MACHINISTS' TOOLS.

BEMENT & SON'S MACHINISTS' TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND EXHAUSTS.

SHIMER MATCHER HEADS.

BRAINARD MILLING MACHINES.

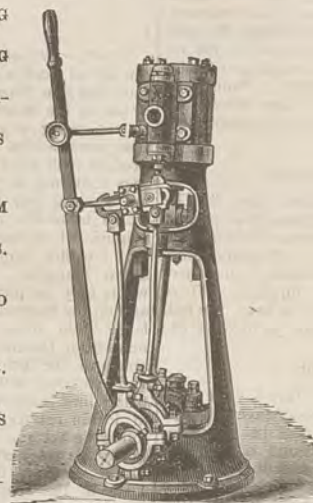
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISHERS.



**YACHT ENGINES.**

WILLIAMSON BROS' HOISTING ENGINES.

ATLAS ENGINE WORKS ENGINES AND BOILERS.

PAYNE'S VERTICAL AND HORIZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECTORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

### MILL SUPPLIES AND LUBRICATING OILS.

THE CONSUMERS' COMPANY.

## VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

**Vulcan Nos. 1, 2 and 3,**

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequalled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**

218 California Street, San Francisco, Cal.



## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

**GIANT POWDER or DYNAMITE,**

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

**JUDSON POWDER IMPROVED.**

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

**BANDMANN, NIELSEN & CO.,**

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

### THE RUSSELL PROCESS COMP'Y.

**C. A. STETEFELDT, President.**

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

### San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

**TUBBS & CO.**

611 and 613 Front St., San Francisco.



The California  
Perforating Screen  
Company.

All kinds of Quartz Screens, slot or round holes; zinc, copper and brass for

**FLOUR AND OTHER MILLS.**

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco

**Engraving.** Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

UTAH OFFICE—SALT LAKE CITY, UTAH.

Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,

JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

## Metallurgy and Ores.

**SELBY  
SMELTING and LEAD CO.,**

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY  
And Assay Office.

Highest Prices Paid for Gold, Silver and  
Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,  
LEAD PIPE,  
SHEET LEAD,  
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,  
Under Chamberlin Patent.

**Nevada Metallurgical Works.**

NO. 28 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED 1869.

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the  
most suitable Process for Working Ores.

Special attention paid to Examinations of  
Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

## THOMAS PRICE'S

ASSAY OFFICE,

CHEMICAL

LABORATORY

Bullion Rooms and Ore Floors

No. 524 Sacramento Street,  
San Francisco.

J. KUSTEL.

H. KUSTEL.



**METALLURGICAL WORKS,**

318 Pine St. (Basement),

Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my  
Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical Instruction given Treating Ores by im-  
proved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

C. H. AARON,

ASSAYER AND METALLURGIST,

NOGALES, ARIZONA,

Will attend to business in connection with mines in So-  
nora or Arizona.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

515 California Street,

Bet. Montgomery and Kearny, SAN FRANCISCO.

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

## JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

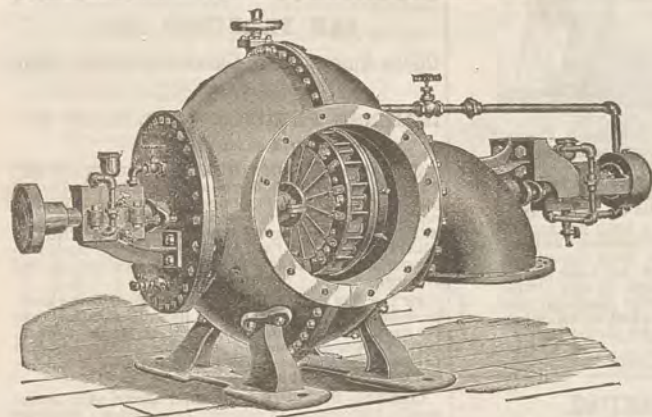
114-118 Pine Street, - San Francisco.

We would call the attention of Assayers, Chemists,  
Mining Companies, Milling Companies, Prospectors, etc.,  
to our full stock of Balances, Furnaces, Muffles, Crucibles,  
Scorifiers, etc., including, also, a full stock of  
Chemicals.

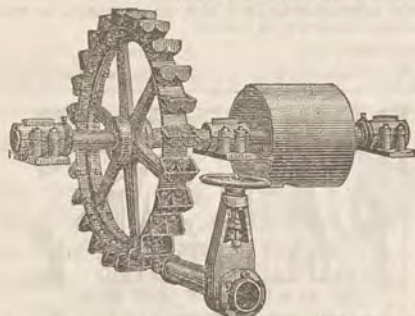
Having been engaged in furnishing these supplies since  
the first discovery of mines on the Pacific Coast, we feel  
confident from our experience we can well suit the de-  
mand for these goods, both as to quality and price. Our  
New Illustrated Catalogue, with prices, will be sent on  
application.

Our Gold and Silver Tables, showing the value per  
ounce Troy at different degrees of fineness, and valuable  
tables for computation of assays in grains and grammes,  
will be sent free upon application. Agents for the Patent  
Plumbago Crucible Co., London, England. Also for E.  
G. DENNISTON'S Silver Plated Amalgam Plates. The  
plates of this well-known manufacturer are thoroughly  
reliable, and full weight of Silver guaranteed. Orders  
taken at his lowest prices.

JOHN TAYLOR & CO.



## PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED  
by the Idaho Company at Grass Valley, Cal., and  
gave 90 2 per cent., distancing all competitors. Send for  
Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street  
San Francisco, Cal.

## N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Cata-  
logue. 17 and 19 Fremont St., San Francisco.

NATIONAL ASSURANCE CO.,  
OF IRELAND.

ATLAS ASSURANCE COMPY.,  
OF LONDON.

BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.

H. M. NEWHALL & CO.,

GENERAL AGENTS,

309 & 311 Sansome St., San Francisco, Cal.

## THE SCIENTIFIC PORTABLE FORGE

AND

## BLACKSMITH HAND BLOWERS.

GUARANTEED

The Lightest Running! The Strongest Blast!  
The Most Durable!

ADAPTED TO ALL KINDS OF WORK,

Send for Catalogue! AND MADE IN STYLES AND SIZES TO SUIT.

THE FOODS MANUFACTURING CO., - - Springfield, Ohio



ADAMANTINE.

We manufacture the above Adamantine  
Shoes, Dies and Crusher Plates. They are in  
use on the hardest quartz in the United States  
and South and Central America, and have been  
for the last ten years; we warrant them to out-  
wear three (3) sets made of any other metal, and many report that they last from 4 to 8 times  
longer than any other make. They never break AT THE SHANK, and the wear is so light  
that little or no foreign matter gets mixed with the crushed ore.

Also CHROME CAST STEEL for Mining and General Use, of the finest quality.

For further particulars, address

**CHROME STEEL WORKS,**

H. D. MORRIS, Agent, 22 Fremont St., San Francisco.

When ordering, a rough sketch, with full dimensions, is all that is necessary.

## CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

**STEIGER & KERR, Occidental Foundry,**

No. 187 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.



## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co.	Nevada.	29.	25. May 23. July 2.	J. B. Burris.	329 Montgomery St.
Belmont M Co.	Nevada.	40.	10. Apr 30. July 8.	J. W. Pew.	310 Pine St.
Bo die Tunnel & M Co.	California.	13.	25. May 23. July 6.	G. C. Harvey.	309 California St.
Bodie Con M Co.	California.	5.	50. June 21. July 26.	G. W. Sessions.	309 Montgomery St.
Best & Belcher M Co.	Nevada.	34.	50. June 14. July 21.	W. Willis.	309 Montgomery St.
Crocker M Co.	Arizona.	3.	20. May 25. July 6.	A. Waterman.	309 Montgomery St.
Dudley M Co.	California.	12.	25. June 21. July 27.	J. Stadfield Jr.	419 California St.
Golden Fleece G M Co.	California.	5.	20. May 23. July 31.	W. J. Gleason.	Phe an Block
Gould & Curry S M Co.	Nevada.	53.	50. June 21. July 26.	A. K. Durbrow.	309 Montgomery St.
Live Oak Drift G M Co.	California.	1.	25. May 25. June 30.	T. Wetzel.	322 Montgomery St.
Mexican M Co.	Nevada.	32.	25. June 17. July 24.	C. C. Elliott.	309 Montgomery St.
Mayflower Gravel M Co.	California.	31.	25. July 1. Aug 9.	J. Moritz.	328 Montgomery St.
North Peer M Co.	Arizona.	3.	02. May 19. June 24.	J. H. Deas.	309 Montgomery St.
Ophir S M Co.	Nevada.	51.	25. June 7. July 13.	E. B. Holmes.	339 Montgomery St.
Palomas Placer M Co.	California.	1.	02. June 1. July 5.	J. D. Buck.	309 Montgomery St.
Potosi M Co.	Nevada.	24.	39. June 25. July 25.	A. C. B. Elliott.	309 Montgomery St.
Sierra Nevada S M Co.	Nevada.	85.	25. May 27. July 1.	J. L. Parker.	309 Montgomery St.
Savage M Co.	Nevada.	60.	50. June 17. July 20.	E. B. Holmes.	309 Montgomery St.

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Benton Con M Co.	California.	W. H. Watson.	332 Montgomery St.	Annual.	July 28
Lady Washington Con M Co.	Nevada.	W. H. Watson.	332 Montgomery St.	Annual.	July 28
Loreto M & M Co.	Mexico.	C. T. Bridge.	224 California St.	Annual.	Aug 5
McMillen M Co.	Arizona.	J. Moritz.	328 Montgomery St.	Annual.	Aug 4
New York Hill M Co.	California.	J. B. Leighton.	313 Montgomery St.	Annual.	July 25
Union Con M Co.	Nevada.	J. M. Burlington.	309 California St.	Annual.	July 19

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Holmes M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	25.	Mar 20
Monro M Co.	California.	G. W. Sessions.	359 Montgomery St.	25.	Mar 10
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	July 15
Young America M Co.	California.			40.	May 20

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING July 24.	WEEK ENDING July 25.	WEEK ENDING July 26.	WEEK ENDING July 27.	WEEK ENDING July 28.
Alpha.	.75	.87	.85	.95	1.00
Alta.	.40	.55	.45	.55	.60
Andes.	.10	.10	.10	.10	.10
Argenta.	.10	.10	.10	.10	.10
Belcher.	.10	.10	.10	.10	.10
Belding.	.10	.10	.10	.10	.10
Best & Belcher.	.95	1.15	.90	1.30	1.20
Bullion.	.25	.39	.25	.30	.40
Bonanza King.	.10	.10	.10	.10	.10
Bodie Con.	1.40	1.90	1.45	1.55	1.40
Benton.	.05	.05	.05	.05	.05
Bodie Tunnel.	.10	.10	.10	.10	.10
Bulwer.	1.50	1.70	.85	1.35	.70
California.	1.30	1.69	1.30	1.45	1.40
Challenge.	.35	.35	.40	.40	.40
Champion.	.40	1.25	1.00	1.20	1.45
Chollar.	.40	1.25	1.00	1.20	1.45
Confidence.	.30	.30	.30	.30	.30
Con. Imperial.	.15	.15	.15	.15	.15
Con. Virginia.	1.30	1.60	1.30	1.45	1.40
Con. Pacific.	.10	.10	.10	.10	.10
Crown Point.	.10	.10	.10	.10	.10
Day.	.10	.10	.10	.10	.10
Eureka Con.	2.40	3.00	3.00	3.50	3.00
Eureka Tunnel.	.10	.10	.10	.10	.10
Exchequer.	.20	.20	.20	.20	.20
Grand Prize.	.10	.10	.10	.10	.10
Gould & Curry.	.80	1.20	1.05	1.65	1.30
Goodshaw.	.10	.10	.10	.10	.10
Hale & Norcross.	1.40	2.75	1.10	2.40	2.60
Holmes.	2.70	3.00	3.25	3.20	3.99
Independence.	.10	.10	.10	.10	.10
Julia.	.10	.10	.10	.10	.10
Justice.	.10	.10	.10	.10	.10
Martin White.	.10	.10	.10	.10	.10
Monro.	1.80	2.10	1.90	2.00	1.90
Mexican.	.35	.50	.40	.50	.60
Mt. Diablo.	.30	.30	.25	.25	.25
Northern Belle.	.65	.80	.70	.75	.70
Navajo.	.35	.45	.35	.40	.40
North Belle Isle.	.35	.45	.35	.40	.40
Oedental.	.35	1.00	.35	.40	.40
Ophir.	.50	.75	.60	.80	.85
Overman.	.25	.50	.30	.40	.35
Potosi.	.40	.65	.54	.65	.75
Pinal Con.	.10	.10	.10	.10	.10
Savage.	1.10	2.70	1.90	3.75	3.60
Seg. Belcher.	.40	.45	.40	.75	.70
Sierra Nevada.	.10	.10	.10	.10	.10
Silver Hill.	.10	.10	.10	.10	.10
Silver King.	.10	.10	.10	.10	.10
Scorpion.	.10	.10	.10	.10	.10
Syndicate.	.10	.10	.10	.10	.10
Union Con.	.40	.50	.45	.55	.60
Utah.	.50	.60	.50	.60	.60
Yellow Jacket.	.85	.91	1.25	1.40	1.30

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., July 15.	200	Gould & Curry.	1.15
100 Alta.	60c	150 Hale & Nor.	2.55
100 Andes.	40c	100 Justice.	30c
200 Alpha.	35c	115 Mexican.	60c
125 B. & Belcher.	1.65	575 Navajo.	1.10
150 Bodie Con.	1.45	1220 Ophir.	1.40
150 Bulwer.	75c	200 Potosi.	65c
150 Bullion.	40c	670 Savage.	2.95
100 Belle Isle.	10c	300 Sierra Nevada.	85c
650 Chollar.	1.40	50 Utah.	1.10
350 Con Va & Cal.	1.50	100 Union Con.	65c
100 Eureka Con.	3.25	200 Yellow Jacket.	1.40

**THE NEW COSO MINE.**—A suit has been commenced by the New Coso Mining Company against Thomas Bell, L. L. Robinson and the executors of the will of Alexander Forbes to recover \$72,791.12, with interest. The defendants were directors of the plaintiff corporation, and it is alleged that they mismanaged the affairs of the corporation in such a neglectful manner that no accounting was made for moneys received from sales of bullion, assessments, etc.

**THE new steel water-steamer Balboa,** just completed by the Union Iron Works for the Panama Railroad Company, had a trial trip this week. The contract called for a speed of nine knots, but a speed of 10½ was easily developed.

A GREAT deal of copper is being consumed at present; but the price remains stationary, while production is said to be falling off, except in the lake districts.

SEVERAL thousand pack animals are in constant use by Walla Walla traders in sending supplies to the numerous mining camps which can be reached in no other way.

THE big discount on silver is very detrimental to profitable mining for the white metal. Only ores of a high grade can be handled without loss.

MULLER'S success dates over a quarter century. Optical Depot of the Pacific Coast, 135 Montgomery St., near Bush.

## San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, July 15, 1886.

ANTIMONY—French Star.	91 @	8
BORAX—San Bernardino.	— @	8
Armstrong.	— @	62
IRON—Glenbrook ton.	— @	22 50
Eglinton, ton.	— @	21 50
American Soft, ton.	23 00	24 00
Oregon Pig, ton.	21 00	23 00
Clippert Gap, Nos 1 & 4.	22 00	23 50
Clay Lane White.	22 50	—
Shotts, No. 1.	23 50	—
Strass—English, lb.	16 @	25
Black Diamond, ordinary sizes.	10 @	—
Plow.	4 @	5
Machinery.	5 @	6
Sanderson Bros.	10 @	—
COPPER—		
Braziers' sizes.	19 @	—
Fire-box sheets.	20 @	—
Bolt.	19 @	—
Sheathing.	18 @	—
Ingot.	12 @	13
LEAD—Pig.	4 50 @	4 65
Bar.	54 @	51
Pipe.	7 @	—
Sheet.	8 @	—
Shot, discount 10% on 500 bag.	Drop, 8 bag.	1 85 @
Buck, 8 bag.	1 85 @	—
Chilled, do.	2 05 @	—
ZINC—German.	9 @	10
Sheet, 7x3 ft, 7 to 10 lb, less the caulk.	72 @	—
QUICKSILVER—By the flask.	35 75 @	36 00
Flasks, new.	1 05 @	—
Flasks, old.	1 05 @	—
TIN PLATE—Ooke.	5 85 @	—
Charcoal.	6 75 @	—

## New York Metal Market.

Telegraphic advices dated July 15th give the following New York prices:

BORAX—6½ @ 7¼ c.	
BAR SILVER—96 per oz.	
COPPER—LAKE—\$10.00 @ 10.50.	
IRON—No. 1, \$17 @ 18.00; No. 2, \$15 @ 16.00.	
LEAD—\$4.85 @ 4.95.	
QUICKSILVER—43 @ 43½ c @ lb.	
The following is the latest by mail from the "New York Metal Exchange Market Report":	
COPPER—Again nominal; Lake offered at 9.80c. @ 10.00c. Transferable Notices (Lake) offered at 10.00c; Transferable Notices (Chili Bars) offered at 13.90 c.	
LEAD—Steady at 4.80 @ 5.05c. Transferable Notices (Domestic) issued at 4.95.	
TIN—Unsettled, closing at \$22.35 @ 22.45. Transferable Notices issued at \$22.40c.	
TIN PLATE—Dull. Transferable Notices issued at \$4.30.	
SILVER—New York, 97½ per oz. London, 44½ d.	
MAKER'S PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge, \$15.00 @ 16.00. Hudson River, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge \$15.00 @ 16.00. Southern, Grade No. 1, \$18.00 @ 18.50; No. 2, \$17 @ 17.50; Grey Forge \$15 @ 16.	

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.45 @ 22.65; Billiton Tin, \$22.60 @ 22.80; Banca Tin, \$22.70 @ 22.85; Baltimore Copper, \$9.75 @ 10.00; Orford Copper, \$9.75 @ 10.00; P. S. C. Copper, \$9.75 @ 10.10; Foreign Lead, \$4.95 @ 5.05; Foreign Spelter, \$4.70 @ 4.80.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
J. J. BARTLETT—San Joaquin Co.  
G. W. GALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
R. G. HUSTON—Idaho and Montana.  
Geo McDOWELL—Santa Clara and Santa Cruz Co's  
J. B. PATON—Nevada and Utah.  
M. S. PRIME—Shasta Co.  
FRANK W. SMITH—Oregon and Wash. Ter.  
A. CALDERWOOD—Napa Co.

## Practical Treatise on Hydraulic Mining

By AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by DEWEY & Co., Publishers, 252 Market St., San Francisco.

## To Young Men and Young Women.

All competent boys and girls should prepare themselves for usefulness in business if they wish to "step up higher." We have for sale to such, on easy and favorable terms, a scholarship in one of the best business colleges in the U. S. Address this office.

## Joshua Rose's Great Treatise on Steam Engines.

JUST PUBLISHED.

## Modern Steam Engines.

An Elementary Treatise upon the Steam Engine, written in Plain Language, for use in the Workshop as well as in the Drawing Office; giving full explanations of the Construction of Modern Steam Engines; including Diagrams showing their actual operation; together with Complete but Simple Explanations of the Operations of Various Kinds of Valves; Valve Motions, Link Motions, etc., thereby enabling the Ordinary Engineer to clearly understand the Principles Involved in their Construction and Use, and to Plot Out their Movements upon the Drawing Board. By JOSHUA ROSE, M. E., author of "The Complete Practical Machinist." Illustrated by 422 engravings. In one volume, 4to., 320 pages. Price, \$6.00, free of postage to any address in the World.

An Illustrated Circular, 8 pages, 4to., giving the Contents of this remarkable book, will be sent free to any one who will furnish his address.

## HENRY CAREY BAIRD &amp; CO.,

Industrial Publishers, Booksellers and Importers, 810 Walnut St., Philadelphia, Pa., U. S. A.



THE Sign of the Arkansaw Cough Syrup is looking you all square in the face.

Do you want a sure, safe and reliable Cough Syrup? Are you troubled with a Cough, Cold, Bronchitis or Lung Complaint? Do your Babies keep you awake all night with Hacking Coughs, Colds in the head, etc. Do you want something reliable in the house to meet these emergencies? We answer to all: "Go to your Druggist and get a Bottle of the Arkansaw Cough Syrup, and be troubled no more." Price, 50 cents per Bottle!

For Sale by all Druggists.

## ANNUAL MEETING.

## Spring Valley Water Works

San Francisco, Cal.

The annual meeting of the Stockholders of the Spring Valley Water Works will be held at the office of the company, 516 California street, on WEDNESDAY, July 21, 1886, at 12 M., for the election of Trustees for the ensuing year, and for such other business as may be brought before the meeting.

WM. NORRIS, Secretary.

## DIVIDEND NOTICE.

## The German Savings and Loan Society.

For the half year ending June 30, 1886, the Board of Directors of The German Savings and Loan Society has declared a dividend at the rate of four and thirty-two one-hundredths (4 32/100) per cent per annum on term deposits and three and sixty one-hundredths (3 60/100) per cent per annum on ordinary deposits, payable on and after the 1st day of July, 1886. By order.

GEO. LETTE, Secretary.

**PRIVATE** Collector and Insurance Broker. The undersigned respectfully offers his services in any of the above capacities. Correspondence solicited. Address 2 M. RICHARDSON, care "Fraternal Record," No. 252 Market St., San Francisco, Cal.

## Engraving

Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.

## THE GUTTA PERCHA AND RUBBER MANUFACTURING CO.

—MANUFACTURERS OF—

## RUBBER GOODS.

Patentees of the Celebrated "MALTESE CROSS" Brand Carbolized Hose.

The Best Belting for Threshing Machines is our MONARCH RUBBER BELTING, made with Cotton Stays or Flexible Rivets.



MALTESE CROSS.

We have also the Patent RED STRIP Rubber Belting, and our Superior STANDARD Rubber Belting. Send for Price List of kind wanted.

JAMES F. HOUGH, General Manager of San Francisco and Portland, Or., Branches 15 and 17 FIRST ST., near Market, SAN FRANCISCO, CAL.

## Educational.

W. E. CHAMBERLAIN, JR.

T. A. ROBINSON.



Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Evening Sessions during the entire year.

Call, or send for CIRCULAR to

CHAMBERLAIN &amp; ROBINSON, Prop's.

## Field Seminary for Young Ladies,

1825 Telegraph Avenue,

Oakland, California.

Address MRS. R. G. KNOX, Proprietor, or MISS FRANCES A. DEAN, Principal.

THE FIFTEENTH YEAR WILL BEGIN

Wednesday.....July 28, 1886

## HEALD'S BUSINESS COLLEGE,

24 Post St. S. F.

Send for Circular.

## TWENTY-FIRST

## Mechanics' Institute Fair,

SAN FRANCISCO, 1886,

Opens August 24th, Closes September 25th,

—IN THEIR—

IMMENSE PAVILION ON LARKIN ST.,

WITH A GRAND DISPLAY OF

NATURAL AND MANUFACTURED PRODUCTS OF THE PACIFIC COAST, including a magnificent collection of Oil and Water Color Paintings, Art Work, and Photography; MACHINERY in operation; a SPECIAL FLORAL EXHIBIT each week; the finest display of FRUITS, GRAINS, and VEGETABLES ever before presented to the





### PATENT LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning  
and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, Threshing and Stock-driving, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,  
380 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.



## THOMAS PRICE'S ASSAY OFFICE,

524 SACRAMENTO STREET, SAN FRANCISCO.

### Working Tests of Ores by all Processes.

SPECIAL ATTENTION PAID TO THE CONCENTRATION OF ORES.

### ORES SAMPLED and ASSAYED.

H. M. RAYNOR,  
No. 25 Bond St.,  
NEW YORK.

ESTABLISHED

1858.

**PLATINUM**  
FOR ALL  
Laboratory  
AND  
Manufacturing Purposes.  
Wholesale and Retail.  
Native Platinum and Scrap purchased.

### American Exchange Hotel,

SANSOME STREET,

Opposite Wells, Fargo & Co.'s Express, one door from  
Bank of California, SAN FRANCISCO.

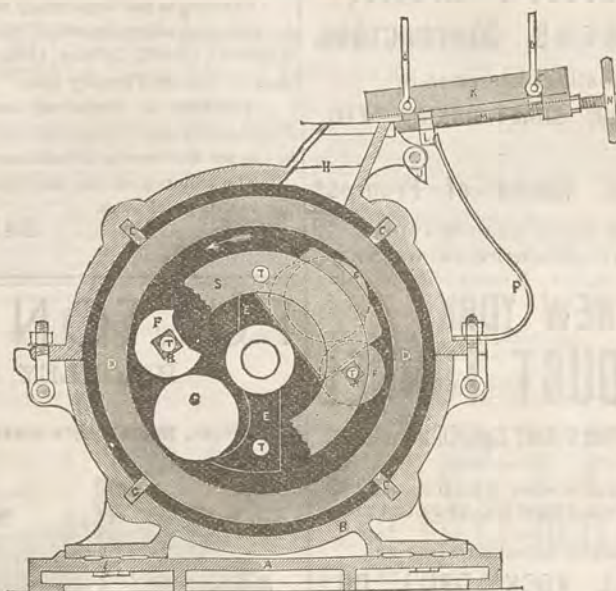
This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50  
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.

Certificates as to performance of the Mills, and any information required, furnished on application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 & 106 Washington St., NEW YORK.  
OR PACIFIC IRON WORKS, SAN FRANCISCO.

## CALIFORNIA ARTIFICIAL STONE PAVING CO.

(SCHILLINGER'S PATENT.)

—FOR—

SIDEWALKS, GARDEN WALKS, CORRIDORS, OFFICES, CARRIAGE  
DRIVES, STABLES and CELLAR FLOORS, KITCHENS, Etc.

The Courts here and in the East have decided that Artificial Stone Pavements with plastic concrete and in detached blocks, are infringements on the Schillinger Patent; and also, that when the plastic material is blocked off with a trowel and cut through far enough to control the cracking caused by shrinkage, that such pavement is in law the same as if laid in detached blocks, and is an infringement of the patent. All property-owners having such pavements laid without the license of the above Company, will be prosecuted.

OFFICE, 404 MONTGOMERY STREET, SAN FRANCISCO.

EGBERT JUDSON, President.

ALBERT H. REICHLING, Secretary.

G. GOODMAN, Manager



1850.

1885.

**RANKIN, BRAYTON & CO.,**  
...BUILDERS OF...  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING and REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

### WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



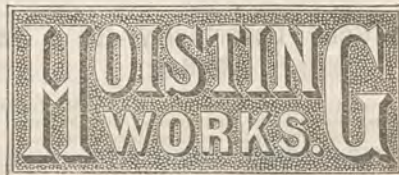
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



### Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.





**NOTICE TO  
MINING MEN,  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.**

**Engineers' Tables of Progress**

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, etc., address:

**INGERSOLL ROCK DRILL CO.,**

REPRESENTED BY

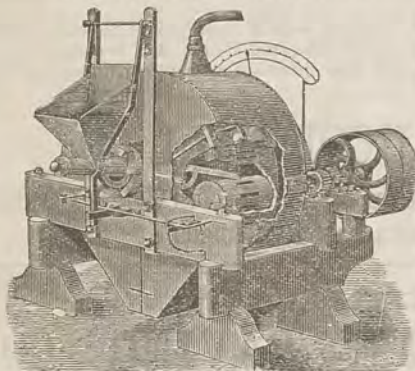
**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

**Tustin's Pulverizer  
WORKS ORE WET OR DRY**

FULTON IRON WORKS, S. F.

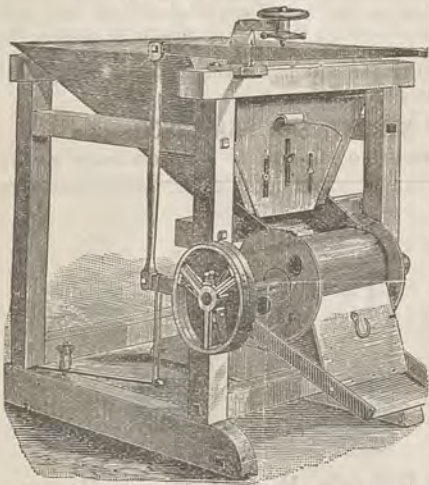


MANUFACTURED BY

**HINCKLEY, SPIERS & HAYES,**

**THE ORIGINAL  
Roller Ore Feeder.**

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Challenge" Ore Feeders for any character of ores; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ores.

Prices furnished upon application to

**JOSHUA HENDY MACHINE WORKS,**  
39 to 51 Fremont St., San Francisco.

**A Good Opportunity for a Machinist.**

A variety of good Tools, Patterns, etc., with business for sale cheap by a party retiring from business. A splendid opportunity for an enterprising mechanic.

Address A. B. C., care of this paper.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**  
316 California St., San Francisco.

## FULTON IRON WORKS,

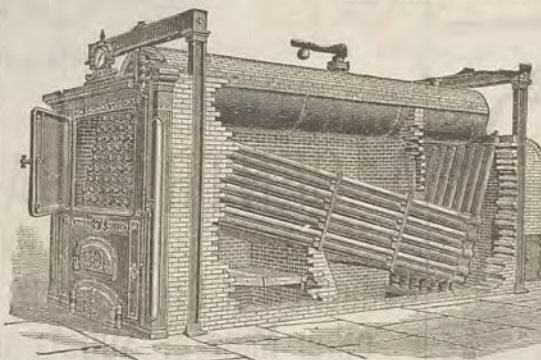
HINCKLEY, SPIERS & HAYES, Proprietors.

(ESTABLISHED IN 1855.)

Office, 220 Fremont St.,

MANUFACTURERS OF

San Francisco.



BABCOCK & WILCOX BOILERS.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure  
or Compound, Stern or Side-wheel En-  
gines.

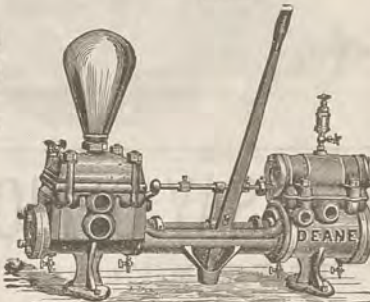
MINING MACHINERY—Hoisting En-  
gines and Works, Cages, Ore Buckets,  
Ore Cars, Pumping Engines and Pumps,  
Water Buckets, Pump Columns, Air Com-  
pressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for  
Dry or Wet Crushing, Amalgamating  
Pans, Settlers, Furnaces, Retorts, Con-  
centrators, Ore Feeders, Rock Breakers,  
Furnaces for Reducing Ores, Water Jack-  
ets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MA-  
CHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines  
and Boilers, Dredging Machinery, Pow-  
der Mill Machinery, Water Wheels.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.

—ALSO—

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

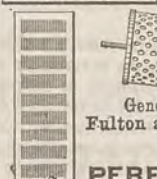
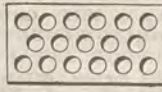
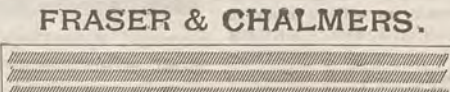
ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

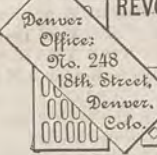
Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**

## FRASER & CHALMERS.



**PERFORATED METALS FOR  
REVOLVING and SHAKING-SCREENS,  
JIGS & STAMP BATTERIES.**



UTAH OFFICE—SALT LAKE CITY, UTAH.

## Iron and Machine Works.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

**Mold-Board AMALGAMATORS,**

**Golden State Pressure Blowers.**

First St., between Howard & Folsom, Sts.

### California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbit  
Metal Castings, Brass Ship Work of all kinds, Spikes  
Sheathing Nails, Rubber Braces, Hinges, Ship and Steam  
boat Bells and Gongs of superior tone. All kinds of Cock  
and Valves, Hydraulic Pipes and Nozzles, and Hose Coup-  
plings and Connections of all sizes and patterns, furnished  
with dispatch. PRICES MODERATE.

J. H. WEED.

V. KINGWELL.

THOMAS THOMPSON

THORNTON THOMPSON

**THOMPSON BROTHERS,**

**EUREKA FOUNDRY,**

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

—BUILDER OF—

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines  
Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. ORDERS SOLICITED.

### UNION IRON WORKS,

SAORAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

### STEAM ENGINES, BOILERS AND ALL

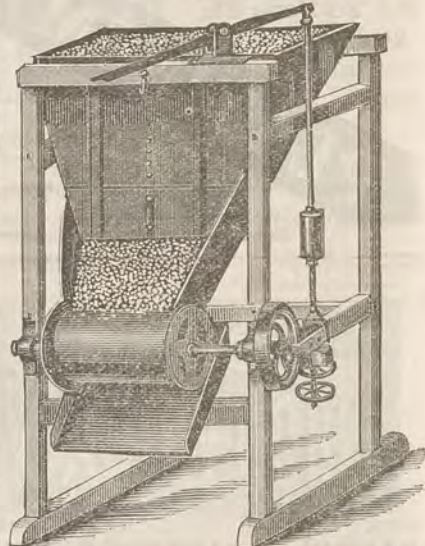
Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front Street, Between N and O Streets,  
SAORAMENTO, CAL.

### THE ROLLER ORE FEEDER

(Patented May 28, 1882.)



This is the best and cheapest Ore Feeder now in use.  
It has fewer parts, requires less power, is simpler in  
adjustment than any other. Feeds coarse ore or soft clay  
alike uniformly, under one or all the stamps in a battery  
as required.

In the Bunker Hill Mill it has run continuously for two  
years, never having been out of order or costing a dollar  
or repairs.

### Golden State and Miners' Iron Works.

Sole Manufacturers,

237 First Street, San Francisco, Cal.

### QUARTZ BREAKERS!

—AND—

**Pulverizers Combined**

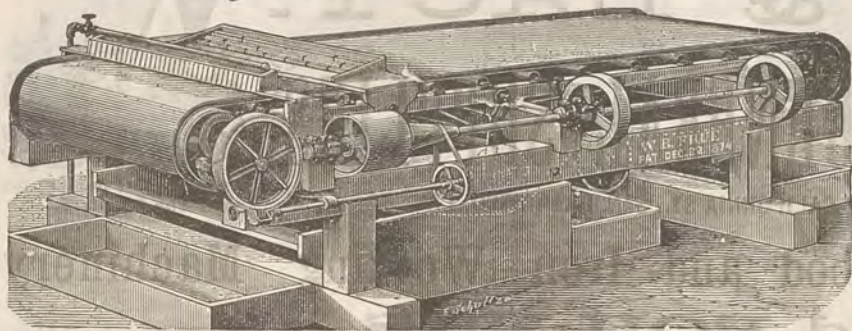
To Run by Hand or Power.

Mining Machinery of Every De-  
scription; Drawings, Plans  
and Specifications.

E. I. NICHOLS, 318 Mission Street, S. F.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS.**  
(\$575 00), F. O. B.

**OVER 1,000 ARE NOW IN USE.** Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

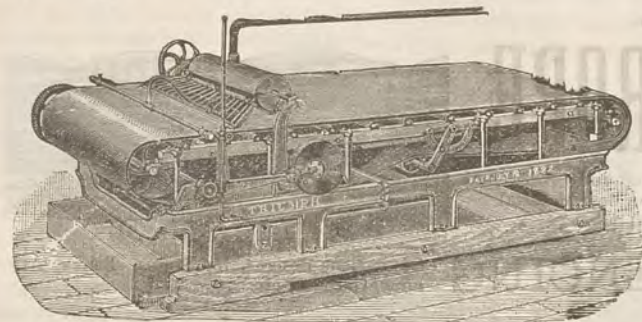
N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street.

SAN FRANCISCO, CAL.

# \$1,000 CHALLENGE ACCEPTED, PRICE, FIVE HUNDRED AND FIFTY DOLLARS (\$550.00).



**THE  
"TRIUMPH" ORE CONCENTRATOR.**

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

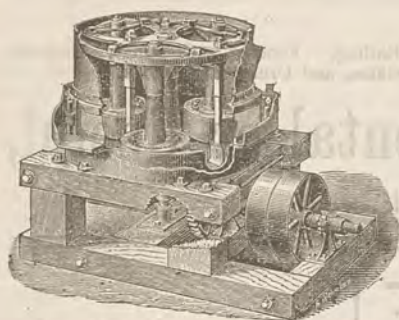
They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE, placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.



Centrifugal Roller Quartz Mill.

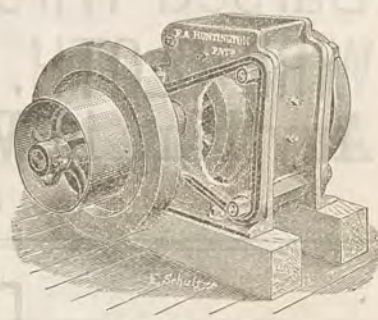
## F. A. HUNTINGTON, MANUFACTURER OF Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,

Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent

L. R. MEAD, Secretary.

# THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

## BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch

pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube);

50,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-

iron pulleys: will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship

Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain

Mining Company

Send for Circular and Price Lists.

GEO. W. PRESCOTT, President.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.

IRVING M. SCOTT, Gen'l Manager.

J. C. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

## STEAM, AIR, AND HYDRAULIC MACHINERY.

**Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

## UNION IRON WORKS,

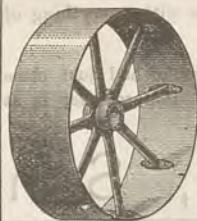
Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.



PAT. OCT. 25, 1881.

## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEISE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

Nos. 129 & 131 Fremont Street, - - - San Francisco, Cal.

## THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

## MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS  
LOGGING, PORTABLE, STATIONARY, MARINE  
AND LOCOMOTIVE ENGINES,

AG'TS DYER CANNON BALL QUARTZ MILL

222 & 224 FREMONT STREET. SAN FRANCISCO.

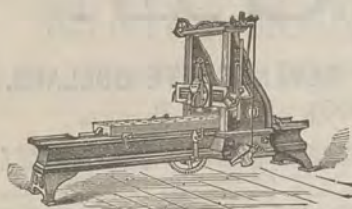
DEWEY & CO., { No. 252 MARKET ST. } PATENT AGENTS.  
Elevator 12 Front St.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



Putnam Planer.

**PARKE & LACY.**

.....IMPORTERS OF AND DEALERS IN.....

**MACHINERY AND GENERAL SUPPLIES,**

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Knowles Steam Pump  
The Standard.**Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
ENGINES and BOILERS.**

SEND FOR CIRCULARS.

**CALIFORNIA WIRE WORKS,**

MANUFACTURERS OF

**WIRE ROPE**

Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.

**WIRE** Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK

YOUR

DEALER

FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

**Barbed Wire.****WIRE CLOTH.** Brass, Copper, and Steel, all kinds, and meshes from 1 to 10,000 to the square inch, for Quartz Screens, Flour Mills, Gravel Screens, etc.**WIRE FENCING**

Of various designs, for Storos, Banks, Asylums, Gardens, etc.

**WIRE GUARDS**

For the protection of Windows, Skylights, Prisons, etc., etc.

**WIRE RAILINGS**

For House Fronts, Window Sills, Stores Public Squares, etc.

**WROUGHT IRON**

Railing, Fencing, Crestings, Entrance Gates, and Ornamental Work.

**Anything in Wire or Light Wrought Iron, Ornamental or Useful,**

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

**DAMAGED BY FIRE!****Engines, Boilers, Wood and Iron Working Machinery, Belting, Etc.****FOR SALE CHEAP!**

The fire which destroyed our building, Nos. 25 to 31 Main Street, on the 20th of June, will have no effect on our business.

We have already secured one of the stores in the magnificent Donahue Block, Nos. 34 and 36 Fremont Street, near Market, the finest in the city.

We have removed our Machine Shop to Nos. 225 and 227 Beale Street, and are now in full blast.

Our Oil Warehouse is located at 519 Front Street.

Our Oregon Branch is still at 91 and 93 Front Street, Portland.

Constant arrivals of new stock will enable us to supply our customers with everything of the latest and best description.

In addition, we shall have all of our old stock of Machinery, much of which had just come in, removed from the burnt building to our new store, where we shall be able to offer it at **EXTREMELY LOW PRICES.**

When the fire occurred, we had, fortunately, finished shipping the mammoth mills for La Trinidad and Silver Queen Mines, of Mexico, and the 20-Stamp Mill for the Buchanan Mine, of Tuolumne.

Notwithstanding our fire, the Pacific Lumber Company, of Humboldt, awarded us the contract for their new mill over all competitors, preferring to wait till our New Shop was ready rather than get their Machinery elsewhere, though they are in a great hurry. We consider their action conclusive evidence of the superiority of our Machinery, as they are determined to have the finest mill on the Coast.

Our New Concentric Set Works and Headblocks, and the Sinker, Davis &amp; Co. Band Log Mill, which we recently furnished the Humboldt Lumber Company, of Humboldt, are pronounced by them superior to any ever seen in Humboldt.

We are now at work on nine Headblocks for Pope &amp; Talbot Mills on the Sound.

From the above facts, it would appear that we stand fire pretty well, and if our patrons will kindly continue to favor us with their valuable business, we will do our best to excel our former efforts.

**TATUM & BOWEN, San Francisco and Portland.****IMPORTANT TO GOLD MINERS!  
SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD**

IN QUARTZ, GRAVEL AND PLACER MINING.

**Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.****BEST SOFT LAKE SUPERIOR COPPER USED.**

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.****E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR &amp; CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



SEND FOR CIRCULAR.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, JULY 24, 1886.

VOLUME LIII.  
Number 4.

## The Tustin Ore Mill.

This mill has been on the market some little time, but only recently attracted much attention from the results it accomplished in the several practical trials at the Oro Plata mine, Murphy's, Calaveras county, where, on the ore there worked, it is stated to have excelled the stamps. It did this by producing a pulp very free from slime, and in a most favorable state for either amalgamation or concentration. The slimes made by this mill do not average more than from one-fourth to one-eighth of that made by stamps, and it is claimed that from 20 to 40 per cent more gold and sulphurets were saved. The mill has gone through the experimental stage and is now much improved. To run the largest machine less than four and a half horse power is required. The weight of the large mill is 13,000 pounds, and the heaviest piece weighs 1270 pounds.

By reference to the three engravings a clear idea of the machines can be obtained.

Fig. 1 is a general view, a portion of the external case being cut away to show the screens, slotted grate and dies, hand-hole plates and driving gear. Fig. 2 is a sectional view through the center. The principal parts shown are the two loose rollers (10-10), slotted grate dies (11), screens (14), yoke bar (15). The machine revolves in the direction shown by the arrow, and when in operation the rollers keep the position shown. Fig. 3 is a sectional view through the center, at right angles to that of Fig. 2.

The barrel turns upon two hollow trunnions

tween and under them. The crushed ore drops through the slotted grate dies (11) and on the screens (14). The screening takes place in the lower right hand side (Fig. 2), nearly all of the pulp being discharged under the two rollers.

screen but once. For this reason a high per cent of the ore grains are nearly of the same size as the screen, and very little slime is made. When the machine has the proper feed the rollers are nearly stationary, as shown in Fig.

into the feed hopper of the machine, and in this way a very perfect automatic feed can be had.

Two liner rings (9—Figs. 2 and 3) are secured to the heads (7 and 8) and serve to take up the wear from the ends of the rollers, and prevent damage to the heads. The hand hole plates (13) serve to remove bits of steel or iron that may accidentally enter the machine. For wet crushing, water is admitted on the screens by the nozzle (38). The following statement of results, made by Luther Wagoner, M. E., gives some interesting figures: Lot 1—Twenty-eight tons of ore furnished by C. W. Tozer, superintendent Angels' quartz mine. Lot 2—Twenty-five tons of ore furnished by Judge Hewel, superintendent of the Utica mine. Both lots of ore were composed of talcose slate and some quartz, slate and talc being the prominent feature. They were worked at Murphy's, Calaveras Co., using one Tustin pulverizer and three Frue vanners. Screen, 20-mesh steel-wire cloth.

### MILLING RESULTS.

	Lot 1. Tozer.	Lot 2. Hewel.
Number of tons of ore milled...	28	25
Time, in hours, to mill the ore...	40	27
Power used to run the Tustin pulverizer.....	4½ H. P.	4½ H. P.
Bullion amalgamated on plates, per ton.....	\$1.46	\$2.07
Bullion amalgamated and left on plates, estimated.....	.35	.12
Sulphurets saved. Value, per ton, of ore.....	4.25	1.52
Sulphurets left in boxes and otherwise lost, estimated.....	.27	.07
Assay value of tailings. Mean of 8 assays.....	.83	.90
Value of the ore per ton.....	7.16	4.68
Assay value of sulphurets per ton, gold.....	126.83	68.90

From the above results and personal knowledge of the ores of the camp, I believe it safe to say that the use of the Tustin mill and Frue vanners will enable the ores to be worked so as not to leave more than 75 to 90 cents in the tailings, and that from 17 to 25 tons of ore per 24 hours is a fair estimate of the capacity of the

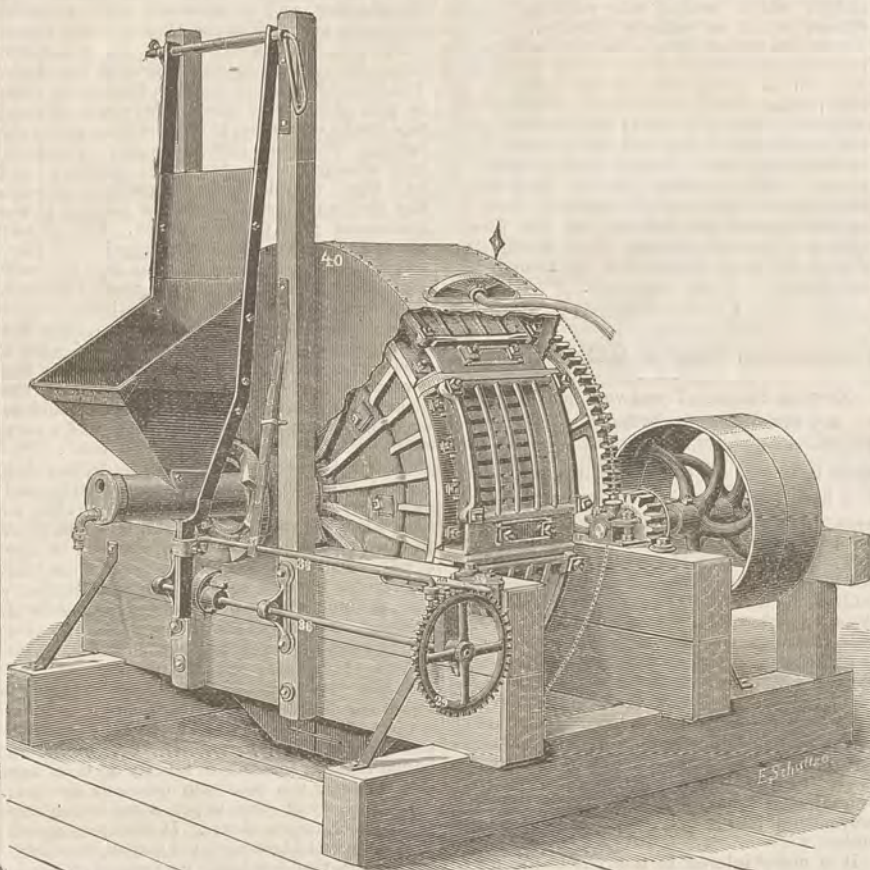


Fig. 1.—GENERAL VIEW OF TUSTIN ORE MILL.

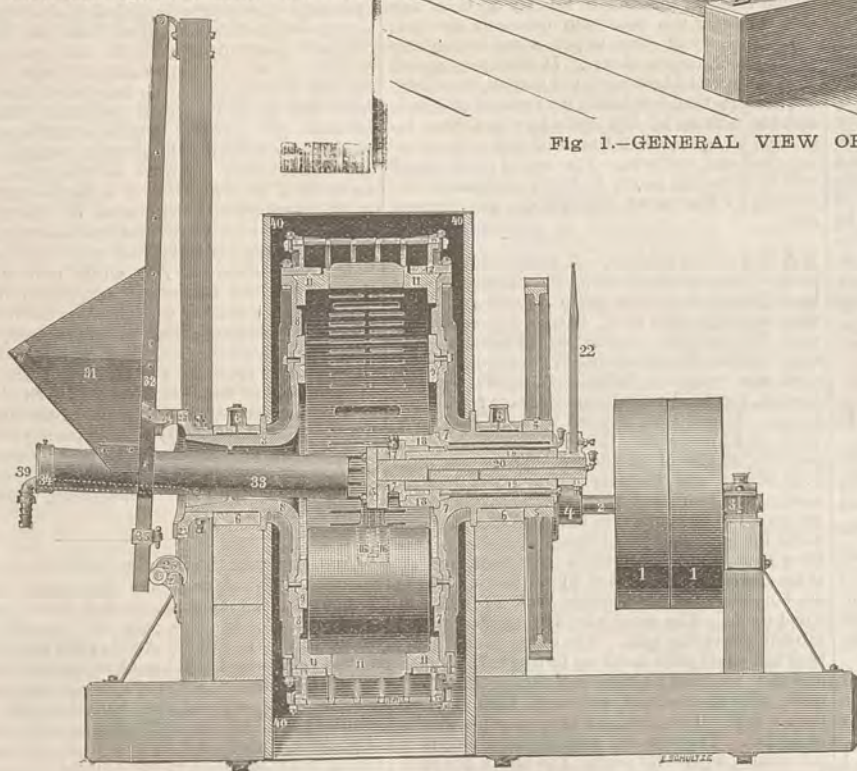


Fig. 3.—SECTIONAL VIEW AT RIGHT ANGLES TO Fig. 2.

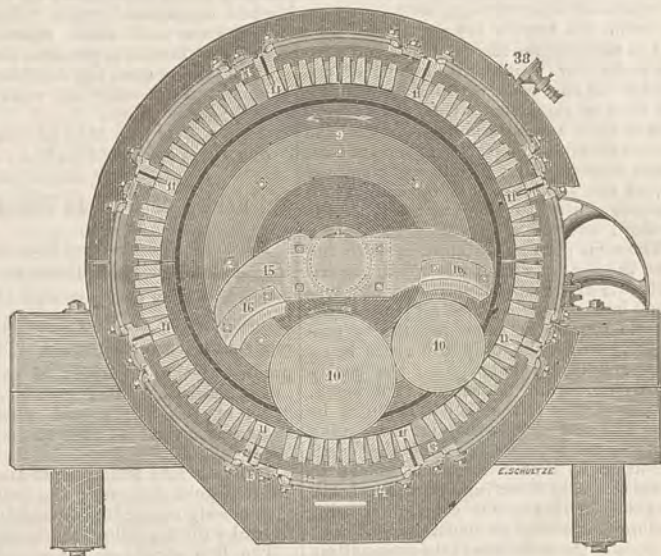


Fig. 2.—SECTIONAL VIEW THROUGH CENTER.

(7-8, Fig. 3). Ore is fed into the hopper (31) and by the feed tube (33) is delivered inside the barrel; this feed is regulated by a hand wheel (29) that alters the throw of the hopper by means of the cam (25) on the hand-wheel shaft. The throw is made by the ratchet wheel (23) on the hollow trunnion (8), in combination with a spring shown in Fig. 1. The ore falls on and under the rollers (10-10), and is crushed be-

As the screen revolves, the coarse pulp falls down the screen and rolls into the large opening in the grate die near (11, Fig. 2). When this opening is nearly overhead the coarse ore falls back under the rollers to be recrushed.

Owing to the free escape of the crushed ore through the slotted dies, and the ample screen surface, it is almost impossible for the rollers to run over a grain small enough to pass the

2, but if the feed is scant, then they oscillate right and left like a pendulum. In doing so they strike the shoes (16) of the indicator yoke (15) and cause the pointer (22) to oscillate. This shows the attendant what is going on in the inside of the machine, and also shows that more feed is needed. By attaching a cam to the indicator shaft, this motion can be used to operate any self-feeder, the latter discharging

machine. Mr. F. B. Morse, the superintendent, examined the assays and statement of results above given, and states that they are correct.

The machine is adapted for both wet and dry crushing. It is made in this city by Hinckley, Spiers & Hayes, Fulton Iron Works, who have spared no trouble in perfecting its details so as to make a good practical ore pulverizer.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

## Common-sense Geology—No. 3.

[Written for the Press by JUSTIN CHENOWETH.]

Opposite to this stretch of sandstone heretofore described and lying only a few miles to the westward is the northern extremity of a chain of islands having an aggregate length of fully 30 miles. Within that length there are only three separations by water, no one being of great width. Along the water line they are all composed of a dark-colored trappean rock, identical in appearance and composition, and may, therefore, in a geological sense, be regarded as a continuous body of land the entire distance of their aggregate length. At frequent intervals along the wave-beaten rocky shore of this chain of islands, there are visible outcroppings of petrified seams of coal; some of them having a thickness of fully 10 feet.

I speak of it as being petrified for the reason that from some cause it has been changed to a stony character so that it will not burn, though yet sufficiently soft to blacken the fingers when handled; and where exposed to the constant wearing action of waves, presents the same appearance as a freshly opened seam of free burning coal. The seams uniformly dip to the northward at an angle of 45 degrees, and, therefore, by geological rules, the inclosing rock will necessarily be regarded as of aqueous origin, stratified and inclined at the angle indicated by the coal seams. Under the same rules it cannot be regarded otherwise than as a single formation, having a thickness of about 22 miles. The preceding examples that I have given prove conclusively that in some instances, at least, inclined strata have been originally deposited in the position in which they now appear, and therefore disprove the assumed principle of universal original horizontal deposition. The two last do more. They show the absurdity of the principle on which superposition of strata is decided in so far as it relates to geological chronology.

It may be observed in the sandy bed of clear rivulet, or of any tidal slough in which the same kind of bottom is periodically laid bare, that in either case where there is any considerable current, the surface of the ground is always thrown into a regular succession of ridges nearly at right angles to the direction of the current. They uniformly rise with a gentle ascent, in the direction of the flow, to a certain point where the ascent terminates in a steep talus, at the foot of which another ascent begins, and is terminated in a similar manner; the process being repeated *ad infinitum* along the course of the stream. Small pieces of sticks, leaves, grass, etc., that have become water-soaked, so as not to float on the surface, will be driven along and accumulate at the bottom of each talus, and frequently extending nearly to the top. Where there is a sharp bend in the course of the stream the projecting point of land will produce a spot of still water below it; or an obstruction of some kind, such as a stone or sunken log, will have the same effect in midstream.

At these points the sandy bottom will have a level surface on which is likely to be resting a complete covering of the lighter materials heretofore described, if there be a considerable quantity of such substance present in the stream. In my opinion, this gives an illustration on a small scale of the manner in which the two stretches of rocks in Puget Sound were formed at a time when the whole surface of the earth was covered with water flowing with a strong current from the tropics toward either pole; and that in this manner the chief mass of sedimentary rocks now visible in all parts of the world, with the coal-beds which they contain, resulted from a cataclysm. One strong confirmation of such a conclusion consists in the fact that the islands of Puget Sound and the Gulf of Georgia, wherever they have a rocky surface exposed, on the southern side or end, it uniformly slopes gently to the southward, while the northern extremity as surely exhibits a bluff. The same peculiarity appears with the islands on the eastern side of the North American continent; and I apprehend that observations made in that connection in all parts of the world would reveal the same peculiarity prevailing everywhere, the only difference being that in the southern hemisphere the gently sloping surface would be toward the north. In a superficial view of the subject it might be considered that the various theories concerning the fluidity of the interior body of the earth had no relation to that feature of geology to which I am specially directing attention. I will show that they have a direct connection with it. Until quite recently geologists taught that the main body of the earth was at the present time a molten fluid mass, having a solid crust only about 30 miles in thickness; but astronomers by means of cold facts and figures have compelled them to admit that it is a solid body throughout, certainly possessing greater rigidity than a solid globe of glass of the same size would have. They seem to have disregarded the fact that if the principle on which they relied to prove fluidity was sufficient for their purpose, when pushed to extremities it proved entirely too much. There cannot be any physical cause assigned for an increase of heat in proportion to the depth until a sufficient degree has been attained to melt all known substances and then stop. If it

were to continue in the same ratio, at a comparatively inconsiderable distance from the surface, all known substances would become volatilized by heat, and the earth would be merely a huge balloon having a rigid shell proportional to the mass, only about one-third the thickness of that of the egg of the barnyard fowl. It will not avail to assume that the gases might be held in a viscid state by external pressure; for it is yet an essential part of the system, having no regard to its present condition in that respect, to assume that at the time the visible portion of the earth's surface was molded into its general contour with the inclinations and contortions which the different strata exhibit, the interior of the earth was in a molten condition, and that the crust during that period was repeatedly broken through. Reasoning by analogy, a fracture of the crust would admit the atmosphere, and if that did not cause an explosion it would certainly create an expansion so great as to destroy the crust already formed. Geologists have compared the cooling earth to a shriveling apple, and on such comparison have based all their theories relating to the formation of oceans and continents, with the mountains, the contortions, and inclination of strata pertaining to the latter. It is not a logical comparison. The skin of a fresh, plump apple presents a smooth surface incapable of condensation in the line of the circumference; consequently, when the interior body of the apple is lessened in size by evaporation the skin becomes wrinkled or contorted. Presuming the earth to have been a mass of molten matter cooling into solidity, the conditions would be entirely different. If the Newtonian theory of gravitation be true, the most dense portions of the earth would then sink, so to speak, toward the center of the mass; consequently, as the surface became condensed by cooling, it would immediately gravitate toward the center, and that process would be continued until a solid nucleus would be formed and congelation proceed from the interior toward the surface instead of from the surface toward the interior, as the present system of geology requires. The manufacture of shot affords an illustration on a small scale corroborative of my argument.

(To be Continued.)

## Comparative Tests of Quartz Grinders.

EDITORS PRESS:—I was very much amused at Mr. Blanding's "bristling" at my request that he should confine himself to exact comparative figures in his tests of quartz machinery. "A little knowledge is a dangerous thing," he says. Well, let him use it rightly, and there is no particular danger for him. He puts me down as "evidently of the old, and probably of the foreign and unprogressive school." He is wide of the mark. "Old Man" is a full-fledged American of the progressive order. Mr. B. doesn't like my writing over a *nom de plume*. It is not the author (Mr. Blanding for instance) that is so material. It is the facts and brains presented that interest the public. Mr. B. dates his experience back to 1865. "Old Man" can go him just 15 better—to 1850—and knows exactly what he is talking about when it comes to gold or silver mining, or any and every class of mining machinery, but doesn't know what improvements Mr. B. ever suggested for quartz mills.

It is not of interest to the public for me to bandy words as to our comparative work with mills. Were I to do so Mr. B. would be honest and acknowledge himself beaten. As a mining man I have nothing against Mr. B. (according to his experience; far from it), but if he had commenced when "Old Man" did he would know more about primitive stamp batteries, and how to appreciate the present ones.

Go it, young man, but don't scratch your back against the rail fence any more. Take things calmly; argue points.

THE OLD MAN OF THE MOUNTAINS.  
Sonora, Tuolumne Co., Cal., July, 1886.

## Tellurides of Gold in Tuolumne County.

EDITORS PRESS:—Two lots of ore from the Garrett mine, on Bald Mountain, near this town, lately tested by me, gave such high results that it occurred to me that it might interest your readers to learn the figures. This is the mine producing the tellurides of gold to which I called attention some months ago in the columns of the PRESS, and which were made known by myself to exist in this mine and the Neale mine.

The two lots tested were amalgamated and all free gold removed; the tailings or residue then closely concentrated and the concentrates treated with the following results:

The first sample of 10½ pounds gave ¼ of 1 per cent telluride of gold. It yielded at the rate of \$23,368 per ton of tellurides.

The second sample of 93 pounds showed a yield of \$3.22 in free gold and ¼ of 1 per cent telluride of gold closely concentrated. The treatment of the tellurides from this lot gave a yield of \$27,500 per ton of tellurides.

The tellurides are found to exist in mines located at several points along the major axis of Bald Mountain, and lately I have also detected it in paying quantity in three mines on the mother lode, near Jamestown, in this county.

LOUIS BLANDING.  
Sonora, Tuolumne Co.

## A New Safety Cartridge for Coal Mines.

A new safety cartridge for use in coal mines where it is not safe to blast with gunpowder has lately, says *Engineering*, been introduced in Germany by D. Kosmann, of Breslau. Its action depends upon the rapid liberation, in the bore-hole, of a large quantity of hydrogen gas, the pressure resulting from which forces the coal or rock asunder. The hydrogen is liberated by means of the action of sulphuric acid upon very finely divided metallic zinc. For this purpose, Dr. Kosman takes the bluish-gray powder that forms in the condensers of zinc distillation furnaces, and which consists of a metallic zinc that has not been condensed to the liquid form, but results as a powder or as a more or less spongy mass. There is a small amount of oxide mixed with it, but for all practical purposes it may be considered as metallic zinc. The cartridge consists of a glass cylinder, narrowing to a neck, and being also contracted at a point below the neck, so that the cylinder is divided into two portions, communicating through a contraction whose opening is from 8 mm. to 10 mm. The contraction is so placed that the two parts of the cylinder are to one another in cubic capacity as 1 to 4, the smaller part being near the neck of the cylinder. The lower or larger division is filled with sulphuric acid obtained by diluting the chamber acid of commerce with an equal volume of water. The contraction is then closed with a stopper of rubber or cork, and in this condition the cylinder is handed over to the miner. The hole being bored ready in the coal or rock, is well clayed over inside, in order to close any cracks or cavities through which gas could escape. The upper part of the glass cylinder is now charged with the zinc powder, and an iron rod is laid in, passing through the zinc and resting upon the stopper in the contracted part of the cylinder. The neck of the cylinder is then tightly plugged with clay, and it is laid in the hole which is then also well tamped with clay, the iron rod passing through both these clay stoppings, and projecting some little distance beyond. In order to "fire the shot," the miner strikes the iron rod with a hammer, so as to drive in the stopper in the contracted part of the cylinder, or to break the glass at that part. In either case, the acid at once runs in among the zinc powder, and a very rapid evolution of hydrogen takes place. The iron rod is not uniform in thickness, but conical, being thicker toward the outside, and this increase of thickness is considerable, so that when the rod is driven in, it keeps tight in the clay stoppings and prevents any escape of gas. The inventor gives figures to show that a cartridge 180 mm. long and 25 mm. in diameter, taking a charge of 50 cubic centimeters of acid and 12 grams of the zinc powder, will give rise to an evolution of gas equal to 3.37 cubic meters at ordinary barometric pressure, and that the compression of this volume of gas into a space of 90 cubic centimeters means a pressure exerted on the sides of the hole equal to some 37,000 atmospheres. The pressure is obtained rapidly, but not so rapidly as to in any way endanger the man who drives in the rod. He has plenty of time to get away before any coal or rock comes down. It does not appear that these cartridges have yet had any thorough trial in practice, but much is expected of them, and the making of the cylinders has been entrusted to a large firm that will insure their being good and uniform. The cost of each "shot" will be from one penny to three half-pence, according to the size of the cylinder and charges used.

A GREAT GOLD MINE.—A great mining company is the one which owns the Homestake, at Lead City, three miles from Deadwood. The mine employs 3600 men. It is an extraordinary vein, 300 feet wide, a decomposed talcose green slate running \$8, and saving \$7.50 on plates. The mine was bought in 1875 for \$100,000 by Geo. Hearst, the lately appointed Senator from California. It was then stocked through Haggin & Tevis at \$2 per share, 100,000 shares, and has paid \$3,750,000 of dividends. There are over \$700,000 in the treasury. The stock has recently been increased 25,000 shares, thus there are now 125,000 shares in all. The increase was made for purchasing additional property. This mine pays \$50,000 a month dividend, and an extra Christmas present of \$1 per share. There are 60 miles of water ditches and 70 miles of wood roads. The wood cars are emptied on the hillside above the mill. The chute is so built that the wood piles itself up in front of the mills and thus requires no more handling. The four mills, 580 stamps, are reducing 1750 tons of rock a day. Two hundred stamps more are to be added. There is ore enough in sight, it is calculated, to last 30 years. The ore in the vein for 300 feet in width is worked like an open cut, the face of which is now 500 feet high. It is undercut and blown out and thus continued upward. In this ore body itself there is a 10-foot vein which mills \$60 per ton. It is used to average the balance. It is free milling, remarkably free. There is no stock swindle in the management, which is also managing the Ontario of Utah, that has paid \$7,000,000 and is paying yet at the rate of 75 cents a share a month (100,000 shares), also manager of the Anaconda mine and mill at Butte City, Montana. The mill was shut down a short time for alterations, but is again in operation.

## Dip and Underlie.

The "dip" of a bed is, as every one knows, its inclination downward, measured by the angle between the plane of the bed and the plane of the horizon. The normal position of a bed is horizontal, so that the measurement of its "dip" or deviation from this normal position is naturally and necessarily made from the plane of the horizon.

In metallic mining, however, another term, conveying a different idea, is commonly used in practice, and the inclination of a bed or vein is spoken of as its underlie. This is a well-known and commonly used term; but nevertheless, its true meaning—the one in which it has been invariably employed—seems to have been misunderstood by geological writers, who use it as a synonym for dip. Even so thoroughly practical a geologist as Mr. Beete Jukes defines "underlie" as the "inclination or dip of a vein or fault;" and it is not unusual for geological writers to say that a vein underlies at such and such an angle from the horizon.

But the real meaning of the word "underlie," as applied by miners to a vein or lode, is just the converse of this—for it is employed to express its deviation from a vertical plane. The normal position of veins—conversely to that of beds—is vertical; and consequently it is natural to measure their deviation from a vertical plane. Speaking of a vein, a miner will say that it has very little "underlie" if it is nearly vertical, and that it "underlies" very much if it deviates considerably from a vertical plane. And this is not only the sense in which it is at present universally used in practice, but it is also the sense in which it has ever been used and even in books until recently. In Pryce's *Mineralogia Cornubiensis*, "underlie" is defined as "the deflection, or deviation of the fissure from its perpendicular line;" and in Thomas' "Report" it is also calculated as "the angle of inclination from the perpendicular."

Therefore to say that a vein or lode "underlies" so many degrees from the horizon is to state a contradiction in terms—that is, the "dip" of the vein, but not its "underlie." In fact the "underlie" is the complement of the "dip," and vice versa.

It may be considered that a distinction of this kind is unimportant, but such is far from being the case. In Cornwall, and in numerous districts where the Cornish nomenclature has been adopted, the inclination of a lode is expressed by the length of base corresponding to one fathom in perpendicular depth, considering the line of inclination as the hypotenuse. Thus one lode (A) "underlying" 14° (or "dipping" 76°) is said to "underlie" 1' 6"; and another (B) "underlying" (or "dipping") 45°, is said to "underlie" 6". Such a mode of expressing the inclination of veins is not only clumsy in itself, but it is incapable of that ready determination by which an angle can be at once measured by a clinometer; and it besides encourages a want of accuracy.

Yet with all these disadvantages, even this system is more convenient than that of expressing the inclination in degrees from the horizon—clashing as it does with all our conceptions of metallic veins, which naturally refer to, and express themselves in, the amount of deviation from the normal vertical position. Thus, in the cases given above, of lodes A and B, we involuntarily attribute the greater deviation to B; and consequently when we say that lode A only underlies 1' 6", while lode B underlies as much as 6", the numerical expression of deviation is in the same sense as our natural conception of it. If, on the contrary, we say that lode A "dips" as much as 76°, while lode B only "dips" 45°, the numerical expression of the deviation is contrary to our conception of it. Hence, notwithstanding its clumsiness, it is more convenient in practice to express the inclination of a lode by the length of the base subtending the angle of the "underlie," than by the complement of this angle, or the angle of the "dip"—particularly in comparing the inclination of two or more lodes—inasmuch as the one conveys a direct numerical expression in accordance with our conceptions, while the other does not.

COAL IN THE TEMESCAL MOUNTAINS.—A splendid vein of coal was discovered in the Temescal mountains about five or six months ago by H. A. Bradley, the well known prospector of this vicinity. A shaft has been sunk on the vein (which pitches at an angle of about 45°) to a depth of about 40 or 50 feet, which presents a fine vein of merchantable soft coal about 12 to 16 inches in thickness with plenty of promising sand-rock in the foot wall and a ceiling of shale which in our opinion is heavily charged with petroleum, as a small piece will burn a steady light for fully half an hour. This valuable mine is located about 17 miles from Riverside and within plain sight of Arlington avenue. A surveyed line of railroad runs within about one and one-half to two miles of the mine and it is fully expected that the road will be in full running order inside of four or five months. Our townsmen, Frank Ryan and Charley Lockwood, have interested themselves in the coal mine and they promise some good developments as soon as arrangements can be made to develop the property.—*San Jacinto Register*.



## Another New Mining District.

Mines on the Moses Reservation.

The recent order of President Cleveland, throwing open the Moses reservation to public settlement, will add another new mining district to the many which radiate from Spokane Falls as their point of supply. Besides the mineral productiveness of this new and almost unexplored region, its inexhaustible soil and vast area of grazing land, of which those who have inspected them speak in terms of the highest appreciation, must tend to make agricultural and mining developments associate partners in the same firm, the one the handmaid of the other, with such reciprocal interests and mutual expectations as to augur very flatteringly for the permanency and progress of the country.

The Spokane Falls *Miner* says: The Moses reservation lies north and west of the Columbia river and embraces 2,243,040 acres of land. It lies in the western part of Stevens county and extends from the Okanogan river to the summit of the Cascades, and from Fort Chelan to within 15 miles of the British line. A portion of the country immediately south of it was thrown open in February, 1883, and those who prospected here have been long and eagerly waiting the executive order which would permit them to enter this promised land from which they have been too long debarred. It should be added here that the Okanogan country is distant in a northwesterly direction about 130 miles from this city.

A gentleman whose name we could not learn, but who has, for several years past, been attached to the reservation in the capacity of farmer, had kept himself thoroughly posted on the topography of the reservation and quietly explored it for mines which he dared not then, under the law and the circumstances, locate, was the first to drive his stakes on a mining claim. Being absent from the reservation at the time it was declared open, as soon as he learned that such was the case he rode day and night from a point in the vicinity of Colville till he reached it. The last night's ride was a weary and fatiguing one, but without resting he proceeded to the spot, well known to himself and, as he thought, to no others, began stepping off his 1500 feet and had scarcely finished driving his stakes when, as daylight began peering through the half-sleepy eyelids of the morning, he discerned five horsemen approaching him. He was surprised to learn that their errand was to locate the same claim which he had just allotted himself. Disappointed but not aggrieved, the five breathless prospectors immediately set out to locate several mines near by, whose existence they had a year previously ascertained. Since then several parties have gone over to the Okanogan and have returned or sent back glowing reports of that country's mineral promise. Among them is Mr. A. E. Benoist, one of the discoverers of the Old Dominion near Colville. Mr. Philip Pierce, of Colville, returned from the new district some two weeks ago and he reports that the country is pleasantly accessible to the prospector, that ledges have been discovered which measure from 8 to 30 feet face and which assay \$10 in gold and \$50 to \$90 in silver.

As was to be expected, a moderate stampede of miners from the South Fork and Colville districts set in, and it is safe to say that at present writing there are 100 prospectors striking heavy blows, bidding the treasures of Okanogan come forth from their lurking places. Thus it will be seen that another mining camp of great possibilities has been added to the list of these either surrounding or not far distant from Spokane Falls.

As the prospector moves, the area of mineral wealth enlarges and beckons back to civilization and capital to come and occupy, explore and exploit. To us, who live near the scene of these developments, they have ceased to be a matter of wide-eyed surprise. The fact is, we are growing so used to reports of rich districts that we have learned to feel a keen sense of disappointment if they are not reported at frequent intervals, since the richness, stability and universality of leads which gridiron the Colville, Chewelah, Pend d'Oreille and South Fork districts have imbued us with a *nil admirari* matter-of-fact placidity of soul, which subsequent discoveries can neither shake nor disturb.

Time was when California was presumed to be the only territory rich in the noble metals. Then came the Pike's Peak excitement of 1857, which ushered Colorado into a slow and feebly recognized prominence, and it required nearly 20 years thereafter when the Leadville, Gunnison and San Juan countries brought the Centennial State to the front rank as a silver-producing region, to convince the country that California was not the only locality where silver and gold could be found abundantly and everywhere.

Nevada, too, served a good purpose in demonstrating the fact that practically the mineral belt of the Pacific Coast knows neither metes nor bounds; that it is impartial in its universality, and that its prodigality was not confined to California, for it is doubtful if even Peru, since the day when a hundred llama loads of gold and silver were carried down the Andes to ransom the imprisoned Atahualpa, could compare with Nevada's mineral productiveness. The same can be urged of Utah, New Mexico and Arizona to show that new Californias are springing up every few years on this coast under the magic touch of the prospector's pick. And

now comes Eastern Washington, the latest but probably not the last, to unfold the wealth of her neglected mountains and streams. Until within the last 15 months nothing was known of her wonderful mineral possibilities. While other Territories and States on this coast and east of the Rocky mountains, including such Territories as even Dakota and Wyoming, have passed local laws regarding the recording of locations, assessment work, miner's liens, abandonments, water rights, etc., the statutes of Washington Territory are yet unvetted with legislation of this character. She sat secure in the blissful certainty that her only wealth consisted in her rich agricultural and stock-grazing acres on her eastern confines and in the lumber, coal and iron products of Puget Sound. She has been almost unconscious till a very recent period of the mineral wealth on which her future sits enthroned. She was, so far as her knowledge of the entombed gold and silver in her hills went, *magnas inter opes inops*. But a new era has dawned upon us. Stamp mills, crushers, smelters and concentrators are coming into the country. Prospectors are swarming in every direction, making new finds daily; flumes and ditches are carrying in their swift currents golden sands and golden nuggets; manufacturers of mills, explosives and mining supplies have their agents in every camp, till our Territory's mineral possibilities have become recognized potentialities, and the day is not a remote one that will witness the testimony in favor of Washington's pre-eminent mineral wealth given by individuals whose Nazareth has been California and California alone, beyond whose boundaries "no good can come," just as the man of 40 years of age now admits that the geography of his youth was a delusion and a gross error, when it taught that the Great American Desert was a blotch on the map, that it was a wide gap of hideous sterility located midway on our continent, and inhospitable on account of its unproductiveness; yet to show how little was then known of its resources, this same desert embraces to-day the prosperous, fertile States of Kansas and Eastern Colorado, to laugh to scorn this egregious blunder of the map-maker and the silly, rustic omniscience of those who believe that nature has set her bounds to all discovery and will so keep them, unless they are permitted to lazily participate therein.

## The Idaho Mine.

A Very Profitable Gold Producer.

The Foothill *Tidings* (Nevada county, Cal.) says the Idaho is located on what was once known as the Eureka ledge, and the ledge was so named because the Eureka mine was the first on that ledge to be worked. The old Eureka took out about \$5,000,000 worth of gold, before the pay chute went across the line to the east and into the Idaho's ground. The ledge is now generally called the Idaho, because the Idaho mine has overshadowed the memory of the old Eureka. Legally, however, the ledge is still the "Eureka." The Idaho location was made and the mine named in 1863. The mine is east of town, about two miles distant, and it is on the left bank of Wolf creek, a little stream that runs over and near very many rich ledges and will be the main distributor of the new water power. The Idaho's location is 3100 feet on the ledge, and the shares of capital stock are 3100 in number. In 1865 the mine passed into the ownership and management of the present company; Edward Coleman became the superintendent. The management has been the very best. The mine has yielded something over \$8,000,000, of which \$3,750,000 have been paid to stockholders as dividends, the balance being paid to a small army of laborers and men furnishing materials. The mine is now opened to 16-foot level, and the shaft is down to 17-foot level, making an opened mine 1600 feet of perpendicular depth, or on incline 2200 feet, with drifts and levels. On the 1st of June, 1886, the 200th dividend in number was paid, the dividends being monthly as a rule. Some four or five monthly dividends have been missed in the 17 years of dividend paying, and that was when much so-called "dead work" had to be done.

In the later days of the working by steam power, the Idaho mine burned about 8500 cords of wood in a year. Then it was that the Coleman Bros. (we look upon both Edward and John Coleman in the light of managers of the mine) determined to reduce expenses in the matter of power. Some of the stockholders favored "gonging the eye out of the mine and letting her fill up with water," as they expressed it, but the Messrs. Coleman, backed by a majority of shares of stock, made the change at an expense of \$46,000. This proved a good investment, since \$35,000 a year is saved by the water power, and work goes on and dividends continue and the army of Idaho workers are still supporting families and maintaining happy homes.

NOVEL METHOD.—Says the Albion (Idaho) *Times*: J. J. Storey, of the Minidoka ferry, has invented a new process for saving gold on Snake river. He has a plate of iron arranged, heavily charged with mercury, which he attaches to the ferry-boat and allows it to float on top of the water. By this novel method he has saved a large quantity of amalgam, but as yet he has not ascertained its quality. It has long been the theory of many that most of the Snake river gold floats with the current on the surface of the water.

## Side Lines of Mining Claims.

The man who attempts to amend the present mining laws so they will be satisfactory to every portion of the country is making a bed of nettles for himself. An illustration of the fact can be seen in the reception which the mining community has given to the amendment to the present law governing the location of lode mining claims, introduced in the House by Representative Symes.

Of this the Denver *Tribune-Republican* says: The amendment proposes to give to mine-locators all the ore within their boundary lines "extended downward vertically." It puts a mining claim on the same basis as other lands, the owners of which hold everything within their boundaries "between the heavens and the center of the earth." The amendment also provides that a claim may equal, but not exceed, an area of 20 acres; that when the location of adjoining claims will permit, the form of a claim shall be a parallelogram, and that its length shall not be more than one-third greater than its width.

There are some portions of the country, like Leadville and Aspen, where the apex fiend is unpopular, in which the proposed change in the law is favorably considered. In counties like Boulder, Gilpin and Clear Creek, where the veins are acknowledged to be fissures within the meaning of the law, the proposed change is not popular. How it is in Eagle county, about Red Cliff, we cannot say. It is certain, however, that if the law had been as it is now proposed to make it at the time the first claims on Battle Mountain were located, a large part of the rich quartzite deposits since discovered would belong to the owners of those first locations. These facts may have some influence on the opinions of men in that section upon apex and side line problems.

If the law should be amended as proposed, it would have a rather peculiar effect upon the size of claims in counties. Where lodes and claims are thick on every hill, it is generally the case that only a narrow strip of ground can be found between locations. Supposing that a prospector should find a lode on a little strip of vacant ground, say 100 feet wide, the length of his claim would be limited by law to 133½ feet. If the discoverer found entirely free ground, the length of claim which he could take would be 1077 feet, and the width 808 feet. If the law is to be amended, would it not be better to limit the length of a claim to 1500 feet and its area to 20 acres, striking out the provision as to the proportion of width to length? Is it not possible that 20 acres is too much to include in a location? Is there any necessity of modifying the law, except in respect to the apex question? Is there really any necessity for modifying it at all? All these are interesting questions, upon which there is a wide difference of opinion. Any amendment which is now made cannot affect prior rights. It cannot relieve Aspen of the apex ghost that is paralyzing her industries. The present provisions of the mining acts are understood. The courts have passed upon most of the knotty questions and precedents are established. It is a serious question now whether the proposed amendment would not create more litigation than it would prevent in the future.

It is true that the present law is construed by the courts to apply to a class of mines to which it is not believed it was ever intended to apply. It is, perhaps, rather a fortunate thing that, as a general rule, the juries have not agreed with the courts. At the time the present law was enacted, the late J. B. Chaffee was a delegate to Congress from the then Territory of Colorado. The bill, as originally introduced, confined every claim-owner to his vertical side lines, and the amendment allowing him to follow his vein beyond the side lines was made at the instigation of Mr. Chaffee. Mr. Chaffee was requested by many to secure the amendment. We have a distinct recollection that among mining engineers it was not supposed that the law would ever apply to that class of deposits known as beds, to which the courts have made it apply. However, fissure veins were the only ore deposits known in Colorado, and the question received little attention. It would, perhaps, have been better if the amendment had never been adopted, and if the court construction is to forever remain as unchangeable as the laws of the Medes and Persians, it may be that Representative Symes' amendment is a good one. In discussing the subject, Colorado miners should remember that the United States laws are made for the entire country, of which this State is only a portion.

LEASE OF MINE WITH PRIVILEGE OF PURCHASE.—In the case of *Settle vs. Winters*, the Supreme Court of Idaho has quite recently decided that where parties contract for a lease of mining property with the privilege of purchasing it within a fixed time named in contract, and the character of the property (such as of mines generally) is such that it is liable to sudden fluctuation of value, time is of the essence of the contract. No matter if the lessees and would-be purchasers have paid a considerable portion of the proposed purchase money, it has been out of the ore of the mine, and unless all the purchase money is paid within the prescribed time (or time of option), the right of purchase is extinct at the expiration of the time, and the original owners are entitled to hold their property.

## Quartzite Deposits at Red Cliff.

In an article on this subject, the Denver *Tribune-Republican* says: As described in previous letters, the quartzite on shoots occur in trough-like cavities which are denuded of ore as work progresses, so that few, if any, reserves of ore are left standing in the mines. In judging these mines many new features must be taken into consideration, such as continuance of ore, cheaply mined, evidences of which must be had from shipment records rather than from ore in sight. Such records are to be looked for and found in claim after claim developed along the entire belt, as now opened. In the quartzite impecunious miners have suddenly acquired good bank accounts, because pay has generally rewarded their efforts near the point where work was begun and before debts were possible, and all subsequent expenditure provided for in advance, by the richness of the ore already mined. Such mining as this is rare, especially in view of the many instances in which one man's experience or luck has been identical with so many others. It is also a fact that there has thus far been no boom, although the foundation for one, upon merit, has never been greater, if we consider the amount of money realized as profit over expenditure, the rapidity of shipments after discovery, and the scope of country seamed by the mineral-bearing quartzite. But the quartzite mines are not the main source of mineral wealth. The carbonate deposits in the lime have for several years ranked Red Cliff second to Leadville in the field of desirable smelting ores, and that supremacy is liable to continue indefinitely. Some of the old producers, such as the Belden and Eagle Bird group, have been abandoned on account of company difficulties, and the erroneous notion that when the sulphide zone was reached the further search for pay mineral should be abandoned. The Black Iron mine has put this theory to rout and demonstrated that good ore, and of a carbonate variety, too, may be found beyond the sulphide barrier, and it is quite probable that these properties may again be started up. The Iron Mask mine is a finely developed property, with massive mineral reserves blocked out and a daily output of 80 to 100 tons from exploit work alone. The placement of a heavier plant of machinery has retarded shipments for a short time. These two mines, the Black Iron and Iron Mask, show the greatest depth into the mountain—1200 feet—and the heaviest ore reserves. New discoveries are of common occurrence, and the present year will advance Eagle county to a higher standing in the list of producing counties than she has hitherto attained.

PRICE OF SILVER.—Bar silver has again gone lower than ever, is now the lowest on record. It is a little curious that this continuous decline follows close upon the discussion in the British Chamber of Commerce. It was openly and warmly argued in that debate that the continued fall in silver would tend to compel wheat and cotton producers to supply England at low rates. But other and abler men showed that England was losing in the process quite as much as anybody else. A banking house here avows the belief that Germany has been selling part of its store, and that gold drawn from this side went to pay for the silver sold, but behind all the other explanations and more important than all, is the fact that all talk about attempts to force silver into use only tends to discredit the metal and to prevent its use. A prominent Wall street bullion dealer said: "The *Tribune* a few weeks ago published a report from its London correspondent that Germany was selling silver, but not one of the three leading bullion dealers in London has even mentioned such a thing in the market circulars. Neither has either of the London financial newspapers nor any of the daily papers, so far as I could learn, alluded to Germany selling silver. Had such been the case it would undoubtedly have appeared in all the leading London financial papers, and our London house would have advised us at once. The only allusion I find respecting Germany and silver is what might be called an appeal in the London *Economist* to the German Federal Council to adopt the monometallist law passed some years ago by the German Parliament, and thus take from the German silver thaler its legal character. The decline in silver, in my opinion, was caused by the small demand for Indian Council bills. The latter in turn was also caused by the depression in trade and the widespread political agitation in India, together with the unsettled state of feeling between England and China regarding Burmah."

GOLD BULLION.—The receipts of gold bullion at the U. S. Assay Office for the past three days were over 1400 ounces, being the greatest amount ever received for that length of time in the history of the office. The value of deposits received from July 1st to July 9th, inclusive, was \$28,602.61, the heaviest amount ever handled in a like period at this office. The suspension of the transportation charges by the Government, thus saving a considerable expense to depositors, together with the satisfactory assaying done, is turning the tide of bullion business in the direction of Boise City.—*Boise City Statesman*.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, July 24, 1886.

## TABLE OF CONTENTS.

EDITORIALS.—The Tustin Ore Mill, 49. Mine Superintendents; Ore Deposits and Rocks; American Mining, 52. Foundry Notes; Mining Accidents; Petaluma, 53.

ILLUSTRATIONS.—The Tustin Ore Mill, 49. Bullion Furnace Room of the Lyon Mining and Milling Co., Dayton, Nev., 53.

CORRESPONDENCE.—Common-Sense Geology—No. 3; Comparative Tests of Quartz Grinders; Tellurides of Gold in Tuolumne County, 50.

MECHANICAL PROGRESS.—Automatic Machinery; A Boiler Furnace for Refuse Fuel; Helps do More Work; Hand vs. Machine-Cut Files; A Wasteful Engine; Lubricating Gears; India Requiring Iron and Steel, 54.

SCIENTIFIC PROGRESS.—A Solar Cyclone; The Luminosity of Flames; Seeing the Invisible; Self-Ignition of Greasy Cotton Waste; The Red Sunsets; Increase of Accidents from Lightning; Improvement in Bleaching; Lead and Platinum, 54.

ENGINEERING NOTES.—A New Method for Utilizing the Water-Power of Niagara; Wooden Water Wheels; Canals vs. Railroads; Railroad Building in Asia Minor; Coal vs. Wood, 55.

USEFUL INFORMATION.—Size of Rooms and Fitting of Carpets; A Hair-cutting Machine; Renewing Faded Inks; To Make Ink Spots Invisible; Utilizing the Milkweed; New and Cheap Evaporator; Dry Pocket Glue; Fire Extinguishers, 55.

GOOD HEALTH.—Doctors Disagree in Regard to What May be Trusted to Digestion; Imaginary Ills; Advantages of Low Ceilings; Iced Drinks for Dyspepsia; The Poison of the Scorpion; Insanity in China, 55.

MISCELLANEOUS.—A New Safety Cartridge for Coal Mines; Dip and Underlie, 50. Another New Mining District; The Idaho Mines; Side Lines of Mining Claims; Quartzite Deposits at Red Cliff, 51. Refining Copper Bullion Produced by Amalgamating Tailings, 53.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 56-57. MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 60.

## Business Announcements.

Baragwanath Heater—A. P. Brayton, Jr.  
Haywards Hotel—F. A. Wilder, Haywards, Cal.  
See Advertising Columns

## Passing Events.

Great preparations are being made in this city for the coming encampment of the Grand Army of the Republic. A large arch is being built, and many houses will be decorated on the line of march of the procession. Quite an elaborate program of events has been prepared.

The Legislature convened this week to consider the question of water rights and irrigation. Thus far very little has been done, and it is difficult to say what the result will be. It is hoped, however, that some settlement of the difficulties will be made, so that the large tracts of land requiring water for irrigation purposes may obtain it without paying large sums to monopolists of any class.

Machinery and men have been sent to Meadow Lake district, in Nevada county, to try once more to work the refractory ores there. So far there have been many failures, but those undertaking the new plan are hopeful of good results.

The strikes among the iron-workers in this city still continue, but it is hardly probable that they will be kept up much longer, as there are already signs of dissatisfaction among those ordered out, and they want to be at work again.

The chloriders at Reveille are getting out some very fine ore.

## Mine Superintendents.

The mining regions have suffered more or less from incompetent superintendents, and mine-owners have been losers for the same reason. Yet there is no rule or law to prevent a store-keeper, blacksmith or anybody else assuming the position and title if he can get it. Experienced mining men, of course, always look out to get an experienced superintendent for their property; but those fresh in the business have no distinct authorized class to draw from. There are no examinations required and no certificates of competency are issued either by Government, State or association. If there were, people would be better protected, and only those fit for the position would be able to obtain it. No move in this direction has been made in this country thus far, however, though in some European countries mine superintendents have to be commissioned. In England this is the case with coal mines; but, strange to say, not with metalliferous mines. But recently the metalliferous mine agents have been agitating this question and have held a meeting in London to consider a proposed amendment to the Mine Regulation Act, in the matter of granting certificates of competency to metalliferous mine superintendents.

The chairman, in opening the meeting, said he thought it was time something should be done to raise the status of metalliferous mine agents. It was, however, necessary that some one should take the initiative, and for this purpose the meeting had been called, which he sincerely hoped would be followed by many others in different parts of the country. At present a tinker, tailor, peddler or poacher could be appointed manager of mines. He sincerely hoped the meeting would support a resolution in favor of Dr. Foster's proposed amendment, as he felt certain if made law the status of the mine agent would be considerably raised.

Another gentleman briefly related the steps that led to the calling of the meeting. He fully and heartily concurred with everything said by the chairman. The granting of certificates as proposed would tend to raise the status of mine agents, open the door of promotion to the intelligent miner through merit, give employment to the deserving, keep out quacks, and benefit the industry in all its parts.

Still another thought it was high time certificates were granted, as now many an agent gets his office more by being in favor with some of the directors than by any qualification in him for the work.

It was then agreed—"That a resolution in support of Dr. Foster's proposed amendment should be sent to the Home Office, Dr. Foster, the members for East and West Denbigh and Flint, and also that the resolution be sent to the centers of mining in Cornwall, South Wales, Shropshire, and north of England, with a recommendation to bring the matter before the mine agents in their separate localities."

## Ore Deposits and Rocks.

The ore deposits in the different points of Nevada, carrying gold, silver, lead, copper and other useful minerals, are not limited to rocks of any geological age. The Archean granite of Austin, the Paleozoic strata of Eureka and White Pine, and the Mesozoic rocks of Washoe, are sufficient examples of this fact. The deposits occur in the mountains, as is usual the world over, and as the Nevada mountains are disposed in parallel ranges of course the mines occur in parallel belts. There is no perceptible tendency to the development of the same minerals at different points on the same belt, though there are no ore-bearing zones comparable in continuity with the gold and quicksilver belts of California.

In most cases it is impossible to determine the age of the deposits, yet there are many phenomena indicating connection between them and eruptive activity, according to Government geologists, and they are probably, for the most part, referable either to the post-Jurassic period of upheaval or to that of more recent volcanic eruption. The gold veins of this State are post-Jurassic, and the Idaho gold veins are probably for the most part of the same age. It is difficult to suppose that the physical conditions prevailing in Nevada during the same period were not attended with similar mineralogical results. The Comstock, however, is probably very recent, and a concomitant of volcanic eruptions in its immediate neighborhood.

Clarence King, in his "Explorations of the 40th Parallel," drew attention to the fact that no ore pebbles have been found in the Tertiary lakes of Nevada, and this statement still remains valid, so far as the exploration of the 40th Parallel is concerned. Nor are prospectors known to have found any indications of ore in these beds. The negative evidence is all in favor of the supposition that the deposits are mainly Tertiary, or post-Tertiary.

## American Mining.

Among the best characteristics of American mining practice may be mentioned the originality and ingenuity of the methods which have been adopted. In many cases, as, for example, the system of hydraulic mining, a new departure was made, and within a short time carried to an extreme point of development. In other instances modifications and improvements on foreign methods have been added to such an extent that their sources are scarcely recognizable. Another striking feature is the rapidity and execution and consequent saving of time and interest. It is true this has often been pushed too far; but it may be said, as a rule, that capital invested in precious metal mines in this country has always secured quick returns, if any. This is necessitated by the demands of investors who are seldom satisfied, when interested in precious metal mining, with the plodding methods which perhaps in the long run would be more profitable, and on which they would rely in any other branch of industry. Although undue haste must be condemned from an economic point of view, the spur has not been without its advantages on the technical side.

Still another feature is the boldness of conception of engineering enterprises connected with mining, and the large scale on which operations are conducted. As examples may be cited the ditch, flume and pipe system of the hydraulic mines, the daring feats in railroad engineering securing transportation from rugged mining districts, the extensive tunnel enterprises, and the very deep shafts fitted with pumping and hoisting machinery.

On the other hand, says Clarence King, the eminent mining engineer, it must be acknowledged that the attempt to rely on originality of plan to the exclusion of experience gained abroad has often resulted in failure. Novel processes and machinery which have been tried and condemned by foreign miners have sometimes been reinvented and experimented upon in this country with a failure which could have been avoided. The desire for immediate returns has been carried to an extreme and has entailed unnecessary loss. In remote districts freight is often hauled out of season at increased expense. Ores are treated at high cost and low percentage of metals saved in primitive mills and smelters, when such delay as would be caused by the erection of custom works, or the approach of railroads, would much more offset the loss of interest on unreduced ores. It should be noted, however, that mines worked with insufficient capital are obliged to adopt the hand-to-mouth system, in order to keep in operation at all.

A CORRESPONDENT at Cisco, Utah, in describing the blood agate fields recently discovered in that locality, writes as follows: The find has been fully examined and each day brings to light some new and strange formations of the stone, none of which have yet been classified by experts, and all of which are very beautiful. A contract has been let for cutting and polishing a lot of the stone, and it is soon to be placed on the market.

THE Nogales (A. T.) Smelter Company commenced operations on the 14th inst., and everything worked satisfactorily, the result of the day's run being ten bars of bullion. This is an event of great importance to that section of the country, as it will enable mine-owners in Sonora and also that section of Arizona to ship their ore to be reduced at Nogales, instead of shipping it to Denver or Pueblo.

THE furnaces in the Giant mill, Park Canyon and Nye county, are now doing good work and the ore is chlorinized up to between 85 and 90 per cent of its assay value.

ACCORDING to the Carson Appeal, a second shower of sulphur fell there Friday.

## Refining Coppery Bullion Produced by Amalgamating Tailings.\*

NUMBER 2.

## Furnace and Cost.

[On page 33 of last week's PRESS was given a diagram of the furnace for roasting bullion, and the description of the process was commenced on page 35. We herewith show a plan of the furnace-room, which adjoined the retort house, and continue the description.—Eds. PRESS.]

The floor in front of the furnace and around the sulphurizing kettle was covered with sheet-iron plates; elsewhere it was of matched boards. A track for the bullion and amalgam car ran from the mill through the furnace-room into the retort house.

The following amounts were paid out for constructing the furnace and furnace-house (in 1875):

## COST OF FURNACE.

Foundation:	
Preparing ground, Chinaman, 1½ shifts, at \$1.53	\$2.30
Hauling stone, 2-horse team 1 day.....	6 25
Masons, 4 shifts, at \$7.50 plus \$1.75 fare....	31 75
Masons' helpers, 6½ shifts, at \$1.53.....	9 04
Lime, 250 lbs, at 2.652 cents.....	6 63
	\$56 87

Superstructure:	
4930 common brick, at 1.972 cents.....	98 20
400 fire-brick, at 18.35 cents.....	75 41
819 pounds lime, at 2.679 cents.....	21 94
Hauling sand and clay, 2-horse team 1 day....	6 25
Masons, 18½ shifts, at \$7.58.....	140 25
Masons' helpers, 26 shifts, at \$1.53.....	39.78
	\$31 83

Iron Work:	
2 frames and slip doors.....	160 pounds
1 fire-door.....	155 "
Hearth plates.....	1695 "
Hearth-plate discharge cover.....	23 "
	2033 lbs @ 8c. 162 64

Drilling and fitting doors and plates with bolts	18 25
Patterns for doors, frames and plates.....	22 00
Blacksmithing and old iron.....	25 00
	227 89
	\$866 59

## COST OF FURNACE BUILDING.

Lumber:	
Rough, 4710 feet, at \$35 per M.....	\$164 85
Dressed, 487 feet, at \$65 per M.....	31 66
Shingles, 6750, at \$6.50 per M.....	43 88
	\$240 89

Hardware:	
1 keg 10d. nails.....	6 75
1 keg 12d. nails.....	7 00
1 gross screws, 1½ inch, No. 18.....	3 00
59 dozen screws, 1½ inch, No. 13.....	4 88
10 sheets iron, ½" x 3' x 10', 1708 lbs., @ 7.05c. 120 47	
	142 10

Paint:	
White lead and oil, inside work.....	5 50
Copper paint, home-made, outside work, not charged.....	
	5 50

Wages—Carpenters, Painters, and Helpers:	
4 shifts.....	\$6 00
1 shift.....	4 50
10 shifts.....	4 00
12 shifts.....	3 50
5 shifts.....	3 00
	23 50

32 shifts, at \$3.92.....	125 50
	\$513 49

## FURNACE AND BUILDING.

Labor, 88½ shifts, at \$3.95.....	\$349 52= 29 6 per cent.
Material.....	\$30 56= 70.4 per cent.
	\$1180 08=100.0 per cent.

## Roasting Base Bullion..

The usual charge of base bullion for this furnace was 400 pounds; but as much as 500 can be treated easily, while, owing to the way in which the bullion was supplied, the average charge for two years was actually only 384 pounds. Were the furnace running regularly, a normal charge would be about 450 pounds of calcined, corresponding to about 400 pounds of retorted base bullion.

The roasting process is conducted as usual, the manipulation requiring no special description. The bullion is brought to a bright red heat, stirred well, and moved several times from and toward the fire, so as to expose all parts equally to the heat.

When only one charge was roasted daily, the furnace being nearly or quite cold at the commencement, the operation occupied about 1 shift or 10 hours. Two charges were roasted in 1½ shift, and 3 or even 4 charges in 24 hours, the last occurring when the furnace was hot at the start. The roaster was able (except in the last case), also, to sift the charge previously roasted, and to attend to other matters which did not take him away from the furnace building. The roasted material was passed through a No. 10 wire screen, the lumps averaging 1.29 per cent.

The average gain in weight by this operation was 5.4 per cent of the charge, corresponding to 6½ per cent of the retorted bullion.

The average gain in weight (two years), by both calcining and roasting, reduced to terms of retort bullion, and deducting all lumps, was:

	Per cent.
By calcining.....	17½
By roasting.....	6½
Total.....	24

\*Read before the American Institute of Mining Engineers by A. D. Hodges, Jr.



The oxidation of the last remaining percentage of metallic copper in this material would appear to be in part a function of lime. Repeated attempts were made to shorten the operation by crushing finer, constant stirring and the introduction of air through the fire-bridge and the arch and into the fireplace, but no material advantage in this respect was ever obtained, the last one or two per cent of copper oxidizing very slowly.

One man per shift, selected carefully for the place, did all the roasting. The wood fuel consumed was an average of 0.271 cord per shift of 10 hours, or 0.216 cord per charge (of all kinds) actually roasted. These figures are derived from the work done in eight months, when 393 charges were treated in 313 shifts, with a consumption of 85 measured cords of wood, or one cord to 1493 pounds of retort bullion. In another year (an unfortunate one in some respects) 86 cords of wood were charged against the furnace, or one cord to 1040 pounds of retort bullion. Part of this wood was used elsewhere. Although fuel was dear on the Comstock, it was used most wastefully everywhere. The easiest practical way to check this waste was to contract the size of the fireplace to the smallest allowable limits.

#### Sulphurizing.

To this process came the dense material of all kinds—the white bullion, base lumps and all the assay bars. The sulphurizing vessel was an old sulphuric acid parting kettle of cast iron, three feet in diameter, provided with a cast iron cover, which, when the kettle was charged, was luted and bolted fast to the kettle flange. The kettle was set in a low, brick fireplace of the simplest construction.

The kettle was charged with whatever metal was on hand, as much as 450 pounds being put in; mixed with this was 18 per cent of sulphur. For the sake, simply, of facilitating the removal of the mass when sulphurized, layers of thin wood (generally old barrel staves) were placed throughout the charge. The cover was fastened down, and a small fire of chips or any refuse fuel was maintained under the kettle for four or five hours. No particular attention was paid to the length of time of firing (the fuel costing nothing), as the roaster generally charged and fired the kettle during his work on the bullion furnace, and the whole operation of removing the cooled charge, and sulphurizing the new one, was done in one shaft. After the process was finished the cover was removed and the charge left to cool until the next morning.

The sulphurized material formed a black or grayish-black mass, the lowest part fused, the upper and larger part retaining the general form of the pieces put in, often showing pretty, needle-like crystals on the surface. It was removed with hammers and cold chisels, being ductile while warm, but brittle when cold, weighed, and sent to the Chile mill to be crushed. The amount of lumps, after crushing, that would not pass through a No. 20 screen varied according to the method and length of firing, and the size and density of the pieces charged into the kettle. With only retort bullion or small base lumps, and a gentle and long-continued fire, the whole charge was sulphurized so completely as to crush in its entirety. On the other hand, owing to the repeated melting of samples for assays and tests, solid bars weighing five or six pounds or more were frequent, and these were sulphurized only after passing several times through the kettle. All lumps from crushing were put into the roasting kettle.

A small, varying amount of sulphur escaped during the process. On an average 16.7 pounds of sulphur combined with 100 pounds of bullion. The total amount of sulphur used was 21 per cent of the original weight of the bullion at the Lyon mill (1876-7) and 20 per cent at the Omega mill (1878).

The expense of sulphurizing at Dayton con-

sisted simply of the one item of sulphur, as the labor employed being so small was charged for in other work, and any extra fuel possibly used was charged up to roasting.

#### Foundry Notes.

Business continues dull at the foundries in this city, there being very few large orders on. There is more or less small work, as is usual at this season; but big jobs are scarce, and, what is more, they will be scarcer if the era of strikes keeps up.

There are signs, however, that the present strikes will not last much longer. It was first thought that the molders at the Risdon would follow the boiler-makers out, but they did not do so. The machinists, molders and pattern-makers, numbering between 400 and 500 men, were ordered out by the Federated Trades; but as their unions are represented in the Iron Trades Council, the constitution of which provides that no union shall go on strike unless ordered by a majority vote of the unions represented in said council, they refused to obey the order and continued at work. The boiler-makers have received no assistance from the Federated Trades. At the meeting of the Iron Trades Council on Monday night, they decided to take no action in regard to the boiler-makers' strike, for the reason that as the boiler-makers had come out at the request of the Fed-

was because they were asked to work on boilers belonging to Spreckels & Co., who had been boycotted by the Federated Trades. The Spreckels have had upward of 100 new boilers built in this city in the last few years. There are 16 in the Braanan street refinery, 22 in the Potrero, 28 in one house at the Hawaiian Commercial, besides what are in the mill; then there are Hakalau and other plantations, besides some other manufacturing institutions in which Mr. Spreckels is interested in this city. Also three tugs, including the first *Relief*, which was lost. Most of them were built by the Risdon Iron Works and many of them by the very men who have now struck. The miles of large iron pipe that conveys water to the Hawaiian Commercial Company was made by the boiler-makers of the Risdon, and the wages paid for bending, pinching and riveting the iron for this job amounted to over \$50,000.

#### Mining Accidents.

C. I. F. Zeilian, while working in the quartz mill at Poverty Hill, had his left hand caught in the machinery, crushing the last two fingers and a portion of the left hand. He came immediately to town to Dr. Frisius, who found it necessary to amputate the fingers.

While working in the Black Oak mine, near Soulsbyville, Tuolumne county, says the *Union-Democrat*, a sliver of steel from his pick struck

#### Platinum.

Platinum has been found in small quantities in various parts of the country, associated with free gold in placer deposits. Indeed its distribution has been almost co-extensive with these deposits, but in most localities the quantity is altogether too small to admit of economic working, and it is only from the placers of the Pacific Slope, north of the Central Pacific Railroad, where it has been produced in merchantable quantity. The following are the localities at which most of the platinum heretofore collected in California has been procured: Hayfork, a branch of the Trinity river, occurring here in fine grains, mixed with the placer gold, to an extent sometimes sufficient to reduce the value of the gold by 8 to 10 per cent; on the north fork of the Trinity platinum is less plentiful, but occurs in larger grains, the largest pieces ever found weighing between two and three ounces; in Butte county, in the hydraulic mines around Cherokee and Oroville, occasionally for nine parts of gold found in this locality one part is found of platinum and its allied metals; in Mendocino county, in Anderson valley, Navarro river; in Plumas county, on the principal forks of Nelson creek and at Badger and Gopher hills; on the Salmon river, and in the beds of the larger streams in Sierra, Trinity and Del Norte counties; on the ocean beach between Capes Blanco and Mendocino; on the Tuolumne river. Going farther north the amount of platinum increases. On the Oregon coast the proportion of gold to platinum in the placers is sometimes five to one, and in rare instances the amount of platinum equals the gold. Platinum has been reported as occurring in Idaho, and in the Black canyon and on the Agua Fria, in Arizona, though the occurrence in the latter Territory is not well authenticated.

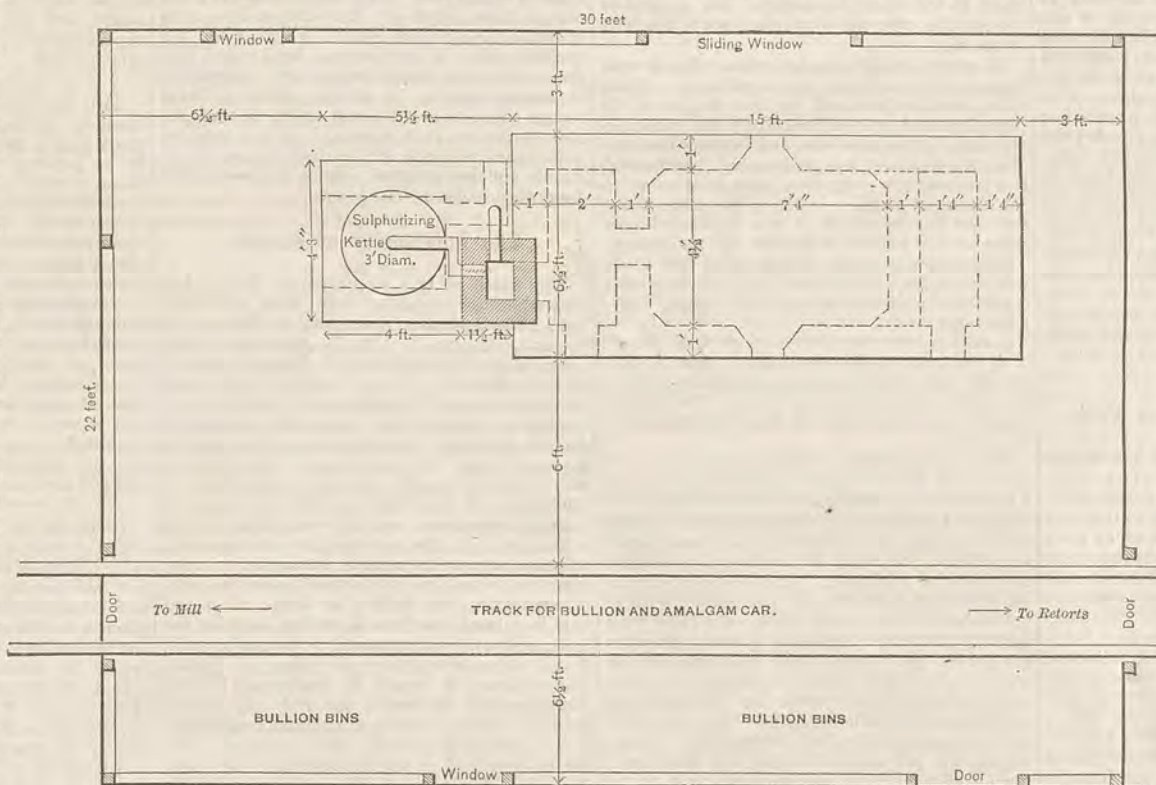
The most important foreign sources of platinum are the hydraulic mines at Nizhne-Tagihlsk and Goro-Blagodat, in the Ural mountains, where the ore is found with chrome-iron ore in serpentine. About 80 per cent of the world's production comes from this source. Next in importance are the gold washings of the Pinto, in the province of Antioquia and the headwaters of the Atril river in the United States of Colombia, where it is bought by the traders in inland towns and sent to Buenaventura, thence to Paris; about 15% of the entire product comes from this source. In Brazil the ore

is found in the province of Minas Geraes, associated with syenite. It is found also in the Natos mountains in Borneo, in Hayti, Peru, India, Australia, and in the sands of the Chaudiere river in Quebec. It has been noticed lately according to Williams' "Mineral Resources," in a quartz vein impregnated with gold-bearing iron pyrites, which was struck when deepening the shaft of the Queen of Beauty gold mine, Thames gold district, New Zealand. The interest in this deposit lies in the fact of the extreme variety of platinum ores in place.

THE Elko *Independent* says: The demand for laborers in this place and vicinity is greatly in excess of the supply, and 40 good men could find ready employment at good wages here by applying for work. Help is wanted to unload cars, also in the hayfields and in the mines of Lone Mountain. We are also informed that a number of men would be furnished steady work in the country round about Tuscarora.

THE supervisors have contracted with E. O. Uren, county surveyor, to make an official map of Placer county. The price for the work is to be \$850. The map will be about 8x4 feet in size and will contain every road, ranch, stream, and land-owner's name in the county.

THE Monarch mine, Indian Springs district, nine miles northeast from Dayton, owned by parties in Dayton, is being prospected at the depth of 50 feet, crosscutting the ledge,



BULLION-FURNACE ROOM OF THE LYON MILLING AND MINING CO., DAYTON, NEV.

erated Trades, without obtaining the consent of the Iron Trades Council, which was necessary under their constitution, the matter had been taken out of the council's hands, and the boiler-makers would have to use their own judgment and act under the direction of the Federated Trades. In a discussion which then took place the opinion prevailed that the federation had not acted wisely in calling out the iron trades, without making provision for giving them financial assistance, and more especially at the time when they had the fight against the Union Iron Works on hand. "For," said one of the delegates, "assessments are levied on all the members working for the support of those on strike, and the more men we have working the larger will be the amount received, and the longer the fight against the Union Works can be carried on."

The Executive Committee was instructed to prepare a review of the situation of the Union Iron Works strike, which should contain a complete statement of the actions of the parties concerned in the strike from the time it occurred up to date. It is also to answer in detail all statements made by the manager on behalf of the Union Iron Works, and to contain new facts, which the council hopes will convince the public of the justness of the action of the iron trades in insisting upon the discharge of certain men.

The Marysville foundry has stopped work for the present.

The cause of the recent boiler-makers' strike

the left eye of Joseph West, causing a painful wound and endangering his sight. Last month his brother Henry, working in the blacksmith shop at the Heslep mine, at Poverty Hill, had one of his eyes injured by a piece of steel flying into it and was absent at San Francisco for treatment at the time Joseph met with his accident. Another brother some time ago was injured the same way at his home in England. There seems to be a fatality in the West family directed to the injury of their eyes by pieces of steel.

S. T. Brown, while at work recently in his mine, near Chas. Lee's place, Butte Valley, Plumas county, was caved on, the bank crushing him to the ground. His son was with him at the time, but was not hurt. He at once set to work to extricate his father, but when he succeeded in getting him out he found that life was already extinct. Mr. Brown was 80 years of age.

THE Pioche Consolidated Company, just incorporated, besides other properties, have acquired the famous Raymond & Ely and Meadow Valley mines, that turned out over \$15,000,000 in bullion in a very short time, and that, too, from a very small portion of the ground above water level. There is also what is known as the black ledge, the ore of which, it is claimed, the new company can work to advantage.

DURING the month of June the bullion shipments of the Navajo amounted to \$51,236.40.



## MECHANICAL PROGRESS.

## Automatic Machinery.

So far as well-built automatic machinery is attended, managed, and overseen by the educated brain and the skilled hand, reproduction may be as nearly reduplication as anything in art can be; but automatic machinery is not necessarily exact machinery. Yet this erroneous belief is not confined to the inexperienced, but is shared, sometimes, by mechanics.

A contractor was seen overhauling the products of some automatic machinery and rejecting more than he approved. Inquiry revealed the fact that out of 500 pieces of the same sort, produced on the same machine, only about 50 passed muster. If ever there were machines which were simply automatic and entirely self-operating, they are the machines for producing machine screws. All the apparent attention they require, as it seems to a shop visitor, is supplying the machine with bars or rods of metal and with oil. The machine is absolute in all its movements—there is no room for variation, except in the dulling of the cutting tools and the inevitable wear of all moving machinery. The machine takes the bar or rod, moves it forward, squares the end, turns the shank up to the head, threads the space between the end and the head, and cuts the screw off the bar, entirely finished, unless it be a screw with a slotted head. And yet these exact machines fail to duplicate absolutely; every day's product must be examined, and it is not uncommon to condemn one fourth of the day's production. The most perfect machinery requires mechanical brains and skill to keep it in operating condition, just as these qualities were required to produce it. There is no intelligence in a machine; it may do rapid work, and when in order may do exact work, but it cannot equal the hand product of human skill, even in some departments of purely mechanical endeavor. A machine-made watch is a good time-piece; but it is not so good a watch as one hand-made; the best machine-made watches require the judgment of the brain and the skill of the hand to make them good. An engraver, with only the tools and appliances that have been the style for centuries, will make, on an average, 1800 cuts or strokes per hour, and produce on 12 different articles a similar pattern conforming to the varying contour of the surfaces. No machine can do this; and if it could, it would have to be guided and controlled by brain and skill. "The thing made is not greater than its maker."—*Exchange.*

## A Boiler Furnace for Refuse Fuel.

MM. Albin & Co., a firm of French mechanical engineers, have made a successful study of the construction of gas generator furnaces for steam boilers, with special reference to the utilization of fuels of poor quality—such as sawdust, tanyard refuse, etc. Their arrangement is described and illustrated in the *Revue Industrielle*, together with a record of tests made under the supervision of M. Walter Meunier, chief engineer of the Alsatian Steam Users' Association. The principles of MM. Albin's system consist in the employment of a tubular cylindrical boiler of considerable diameter in proportion to its length, a spacious steam dome, and an inclined fire-grate supplied with hot air. The fire-grate is stepped with a double tier of horizontal bars placed crosswise of the furnace at a slope of 45°, thus permitting a large volume of air to traverse over and through the combustible. The cold air enters in the first place through flues placed alongside the smoke flues on their way to the chimney, and it is finally led to the front of the double row of bars, which are, of course, closed in from access of fresh air. The whole of the boiler, with the exception of the steam dome, which projects, is inclosed in the setting, and surrounded with flues. The clinking of the fire-bars is managed by a mechanical attachment which rocks them and slices off the clinker.

The charge of raw fuel is in the first place deposited upon a flap door, which can be laid horizontally to receive it; when loaded is turned over, so as to project the charge into the furnace, at the same time closing the opening. Every care is taken to properly ignite the gas before admitting it in direct contact with the boiler plates, and afterward to make the contact as intimate as possible. The apparatus gives most satisfactory results with every kind of green or dry sawdust, and even with tanbark refuse. The stoking is done with great ease, and the clinking does not offer any difficulty. Considering that the furnace only requires charging at most every 20 minutes with the light refuse used as fuel, the labor of attending these boilers is such as the most inefficient workman can furnish, while the fact that the fuel is used without any preliminary drying, even for tanyard refuse, renders the system valuable for isolated factories. The same arrangement burns breeze and dust coal.

HELPS DO MORE WORK.—Machinery is not labor-saving. The man who works with a threshing machine works as hard as his grandfather did with a flail, but he produces greater results. To those who think only of the price of wages, machinery is a fraud, but to the consumer of manufactured articles it is a boon. Our mothers used to card their own wool, spin and weave it and wear it, and it is no disparagement to our wives and sweethearts that they

do not. They can't afford to. If it were not too expensive, the present race of girls and women would do this and more too. Machinery has not obviated the necessity of work, it has only given it a new direction. Good machinery is a good thing, but the man who expects it to do his work will be fooled; it helps him to do more work.

## Hand vs. Machine-Cut Files.

We have several times made brief reference in these columns to the reported relative advantages of hand and machine-cut files. Arrangements are now being made at Sheffield, England, for an extensive trial to determine this question. In the mean time we would refer to a private trial of the same kind made five or six years ago by a large local firm of machinists in England. According to a report of the trial by a correspondent of the *Ironmonger*, although the test was a private one, it was conducted with scrupulous fairness to both systems of cutting, and the workmen and foremen who had the carrying out of the operation were not permitted to know by which process the files which they used were cut. Twelve 12-inch hand bastard safe-edge files were forged and hardened out of the same material by the firm making the experiment. Of these, six were cut by hand on the premises, and six sent out to be cut by the best machines then available. The files were stamped 1 to 12, and six were handed to one foreman and six to another, half of each six being machine-cut. In the case of the first six two trials were made, the only difference between the conditions observed being that, while in the one case the piece of steel operated upon was so fixed in the vise that it projected 3½ inches from the end of the vise; in the other the material was grasped in the middle, with the edge raised above the jaws of the vise.

In every trial the machine-made files proved themselves superior to the hand-made. Much more work, determined by the weight of filings produced, was performed by the machine-cut than by the hand-cut, and in every instance after the hand-cut was pronounced "worn out," the machine-cut competitor was declared to be "moderately good." Acting on the issue of the test, the firm by whom it was conducted have since cut the bulk of their files by machinery. The question is quite an important one to all workers in iron, and we shall look forward with considerable interest to the forthcoming Sheffield trial.

A WASTEFUL ENGINE.—Much loss is frequently met with in setting up engines entirely too small for the work they have. The following, by a correspondent of the *Iron Age*, is to the point:

What do you think of using above \$15 worth of oil on a 20"x24" engine in less than 10 hours? I figured it up, then handed it to the engineer. He said it could not be helped, as with all that oil he had had a hot crank-pin and main bearing all day. So much for putting in an engine too small for the work. On this same engine the crank-pin brasses were perforated with 8" holes about 3" deep, and these were filled with babbitt. It was a nuisance, as every time the pin got hot the babbitt would melt and fill the oil-holes; then there was fun keeping her going until an opportunity arose for disconnecting and boring out the holes again. The amount of oil this engine required was terrifying. Pumping out the pit underneath her was like pumping an oil well. All the bearings had to be kept slushed with oil constantly. The trouble was, the engine had been built to drive a 10" train, and a pair of 16" roughing rolls for making billets from scrap; and as the business increased the billet mill merged into a merchant bar train and a tack plate train was attached to the end of that, so that the engine was unmercifully overburdened.

LUBRICATING GEARS.—Mr. Henthorn, speaking in the *Mechanical Engineer* of greasing gears, says "the only proper way to do the job is to put the grease on with a brush while the wheels revolve slowly, that the working faces of the teeth then receive the lubricant." We have seen millwrights and others greasing gears with a pail while they were in full speed, just pouring the grease on. Why, it just flew off about as fast as it was poured on, and it was not safe to be within a rod of them, as they just raised a centrifugal tempest of grease. Greasing gear wheels in this way does no good, as it is only by the merest chance that the grease gets where it is wanted, to say nothing of the waste. It just drops upon the points of the teeth, and the greater part is immediately thrown off again, and renders everything in the vicinity so filthy that it is disgusting to have anything to do near them. But the most important point of all is that the life of gearing is seriously shortened by such carelessness, as the most accurately-fitting wheels in the world will wear rapidly unless properly lubricated.

INDIA REQUIRING IRON AND STEEL.—The demand of India for iron and steel work is already becoming of considerable importance to the iron industry. There is just now quite a demand for steel bridges and cast iron railway sleepers. One Scotch firm has recently received an order for 1000 tons bridges. The East India office is also calling for large tenders for the supply of cast iron plate sleepers. The demand for iron for that market will soon become quite large, and lead off into a great variety of uses.

## SCIENTIFIC PROGRESS.

## A Solar Cyclone.

Those who have looked through a large telescope under favorable atmospheric conditions at one of those immense cyclones which occasionally break out on the surface of the sun, have derived from what they saw a very good idea of the origin of sunlight. They have seen that the brightest portion of the surface of the sun consists of columns of intensely hot metallic vapors, averaging about 300 miles in diameter, rising from its interior and glowing with extreme brilliancy, from the presence of clouds formed, probably, of shining particles of carbon precipitated from its vapor as the tops of the columns reach the surface and lose heat by expansion and radiation. (A good idea of such a precipitation is had by observing the particles of water condensed from transparent vapor, in unusually high thunderheads, where the action is in some respects similar.) Between these ascending columns are seen descending masses of cooler vapors, rendered dark and smoky by relatively cool and opaque particles of carbon, all or most of the other elements being still maintained by the excessively high temperature in the condition of transparent vapor. In the immediate region, however, where the cyclone is raging, these bright ascending columns are drawn out horizontally by the in-rushing metallic winds (which often reach a velocity of 1000 miles per hour) into long filaments, pointing in general toward the center of the disturbance, which is always occupied by a huge, black cloud of smoke (frequently 20,000 miles in diameter) rapidly settling back into the interior of the sun. Over and across this great central black cloud are often driven long arms of the shining carbon clouds, which, when the cyclonic action is very strong, bend round into slowly changing spiral forms, very suggestive of intense action. A striking illusion, invariably connected with this sight, is that the observer seems to be viewing it from a position quite near the scene of the disturbance, whose minute and complicated details are seen with great distinctness.—*Exchange.*

## The Luminosity of Flames.

The cause of the luminosity of flames has been made the subject of very close investigation. The *Scientific American*, in alluding to the subject, says: "The explanation which accounts for the luminosity of flames of carbonaceous substances, like the candle or coal gas, by the presence of incandescent carbon particles, is, we believe, very generally accepted as correct, although Frankland has endeavored to cast doubt upon its correctness. The facts on which the commonly received explanation of the nature of the light-emitting substance of such flames is based may be concisely presented as follows: 1. The increased luminosity which chlorine imparts to weakly luminous or non-luminous flames, due to its well-known property of separating the carbon as such. 2. A rod held in a luminous flame is smoked only on the lower side—the side opposed to the gas stream; if the carbon were there as vapor, as Frankland assumes, it would be condensed by the cooling action all around the rod. 3. A body held in a luminous flame is smoked even when it is in a state of ignition; this, therefore, cannot be explained on the hypothesis of the condensation of vapor. 4. These carbon particles can actually be seen in the flame when it is made to strike against a second flame, or an ignited surface, when they aggregate to form visible masses. 5. The luminous portion of a flame is not very transparent, no more so than the layer of smoke of the same thickness which rises above a flame fed with turpentine. And, 6th, flames which unquestionably owe their luminosity to the presence of solid particles give a shadow with sunlight, precisely as do hydrocarbon flames; while luminous flames composed of ignited gases and vapors only give in such shadows in sunlight." The views above summarized are the conclusions drawn by Henmann as the results of an extended investigation of the subject, which confirm very satisfactorily the generally accepted theory.

SEEING THE INVISIBLE.—In a recent lecture on the "Solar Corona," by Prof. Wm. Huggins, published in *Popular Science Monthly*, the author says: "We live at the bottom of a deep ocean of air, and therefore every object outside the earth can be seen by us only as it looks when viewed through this great depth of air. Prof. Langley has shown recently that the air mists, colors, distorts, and therefore misleads and cheats us to an extent much greater than was supposed. Langley considers that the light and heat absorbed and scattered by the air and the particles of matter floating in it amount to no less than 40 per cent of the light falling upon it. In consequence of this want of transparency, and the presence of finely divided matter always more or less suspended in it, the air, when the sun shines upon it, becomes itself a source of light. This illuminated aerial ocean necessarily conceals from us, by overpowering them, any sources of light less brilliant than itself, which are in the heavens beyond. From this cause the stars are invisible at mid-day. This illuminated air also conceals from us certain surroundings and appendages of the sun, which become visible on the very rare occasions when the moon, coming between us and

the sun, cuts off the sun's light from the air, where the eclipse is total, and so allows the observer to see the surroundings of the sun through the cone of unilluminated air which is in shadow. It is only when the aerial curtain of light is thus withdrawn that we can become spectators of what is taking place on the stage beyond. The magnificent scene never lasts more than a few minutes, for the moon passes and the curtain of light is again before us. On an average, once in two years this curtain of light is lifted for from three to six minutes. I need not say how difficult it is from these glimpses at long intervals even to guess at the plot of the drama which is being played out about the sun."

SELF-IGNITION OF GREASY COTTON WASTE.—A foreign manufacturer has instituted experiments on the self-ignition of cotton waste, with the following results: A handful of cotton waste was dipped into linseed oil, squeezed out, placed in a wooden box, and the temperature observed by means of a thermometer introduced into the box. The temperature surrounding the box was kept at 76° C. Soon after the temperature in the box rose to 173° C., and smoke issued from the latter. When opened, whereby air was admitted, flames burst out at once. A box, out of which the air was thoroughly excluded, consumed after five or six hours. In another experiment, in which the cotton waste was saturated with rape-seed oil, the box burned after ten hours. With an outdoor temperature of 56° C., Gallipoli olive oil caused the spontaneous combustion of cotton wrapped in paper; castor oil required 24 hours, sperm oil four hours, train oil two hours, for a lively combustion. Considering these results, it will be seen how dangerous it is to let such cotton waste lie around loose—for instance, the waste used for cleaning machinery; and these experiments may throw light on many inexplicable fires.

THE RED SUNSETS.—The discussion as to the cause of the red sunsets for the two or three years past is still continued, and opinion seems to be settling down to the theory that the cause of these phenomena should be found in the atmosphere of the sun rather than in that of the earth. The unusual activity of the sun's atmosphere during the time seems to give much plausibility to this theory. It is held that the violent solar eruptions of the past five years have "so loaded and extended the solar envelope that the nebulosity has become visible from the earth," and of course would be most readily seen just after the sun itself has passed below the horizon. Meantime many scientific men still cling to the explanation of volcanic dust and vapor in our own atmosphere. Sun-spots have had so much to answer for that it would not be strange if we should find much more charged to their account.

INCREASE OF ACCIDENTS FROM LIGHTNING.—Dr. Andries, having calculated that accidents from lightning have increased by from three to five fold during the last 50 years, finds that the causes which have been assigned for the phenomena do not account for all. He regards the main cause as lying in the enormous increase in manufactories, locomotives, etc., which fill the air with smoke, steam and particles of dust of all kinds, while the increased population contribute their share to the impurity of the atmosphere. His own experiments and those of others have shown that all the electrical phenomena of the air increase in intensity with the increase of dust in it.

THE HIGHEST OBSERVATORY IN EUROPE is now being erected on one of the high peaks of the Tyrolean Alps, in the region of eternal snow and about 10,000 feet above the sea level. This observatory is designed more especially for meteorological rather than astronomical observation, although it will undoubtedly be gradually enlarged for usefulness in the latter direction. Should any unusual success attend observations at the Lick observatory on Mt. Hamilton, that fact will undoubtedly attract attention to such a use.

IMPROVEMENT IN BLEACHING.—A new method of bleaching has been discovered, and we understand, a patent applied for, by Henry Nuttall, bleacher, of Fall River Bleachery, by which a saving will be made of over half the coal, labor and chemicals, and three-fourths of the time used by the present system. The new method will make a complete revolution in bleaching. It is said to be ahead of the new style of bleaching done by our English cousins, who use carbolic acid.—*Fall River News.*

LEAD AND PLATINUM.—It is a phenomenon familiar to many, if not all, who have worked in a chemical laboratory, that if lead or even certain of its salts be melted in a platinum crucible the result will be most disastrous so far as the integrity of the crucible is concerned. Directly the lead fuses it alloys with the platinum, and runs through the bottom of the crucible as if it were made of tissue paper.

THE GARTER was first introduced as an ornament and not for use. It was introduced in the sixteenth century, and was at first a most fashionable male ornament. They were worn externally below the knee, and became so expensive and yet so common a luxury that we read of men of mean rank wearing garters and shoe-roses of more than \$20 in value.



## ENGINEERING NOTES.

## A New Method for Utilizing the Water-Power of Niagara.

A large tunnel is to be cut through the rock close by and parallel with the Niagara river, 160 feet below the water above the falls, and running half a mile or more back from the falls. The open end of this tunnel is to empty at the falls a foot or two above the level of the water below the cascade.

Whenever a company wants water-power it may sink a vertical shaft from the surface almost down to this horizontal shaft. In the bottom of this vertical shaft a turbine wheel is to be placed, and below this a smaller shaft, for a tail race, will carry the water from the wheel to the great horizontal shaft, which will then work as a waste pipe to carry off the water. In order to get the needed water to drive the wheel it will only be necessary to build out a short pier on the river shore to catch the edge of the swiftly flowing current and divert a little of it, by means of a ditch or pipe, into the vertical shaft and so past the wheel and through the great subterranean shaft and back into the river again below the falls. These vertical shafts are to be big enough to admit one or two of the workmen, who must place the turbine in position, and afterward attend to it. It is said that a wheel as big as a man's hat will supply 200-horse power.

The plan is to sell the right to sink shafts as close together as practicable along the line of the great waste shaft. It is said that cheap, steady, reliable power is so great an item in manufactures that a committee of Connecticut mill-owners declared it would pay them to remove their mills and factories to Niagara. Freshets, droughts and ice play mischief with those interests that depend on water-power, but no such annoyance, it is said, attends the use of Niagara water. The Niagara never freezes, never overflows and never runs dry. A company with \$3,000,000 capital has been organized in New York City to carry this enterprise through.

**WOODEN WATER WHEELS.**—Wooden turbines have of late been proposed to meet the demand for an excellent and cheap water motor for small powers, and the *Iron Age* thinks there is every reason to believe that within certain limits they will meet with very favorable reception. Turbines, it must be remembered, have the advantage of being small in bulk for their power, and equally efficient for the highest and the lowest falls, and were it not for the fact that they are wholly constructed of metal, their use would probably have long since become more general. Wooden wheels can in some cases be readily procured at a comparatively low price, and as the question of first cost and ease of repairs enters largely into the question of successfully utilizing small water powers for some purposes, and is of greater importance than a high efficiency, turbines have often been unable to compete with wheels of other types. This state of things, it is thought, can be changed by using wood as the structural material, thus securing the advantages of turbines without the drawbacks, and it has been found that in this way their cost can be reduced to about one-fourth of that of iron turbines. In some parts of Europe wheels of this class have been constructed partly of oak and partly of yew, and the results are understood to have been highly satisfactory in every respect.

**CANALS VS. RAILROADS.**—A general but erroneous notion that the day of canals has passed, that they have been superseded by railways, is vigorously combated by Horatio Seymour, Jr., in a pamphlet called "The Canal Age." He shows that railways never have carried freight as cheaply as canals, and probably never can; that the Erie canal, far from being a tax, is a profitable investment for the State; that Germany, Austria, Russia, England and other countries are rapidly extending their canal systems; and that in the extent of our water routes this country is relatively far behind Europe. Thus, France is engaged on four great waterways, for which \$200,000,000 have been appropriated, and which will cost much more; Germany and Russia are constructing a canal from the Baltic to the North sea; England is making canals from London to Liverpool and Bristol, and from Manchester to Liverpool; while Canada is spending \$1,000,000 to improve the Welland canal.

**RAILROAD-BUILDING IN ASIA MINOR.**—The ancient city of Tarsus, where the Apostle Paul was born, has a railroad. British capitalists are constructing a railway in Asia Minor, the first section of which, from Mersina to Tarsus, has just been officially inaugurated. The opening of the road was made the occasion of a grand jubilee, in which the local officials heartily joined. A dozen sheep were sacrificed, there were religious benedictions, speeches, and then a free excursion to the notabilities. Some Arab dignitaries, however, would not trust their lives on the train, saying they would wait till they saw how the extraordinary English contrivance worked.

**COAL VS. WOOD.**—Within little more than a year all the locomotives on the St. Paul & Duluth road (43) have been changed from wood burners to coal burners, though it is almost a continuous forest along the road.

## USEFUL INFORMATION.

## Size of Rooms and Fitting of Carpets.

A correspondent of the *California Architect* called attention, some time since, to the importance of calculating for the sizes of rooms, when building, in accordance with the standard widths of carpets. Says the correspondent: It is easy to cut off or turn under a few inches of carpet, but expensive and bothersome to add that much. Even where a room is one inch too wide for a carpet it is very annoying and expensive. In most cases a moment's thought on the part of the architect would remedy these quite expensive defects. Take a room 4 by 5 yards, an even 20 square yards cover it. But suppose this room 4 yards and 3 inches by 5 yards and 3 inches, and your carpet of a large and showy pattern, from 25 to 30 yards are required. As Brussels carpets are most used and Ingrains are more easily patched, the principal rooms should be made to fit the even sizes of Brussels. You have nice double parlors, and you choose a nice Brussels and find your center widths just 1 or 2 inches too narrow to meet your borders, and even 1 inch compels awkward patching and perhaps from \$20 to \$50 extra expense. This cannot in all cases be avoided, but in the vast majority of cases rooms and halls can be made the right size for carpets, and ought to be. Another point—try to fit a carpet around a door casing with heavy molding, and you have to cut and fold and twist, and then you leave an unsightly, dust-catching corner, as you cannot make the carpet fit neatly around such moldings. Now, Mr. Architect and Carpenter, let a woman give you a very useful lesson: Do not let such moldings touch the floor; leave about a quarter of an inch space and then the carpet can be neatly slipped under them. Nearly all rooms have to be carpeted, not once, but every few years; and carpets have to be put down at least once a year, and many economical housewives have to change the carpets so as to equalize the wear and tear, and the architect or carpenter that compels them to add inch strips and fit around awkward moldings adds 25 per cent to their cost, and is very ignorant of an important practical point in his business.

**A HAIR-CUTTING MACHINE** for the human head is one of the latest reported inventions. The machine is a small box-shaped implement operated with a spring. In operation, after the spring is wound by means of the key, similar to a common clock, if a button is pressed the knife plate reciprocates at a high speed. If the machine is now moved over the head, the comb passes through the hair, which will be cut off by the fixed and reciprocating knife plates a greater or less distance above the comb. Hair can be cut either long or short by adjusting the legs in the box so that the comb and cutters are at the required distance. A person can easily cut his own hair by means of this machine without danger of cutting his ears or injuring the scalp, because the outer ends of the knives are protected by a comb. It is well adapted to clipping sheep, ponies, dogs or hives, thus making a very useful help for farmers, furriers, etc. It has such a universal application for hair clipping, and is said to perform such perfect work, that it is certain to make a very profitable article for a manufacturer's specialty.

**RENEWING FADED INKS.**—A valuable discovery has been made, whereby the faded ink on old parchments may be so restored as to render the writing perfectly legible. The process consists in moistening the paper with water, and then passing over the lines in writing a brush which has been wet in a solution of sulphide of ammonia. The writing will immediately appear quite dark in color, and this color, in the case of parchment, it will preserve. Records which were treated in this way in the Germanic Museum, in Nuremberg, ten years ago, are still in the same condition as immediately after the application of the process. On paper, however, the color gradually fades again, but it may be restored at pleasure by the application of the sulphide. The explanation of the action of this substance is very simple—the iron which enters into the composition of ink is transformed by the reaction into the black sulphide.—*Paper World*.

**TO MAKE INK SPOTS INVISIBLE.**—In order to take away ink spots from paper it is customary to use a blotter, which freely soaks up the liquid, and if by this means all traces of the ink do not disappear, recourse is had to a salt or some substance having the property of bleaching paper, for instance, oxalate of potassium, etc., to attain this end. A simple modification of this renders still better services: Take a thick blotting paper or board, steep it several times in a solution of oxalic acid or oxalate of potassium. Then dry it. If there is a spot to be taken away, apply the blotter which has been prepared in this fashion to the same. In proceeding thus, the ink is entirely removed. The blotter drinks up the ink and whitens the paper at the same time.

**UTILIZING THE MILKWEED.**—We have often wondered, when admiring the silky bolls of the common milkweed, if the material would ever be utilized for manufacturing purposes. Recently a thread has been made from it which is said to have the consistency and tenacity of

imported flax or linen thread. The fiber is long, easily carded, and may be readily adapted to spinning upon an ordinary flax spinner. It has the smoothness and luster of silk, rendering it valuable for sewing machine use. As it grows readily at the North, here may be the beginning of a new industry rivaling that of cotton-growing at the South. Samples of the new material have been introduced into the Boston market.

**USEFUL IF RELIABLE.**—Jerome Prince, of Milford, Mass., is the inventor of an electrical machine for locating articles lost overboard from boats or steamers in deep or shallow water. The model of the machine which Mr. Prince exhibits works perfectly, locating readily iron, steel, gold and silver. The presence of the metal is said to be indicated by rapid revolutions of a compass needle. The machine was given a successful trial at the pond the other day. An iron bar was dropped from a boat and the bottom of the pond in the vicinity dragged with the plummet attached to the machine which was carried in the boat. When the plummet struck the bar it was quickly indicated on the compass. Mr. Prince goes to Boston in a few days to exhibit a model of the machine. He has applied for a patent. The inventor bases his claim on the composition of the plummet and the fact that they will locate gold.

**NEW AND CHEAP EVAPORATOR.**—A member of the Fruit Growers' Association of the United States claims to have invented a cheap evaporator suited to general use, which is far more effective than the more expensive description. The process is complete in from two to three hours. The evaporator is a marvel of simplicity, and can be made by any one at a very trifling cost. By its use millions of dollars can be saved the producer and consumer each year.

**DRY POCKET GLUE** is made of 12 parts of good glue and five parts of sugar. The glue is boiled until it is entirely dissolved; the sugar is then put into the glue, and the mass is evaporated until it hardens on cooling. Lukewarm water melts it very readily, and it is excellent for use in causing paper to adhere firmly, cleanly, and without producing any disagreeable odor.

**FIRE EXTINGUISHERS.**—The ingredients of many of the patent fire extinguishers are said to be 8 pounds carbonate of soda, 4 pounds alum, 3 pounds borax, 1 pound carbonate potash, and 24 pounds silicate of soda solution, which are mixed together; 1½ pounds of this mixture is added to each gallon of water when required for use.

## GOOD HEALTH.

## Doctors Disagree in Regard to What May Be Intrusted to Digestion.

Most authorities are of opinion that cheese is indigestible, yet even on this point doctors cannot agree. A distinguished French chemist has suggested that, to render cheese digestible, a quarter of an ounce of potash should be added to every pound of cheese, while a German chemist has experimented on several kinds, such as cheese, meat, milk and eggs, and he boldly declares that cheese is 'no more indigestible than meat and many other articles of diet.'

Suppers are also usually condemned. Some doctors assert that suppers are not only unnecessary but positively harmful; that sound sleep cannot be obtained after them, and that three meals a day are sufficient. On the other hand, others are of opinion that a light supper is necessary to procure sound sleep. After a meal, they say, blood is drawn toward the stomach to supply the juices needed in digestion. Hence, the brain receives less blood than during fasting, becomes pale, and the powers become dormant. Sleep, therefore, ensues. A doctor says that recently he was called at 2 A. M. to a lady who assured him that she was dying. The body was warm, he says, the heart doing honest work. To her indignation, he ordered buttered bread to be eaten at once. Obeying, the "dying" woman was soon surprised by a return of life and a desire to sleep.

Milk is generally considered a peculiarly nutritive fluid—indeed, a perfect food—and therefore suitable for persons of all ages, when it agrees with their stomachs; yet no less an authority than Sir Henry Thompson states that "for us who have long ago achieved our full growth, and can thrive on solid food, it is altogether superfluous, and mostly mischievous as a drink." He also says that the primary object of drinking is to satisfy thirst, and that water is more powerful to this end when employed free from admixture with any solid material. Chocolate, thick cocoa, or even milk, are therefore not so efficacious in allaying thirst as water. "So plentiful is nutriment," he adds, "that the very last place where we should seek that quality is the drink which accompanies the ordinary meal." In this respect, at any rate, Sir Henry Thompson is at one with the vegetarians.

**IMAGINARY ILLS.**—A Philadelphia physician says that a great deal of what passes for heart disease is only mild dyspepsia, that nervousness commonly is bad temper, and that two-thirds of the so-called malaria is nothing but laziness.

Imagination, he says, is responsible for a multitude of ills, and he gives as an instance the case of a clergyman who after preaching a sermon would take a teaspoonful of sweetened water and doze off like a babe, under the impression that it was a *bona fide* sedative.

**ADVANTAGES OF LOW CEILINGS.**—Rooms with low ceilings, or with ceilings even with the window-tops, says the *Popular Science Monthly*, are more readily and completely ventilated than those with high ceilings. The leakage of air which is always going on keeps all parts of the air in motion in such rooms; whereas, if the ceiling is higher, only the lower part of the air is moved, and an inverted lake of foul and hot air is left floating in the space above the window-tops. To have the currents of fresh air circulating only in the lower parts of the room, while the upper portion of the air is left unaffected, is really the worst way of ventilating, for the stagnant atmospheric lake under the ceiling—although motionless—keeps actively at work under the law of the diffusion of gases, fouling the fresh currents circulating beneath it. With low ceilings and high windows no such accumulation of air is possible, for the whole height of the room is swept by the currents as the dust of the floor is swept with a broom. Low ceilings have also the advantage of enabling the rooms to be warmed with less expenditure of heat and less cost for fuel. The above does not agree with the generally accepted idea of the height of rooms in dwellings, but the authority is good and well worthy of consideration by persons about to build.

**ICED DRINKS IN DYSPEPSIA.**—And now a few words as to the beverages to be taken. Americans are a dyspeptic people; they drink much iced water at meals; *ergo*, iced drinks at meal-times are bad. They may be when carried to excess; this is not denied. But iced drinks are not the cause of the widespread dyspepsia in the United States. There are other potent factors in action. Iced drinks are very grateful to the thirsty, but too much indulgence therein produces a torturing thirst, as the person who indulges in eating snow in the Arctic regions discovers quickly. Just as snowballing causes the hands first to feel cold and then to glow with heat if continued, so the constant application of an iced fluid to the fauces, at first grateful, become a source of intense discomfort; for the blood-vessels are first contracted and ultimately paralyzed, and then the fauces glow with warm blood, like the skin of the snow-baller's hands. Iced fluids are not desirable for dyspeptics, to say the least of it. Ordinarily at dinner the ice pudding is followed by a glass of liquor—"to correct it." A certain temperature is requisite for digestion, and too much cold is undesirable.—*From Dr. J. M. Fothergill's "Indigestion and Biliousness."*

**THE POISON OF THE SCORPION.**—Apparently no very complete exhaustive analyses of the poison of the scorpion have yet been made. The best on record are those by Jousset, presented to the French Academy in 1870 and published in the *Comptes Rendus* of that year. He gives no definite statement of the chemical constitution of the venom, but does state the mode of its action upon the blood, by which in severe cases it causes death. It affects the red corpuscles, paralyzing them so that they cohere one to another, thus becoming agglutinated until they are unable to pass through the capillaries, and may cause fatal obstruction. So far as known, there is no chemical antidote which can neutralize the poison, but inasmuch as, like all animal poisons, the action on the nerve force, or in other words, the vital force, is in the nature of depression, a remedy which stimulates that force temporarily is plainly indicated. Alcohol is always available for that purpose, and being easily obtained, is perhaps more serviceable than any other. Bromide of potassium is of high value, but can be used safely only by the physician himself.

**COFFEE** acts upon the brain as a stimulant, inciting it to increased activity and producing sleeplessness; hence it is of great value as an antidote to narcotic poisons. It is also supposed to prevent too rapid waste in the tissues of the body, and in that way enables it to support life on less food. These effects are due to the volatile oil, and also to a peculiar crystallizable nitrogenous principle termed caffeine. The leaves of the plant likewise contain the same principle, and the inhabitants of the island of Sumatra prefer an infusion of the leaves to that of the berries. Its essential qualities are also greatly changed, the heat causing the development of the volatile oil and peculiar acid to which the aroma and flavor are due.—*Ag. Reporter*.

**INSANITY IN CHINA.**—With a population of about 300,000,000, China has not a single insane asylum. Is this indicative of freedom from insanity in China or of the proverbial indifference of that race to the sufferings of its individuals? In this State we believe that the proportion of insane among the Chinese is nearly as great as among other nationalities.

**COMPULSORY REVACCINATION** of the soldiers was established by the German Government 11 years ago, and since then not a single death from smallpox has occurred in the German army.

**DOCTORS IN CHINA** charge 5 to 10 cents a visit, and are said to be kept exceedingly busy,



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**MINING ACTIVITY AT MIDDLE BAR.**—Amador *Dispatch*, July 17: Last Saturday the parties who over a month ago bonded the Marlette mine at Middle Bar from A. J. Sargent, sent a check on New York for \$2000—the first payment on this contract, which was to be paid in 60 days, the balance (\$25,000) to be paid in six months, for this mine, which is near the town of Middle Bar on the Mokelumne river, and instead of paying the \$2000 in 60 days, they have paid it in 35 days. Mr. Petre himself will be here and commence active operations on the mine forthwith. In fact, Mr. Sargent has already ordered the timbers and set men to work cleaning out the shaft. Mr. Petre is an old Lake Superior miner with an abundance of means at his command to open up and develop this mine, and will this season put up a 20 if not a 30 or 40-stamp mill on or near the mine. Thus, at last, the boom for Middle Bar has begun in good earnest and on a grand scale. This work, we understand, is to be followed by the erection, in the near future, of a ten-stamp mill just above the bar on a mine now owned and being worked by Col. Robinson, who has already built a comfortable house near his mine and moved his family into it. He has found at 40 feet a five-foot body of solid quartz of good paying rock. This mine is on the Zeile ledge of Jackson, and will, in all probability, equal this old Zeile mine in richness, which is one among the best and heaviest mines in the State. Mr. James Farrell and his Stockton partners will this week commence operations on their mine, which is the second mine south of this Marlette mine that Mr. Petre has bought and is now working. Thus it will be seen that no less than three different quartz mines at Middle Bar will be in active operation this summer, besides the Neville or "Mammoth" mine at that place, which will put a mill, smelter and sulphurets works at the Bar, making no less than four gold quartz mines and mills that will be in active operations here, thus making this mineral belt of gold quartz leads in the southern end of "Little Amador" equal to the northern end at Plymouth, where the Consolidated Plymouth mines and mills are located. Then add to this the Kennedy mine's 40-stamp mill that is already under way, and with the old Zeile, the Moore and the Amador Queen mines and their separate mills all at work, and we have some eight mines and mills at work within a distance of four miles from Jackson, and making this the center of trade and supplies. We must also state that Abe McKinney has bought an iron whim which he is putting up at his mine, and will sink the shaft 100 feet deep. This mine joins the Marlette mine at Middle Bar, and is one of the richest quartz mines there.

**WORK COMMENCED.**—Amador *Ledger*, July 17: Work was commenced on the Marlette claim at Middle Bar last Monday. This claim, together with the Sargent mine adjoining, was recently bonded to W. Petre, an Eastern capitalist, for the sum of \$28,000. The work at present consists in cleaning out the tunnel. It is expected that the grading for the millsite at the Kennedy will be completed this week. The value of the last cleanup at the Volcano Gold Gravel Mining Co.'s claim at Volcano, commonly known as the big tunnel, is variously estimated at from \$12,000 to \$15,000. It is expected that the Zeile mill will be started to its full capacity of 40 stamps about the 1st of next month. George W. Horn is prospecting a quartz claim a few hundred yards south of the Kennedy, west of the main road. The quartz is very much broken up and nothing can be said of the prospect as yet. W. Boxall, who has been driving a prospect tunnel into Mattley's hill, a quarter of a mile west of Jackson, is in over 200 feet. He has done the work himself, with the help of two sons. He is drifting to strike a ledge which he believes to run in that vicinity, and expects to have to go 200 or 300 feet further before he reaches quartz.

**SUTTER CREEK.**—The news from the mines of this vicinity is of a discouraging character. A telegram was received from San Francisco last evening ordering work to be suspended at the Amador Consolidated. Whether this means a temporary or permanent shutting down of the mine is not known. The work of keeping the water out continues. As the company have lately been at great expense in getting a new air compressor and also a new rope, it is hardly conceivable that the intention is to abandon prospecting altogether. It means some important change in the program, but whether for better or worse remains to be seen. The new ten-stamp mill at the Iowa will be completed in about a week, when the crushing of surface rock will be commenced. The building of ten additional stamps at the South Spring Hill mine has been commenced. It will take six weeks to complete the job. H. G. Murray, who has been in Calaveras county for several weeks past, has returned and will take charge of the South Spring Hill job. At the Lincoln a break in the main water pipe has brought the machinery to a standstill for about a week.

## Butte.

**BUTTE CREEK.**—*Record*, July 17: Mr. Hedges and Ira Wetherby are out on a prospecting trip high up in the hills. They have a full outfit for the summer's trip. They are experts at mining, and men of large experience, and know the feelings of one who has picked up nuggets, the largest of which weighed 52 pounds. They are men of energy and perseverance, and I know no obstacles they cannot surmount.

**HELLTOWN MINES.**—Messrs. Howley & Gale, who have recently opened a mining claim near Helltown, are doing very well—much better than they anticipated. They have a good and lasting claim; from information and observation they are satisfied. Uncle Joe Rice is again turning boulders from the bottom of the creek, and has a good showing for a good summer's work. Wm. Longley and Harry Moore are his partners. The Hintz mine is doing better, as they drive their tunnel into the flat. They are taking out coarser gold and more of it.

## Calaveras.

**MINING SALES.**—Calaveras *Chronicle*, July 17: The Marlette mine of Middle Bar, owned by Mrs. Julia Sargent, has been bonded to Mr. R. W. Petre of Duluth, Minnesota, and the work of cleaning out the tunnel has been commenced by Jack Sargent, under advice from Mr. Petre, who is expected here shortly from Duluth with money to push the work of development with all possible dispatch. The conditions of the bond were \$2000, 60 days, which payment has already been made; \$3000, six months, and \$20,000, one year. The mine to be worked and hoisting works and mill erected suitable for the reduction and concentration of the ores. The gross profits of the mine applies on the preferred payment. Col. Robinson, who negotiated the bond, receives a commission of 10 per cent of the sale money. The Marlette has a U. S. patent for title, and is upon the Nevill or west lode of the mother belt, and contains 1500 by 600 feet. The "Little Sargent" ground adjoining, and upon the same vein, containing 170 feet, no patent, was placed to the same party with bond for \$3000, payment in six months. Within the last five days the sale of the St. Julian mine of 1400 feet, located between the "Little Sargent" and Nevill mine, was negotiated by the same party to Mr. Wm. M. Curtis for the controlling interest, 62,500 shares, at about 10 cents per share; 10 per cent down in 45 days; 10 per cent in six months, balance, one year. The same rate paid for the control will be paid for the rest of the stock should the parties desire to sell. Col. Robinson is sinking on his Middle Bar mine at Middle Bar, and will likely consummate a sale soon to San Francisco capitalists for one-half interest for mill and hoisting works. The ore assays \$20 per ton.

## Inyo.

**DARWIN.**—Inyo Co. *Independent*, July 16: Everything indicates that lively times are about to set in at Darwin. Men are wanted at the Defiance mine, and Mr. J. S. Gorman is opening up several claims that will each employ a number of men. At other mines work no doubt be begun that will swell the number of men employed and help the general prosperity.

**PALMETTO.**—*Register*, July 15: The indications are that the Palmetto Company is going systematically to work to develop the series of mines owned by the company in Palmetto district, which is situated about half way between Piper's Ranch and Lida Valley. Some 15 or 20 years ago the company had a fine mill there, and ran it for a short time; but troubles of some sort arose and operations ceased, since which time the entire mill has been carried off by different persons. The mines—some five or six in number—were then secured by U. S. patents, and therefore remain to the company. It has always been asserted by those knowing something of the facts that the ore yielded well by mill process, and it is the common belief that they are really very valuable. Work on a small scale has been going on there for several months, but now additional men are being put on, and no doubt is entertained but that something more than mere prospecting is on the tapis.

**LEAD CANYON.**—Erwin & Fuller are still hammering away on their mines in Lead Canyon, which is situated between Waucoaba and Saline valley on the eastern slope of the Inyos opposite Independence. They make an occasional shipment of ore by which to keep up expenses, though the main object is to show up something that will justify the erection of works near by, for which there are the finest facilities—wood and water-power. The prospects of making such a showing of lead ores are considered very good indeed. It is said to be the best fluxing ore ever put through the Elva furnace, and to run high in silver, although we do not now remember the figures. There are a number of these lead prospects in the vicinity, and also in the adjacent districts, where also are found some very promising silver ledges. The chances are that there will be a prosperous camp over there some of these days.

## Mono.

**BENTON ITEMS.**—Inyo *Register*, July 15: Miller's mill is running along steadily. The chlorides on the hill and up in Montgomery canyon are doing fairly well. Tucker & Mitchell shipped two tons of silver-lead ore on Tuesday. M. Harrington is taking out some good ore again. P. Dowd, Joe McDermott, and several other persistent prospectors have been making a few developments on some of the gold ledges of Clover Patch and in the vicinity of the Wild Rose.

**THE STANDARD CON.**—Bodie *Miner*, July 19: Number of men employed in and about the mine: Engineers, 2; pumpman, 1; shiftbosses, 1; carpenter, 1; blacksmith, 1; miners, 23; stationmen, 4; carmen, 5; timbermen, 1; laborer, 1; total employed, 40. Drifts and stopes without special change. Ore shipped to mill for week, 288 tons. Standard side of Bulwer mill running steadily.

**THE MONO.**—The south drift on 700-foot level is extended 24 feet. The east crosscut from south drift on 700-foot level is extended 14 feet. The north drift from east crosscut on 700-foot level is extended six feet. The east crosscut from south drift on 550-level is extended 10 feet.

**THE CON. PACIFIC.**—In drift north on the Fortuna vein has been advanced eight feet. Vein looking about as at last report. During the past week we have had bad air to contend with in the winze down from the 135-foot level. Have advanced the work five feet with no change in vein to report.

**THE BODIE.**—The upraise above 400 is extended 24 feet. The north drift 700 is extended five feet.

## Nevada.

**GOOD ORE.**—*Tidings*, July 16: Some extra rich rock was struck last night in the Boston mine, which was formerly known as the Granite Hill. The Boston is down to a depth of about 300 feet, with a ledge averaging about 18 inches in thickness. The general average of the ore is very good, while that found last night was a bonanza, almost. The last ore crushed from the Boston mine yielded over \$80 per load, and was cleaned up at Rodgers' mill several weeks since.

**QUARTZ.**—*Transcript*, July 18: John Curry recently discovered quite a rich pocket of quartz while prospecting on Rush creek, a couple of miles west of town. He has already taken out about \$400 and thinks there is more left.

**A PRODUCTIVE MINE.**—The Nevada City mine

not only continues to hold its own, but improves with each day's work done. Incline No. 1 is down 850 feet. The ledge in the lower level shows six feet of milling ore carrying good quantities of free gold. The north drift is richer than the south one, but they are both good enough. Shaft No. 2, about 1200 feet north of No. 1, is down 530 feet to the drain tunnel with which it was connected last month by an upraise. Levels are being run each way about 100 feet above the tunnel, and the ore deposits are of most gratifying extent and quality. Superintendent Sprague, when in San Francisco recently, purchased 2000 feet of steel rails for the car track in the tunnel, so that all the ore from the mine can be conveyed with cheapness and rapidity to the mill which is at the old incline. This mill has 20 stamps and although being run night and day it is not capable of crushing the ore as fast as it can be taken out. It is quite likely that more stamps will be added to the mill during the coming fall. There are about 60 men employed by the company, and there will be additions made to the force as new ground is opened up. There is enough ore now developed to keep the mine in operation many years to come. There is a big quantity of ground in the claim that has not yet been penetrated, but it is morally certain to be very productive when the company get into it.

## Placer.

**A CARLOAD.**—Placer *Republican*, July 17: One often reads that a mine averages a certain amount of gold to the carload. This is rather indefinite, because the cars used in different mines vary in size, and the quartz or gravel may be coarse or fine; but in general a carload may be taken to mean about a ton. The cars in quartz mines are generally a little smaller than those used in gravel mines. In the Hidden Treasure mine there are between 40 and 50 cars used to haul the gravel. These are a trifle smaller than the average car in drift mines, but their dimensions will sufficiently indicate the size generally in use. They are (inside measurement) 57 inches long, 27 inches wide and 21½ inches deep. They therefore contain 33,088 cubic inches, or a little more than 19 cubic feet. A cubic foot of gravel weighs about 110 pounds, so that one of these cars will hold about a ton when even full, and a carload may be taken to mean a ton.

**HIDDEN TREASURE.**—The upraise in the Hidden Treasure mine at Sunny South has progressed 250 feet, which leaves about 600 feet before the surface is reached. For some distance the work has been done through cemented sand, which was very hard to remove and was found to solidify in a very short time. This material was used to ballast the road in the tunnel. Last week the workmen got through the cement into a body of gravel, from which the water ran down into the mine in such volumes as to cause some delay and make mounting into the shaft very difficult. However, progress is being made as fast as the owners expected.

**WORK RESUMED.**—Work has been resumed in the old Gold Blossom mine at Ophir, under a new management. The ten-stamp mill has been put in perfect order and the water is being taken out of the old shaft. A new shaft is sinking on the Marion ledge near its junction with the old ledge. The two ledges run along side by side, so that short crosscuts will reach both. Dr. Wright has charge of the mine.

**A NEW MINE.**—*Herald*, July 17: A new ledge is being developed on ground belonging partly to Rhodes and partly to McCurdy, a little south of the Auburn and Lincoln road, and about a mile west of Ophir. The shaft is now down about 80 feet, and at that depth there is a two-foot vein of good milling ore. It is owned by a company of six individuals, viz: The old gentleman Rhodes and his three sons, J. F. McCurdy and E. L. Dodge, the latter of Oakland. They have christened their enterprise the New Year's Mill and Mining Co. They are now putting up a five-stamp mill to be run with an overshot wheel by water power, and to cost about \$5000. The mill building is completed and the machinery is being put in place. With a mill of their own to crush the ore, the company is confident their mine will prove a paying and valuable property.

## Plumas.

**GRANITE BASIN.**—Cor. Plumas *National*, July 15: The Basin is on a boom this season. Mr. J. A. Hall has got the lease extended on the Morning Star mine, has bought the Jenny Lind mine, and is negotiating with Messrs Sparks & Parker for the Caldwell mine. He is working about half Chinese. Mr. Christie comes next in order. He is stoping in his lower tunnel, and has rock that will go \$500 per ton to encourage him for the long tunnel he has to run. Rockefeller & Co. are running their mill to its full capacity. They intend to put in an overshot water wheel in place of the hurdle, as they intend to put in concentrators and pans, therefore will need more power. Mr. Johnson is running his mill steady on the best of ore. He has gone below to make arrangements for improved machinery for his mill. He informs me that he has not been saving more than half of the gold in the rock.

## San Bernardino.

**PROVIDENCE.**—Cor. Calico *Print*, July 18: The Bonanza King Co. is now working about 20 miners in opening up its mine. The lower levels are said to be looking as good as at any time since the opening of the mine. The grade of ore on the eighth level being as good as on the surface, 300 to 400 ounces is not an unusual assay. This speaks well for the mine at that depth. The Bonanza King would put on a few more good miners at the present time. A new rich discovery was made about two months ago by two prospectors by the names of Witts and Slidel. They have already made a sample shipment to Kingman of five tons, the average being over \$150 per ton. The ore shipped was gold, carrying about 40 ounces of silver. There appears to be three strata in the ledge, which is situated about west from the Bonanza King, on the west side of Providence mountain. There is a small gold vein, a silver and gold vein and a large body of carbonate carrying about 30 to 40 ounces of silver and some gold. Those who have examined the prospect speak of a likelihood of another bonanza. The owners are now preparing to sink and see what they have got.

**RUMORED SALE OF THE PERSEVERANCE MINE.**—It is generally understood here that Mr. Kerr's

group of mines north of the Bonanza King's property has been bargained for, and ere this is in type that we are likely to have another company in Providence. The party negotiating is your townsman, Mr. Bahten.

**A NEW FIVE-STAMP MILL.**—Thirty-five miles north of here is a mining camp called Mescal. Messrs. McFarlane & Barrett, the lucky owners of the Cambria mine, some time since bonded their claim to Los Angeles parties. Developments have steadily since gone on, so that they now claim to have enough ore in sight to run a five-stamp mill for three years without doing any more developments. The company, under Mr. Barrett's immediate supervision, is now grading for a five-stamp mill; part of the lumber is already on the ground and the mill will be hauled as fast as John Domingue's big freight teams can bring it in. They have struck a splendid supply of water not more than a mile from their mine, giving them undoubtedly sufficient water for their mill. The mine is opened with two tunnels on the ledge, so that they now have 200 feet of back stoping ground some 200 to 300 feet in length. The mill is under the superintendency of L. W. Carr, of Los Angeles, and is expected to drop its stamps about the 15th of September.

## San Diego.

**JULIAN.**—National City *Record*, July 16: The mining news from the Julian district is encouraging. The Shenandoah mine is showing up new discoveries and richer ledge matter; the Owens is coming to the front with an improved record. The City of Richmond is making extensive preparations for work with good pay ore at a depth of 80 feet, and the Keystone mine is also turning out rich quartz.

## Shasta.

**MILL STARTED.**—Shasta *Democrat*, July 14: Tom Green's new five-stamp quartz mill was started up last Wednesday, and it runs like a top. The Windy Camp Mining Company have commenced new development work on the Ballaklala mine. The brick for the furnace and some of the machinery of the reduction works for the Scheerer mine is now on the ground, and the erection of the plant will commence this week. It is reported here and at Shasta that operations will be resumed at Iron Mountain in a few days. The report is based on a telegram received a few days ago by the man in charge to have everything ready for a force of men to be put to work. The Whitton & Spellman claim, on the east side of the divide, between the White Bear and Ellis claims, Squaw creek, shows about five feet wide and prospects fairly. The owners intend to sink 50 feet on it during this season. This claim is thought to be the first extension east on the Lillian Maud.

## Siskiyou.

**SCOTT BAR.**—Yreka *Union*, July 17: Bennett & Co. are all pumped out and have started to work in the gravel. The Quartz hill miners are still working, it being very seldom that they get such a good year for water, but the water begins to get pretty slack. Ed. Reynolds & Co., who have laid off a week for rest, will resume operations in their claim on Skunk hill. Mr. Reynolds has made a good run of it this year.

## Sierra.

**THAT NUGGET.**—*Tribune*, July 16: The \$7000 gold-nugget which was found in Hayes & Steelman's drift-claim was exhibited to our citizens at A. W. Crowell's store last Saturday afternoon. The sight was good for sore eyes. One old '49er said he had rather own that nugget than any jewel in England's crown. You bet, it was enough to make the "old boys'" eyes sparkle, as well as the young ones'. A fortune could, doubtless, be made by exhibiting that chunk of "yaller stuff" in the cities and charging those who would wish to see it ten cents apiece. We understand that Messrs. Hayes & Steelman will make an unusually large cleanup of amalgam this season, which, together with the nugget, will place them in very comfortable circumstances. These young men located this claim themselves after several others had prospected it a little and then abandoned it.

**THE HORSESHOE MINE.**—The owners of the Horseshoe quartz claim, who reside at Downieville, are considerably elated over recent discoveries made at their mine. Judge Vanciel last week paid Sid York \$850 for the latter's interest in the property. The vein shows some very rich ore in the croppings, and gives every promise of permanency. This claim is located in Gold Valley. The company was incorporated a few weeks since.

**BALD MOUNTAIN.**—*Mountain Messenger*, July 17: Only eight men are now working underground, and 15 in the creek for the Bald Mountain Company, whose energetic and public-spirited stockholders deserve to be pensioned for the steady work at good wages afforded by them to hundreds of worthy men, and the millions of gold during the past 12 years poured from their mine into the treasury of the world; and the northeast extension of the main lead of the Bald Mountain in course of development up the ridge on the Extension ground promises to fully equal, and perhaps distance, its brilliant predecessor. The new main tunnel of the South Fork Company is in 850 feet. A contract for 800 feet and an airway for 500 feet has been let to D. Finane, at \$5 a foot for the tunnel and \$1.50 per foot for the airway. They are running toward an old claim of E. A. Melley, which he has been unable heretofore to develop for lack of drainage, and beyond to their deep channel, for which, it is believed, they are sufficiently low. The Pennsylvania Company are preparing to start a tunnel to tap their pay channel near the Cornish ranch. The Arizona Company have let a contract for 250 sets of timbers and 5000 spiling, and are pushing their upper tunnel ahead and expect good pay ground in the near future.

**PROSPECT.**—A very fine prospect has been obtained in the Horseshoe ledge, situated on the ridge between Salmon and Gold lakes. The ledge was located years ago by Enoch Andrews and Dr. Jump, and some prospecting was done. Recently it was relocated by Wehe, Ford, S. York and others and incorporated. A couple of men were put to work on it last week, and in a few days they exposed the ledge and took rock rich in free gold. Several persons here have invested quite heavily in the stock since the strike. The ledge is about three feet wide, and the general character of the quartz has been pronounced excellent by experts,



Judge Van Clief has put Jerome and Wm. York at work at the old Slug Canyon quartz claim. The tunnel will be reopened, timbered, and the incline cleaned out, and the ledge sunk on to some depth below where it was formerly developed. The mine showed very good ore when it was formerly prospected.

#### Trinity.

NEW RIVER.—Humboldt Standard, July 17: Mr. Dungan says considerable bullion is now finding its way out from the New River mines. The output of the precious metal is steadily increasing. Between 80 and 90 men are now working in the mines, and it is confidently believed at least 300 will be profitably employed on New River before this time next year. Placer mines on the Trinity have yielded better this season than for many years—very much better than during last year.

#### NEVADA.

##### Washoe District.

CON. CALIFORNIA AND VIRGINIA.—Enterprise, July 15: The average daily yield during the week has been a little short of the regular 400 tons and the average assays, from mill samples, about \$11 per ton. On the 1500 level, the northwest drift from the C. and C. shaft toward the Ophir ground is in 400 feet, making rapid advancement in good working ground. The shaft station on the 1500 level is being repaired, and put in complete order for a drift to the northward or northwest. On the 1560 level the southwest drift is now in about 205 feet. Material, vein matter considerably mixed with porphyry and low-grade ore.

BEST AND BELCHER.—The hauling of the requisite stone for the water bulkhead on the lower level, to shut out the strong flow of water coming from that direction, commenced yesterday. It is to be made a model of strength and perfect efficiency. The water is easily held at a point 12 feet below the track floor of the station and level. The repairs and requisite retimbering are being well advanced. The boiler capacity of the hoisting engines being found to be insufficient, a pair of first-class ones have been recently procured from the Omega mill, and will be placed in position shortly.

CHOLLAR.—The north lateral drift on the 3200 level is now in 83 feet from the Combination shaft station. The first 30 feet was driven in a north-westerly direction, subsequent to which the course of the drift was changed to due north. It is skirting along the easterly borders of the ore vein recently developed, and the distance between this drift or shaft station and the Hale and Norcross line being only 60 feet this drift is apparently now in Norcross ground. A lateral drift south from this station has been commenced, which is now out 20 feet. This is intended to develop the Chollar ground in that direction, following along the east side of the vein. Work is to be resumed forthwith in the west face of the station to develop the very promising and important ore vein recently struck at that point.

SAVAGE.—On the 600 level the drain boxes are about all in, and the requisite retimbering and similar work found necessary by the badly swelling ground passed through by the main south lateral drift is completed. The advancement of this drift into the good body of ore found in its face will be next in order. The east crosscut shows only vein matter with little quartz in its face.

HALE AND NORCROSS.—Work has been resumed in the south lateral drift on the 3200 level from the bottom of the deep winze in order to assist in making the desired connection with the Combination shaft as soon as possible. The north lateral drift toward the Savage from the deep winze station on this level is now out 93 feet, 34 feet having been added during the week. Material, vein porphyry, quartz and clay. On the 2900 level the west crosscut from the main north lateral drift shows no particular change in material—vein matter with bunches and streaks of good ore.

GOULD AND CURRY.—On the 500 level the west crosscut has been advanced 18 feet and a south lateral drift started from it is now in 12 feet. On the 550 level at the top of the upraise incline the west crosscut has been extended 25 feet and its course changed to the north, making it now north lateral drift No. 2. North lateral drift No. 1 on this level has been extended 10 feet, making a total of 59 feet. All these drifts mentioned are merely in promising vein matter.

MONTE CRISTO.—The main drift west on the 150 level from the new shaft still progresses, and is in hard porphyry and other vein matter, having about 60 feet further to go to get into the main ore vein itself, striking it about 100 feet below the deepest workings.

OPHIR.—The rumored strike of good ore in this mine is officially denied. The south drift on the 1200 level is merely in a vein porphyry formation, and on the 300 level the crosscut west develops nothing of importance.

SIERRA NEVADA.—On the 520 level the north lateral drift, No. 2, from the west crosscut has been advanced 49 feet, making a total of 300 feet. Material, porphyry, clay, and poor, decomposed quartz.

POTOSI.—Chambering out for a header for diamond drill hole No. 6 east, near the Chollar line, and the reaming out of drill hole No. 5, constitute the advancement of work during the week.

ALTA.—On the 700 level the west crosscut has about 60 feet further to go to intersect its objective point, the old Keystone ledge.

YELLOW JACKET.—About 140 tons per day continues to be the regular yield from the old ore stopes and breasts above the 1500 level.

CROWN POINT AND BELCHER.—Daily yield, 400 tons, and work going ahead vigorously as usual in all the old ore stopes and breasts.

KENTUCK.—Daily yield, 40 tons of low-grade from the old workings above the 1300 level.

#### Aurora District.

ESMERALDA CON.—Walker Lake Bulletin, July 15: The late-appointed officers of the Esmeralda Consolidated, limited, are Mr. Colcord, superintendent, and Mr. Parr, formerly of Bodie, assistant superintendent. The company's mill is constantly at work on one of the upper levels of the Humboldt, and it is said that work will be renewed in sinking the shaft deeper. Mr. Ann, one of the

London directors, will remain here for some time. Negotiations are pending for work upon the Antelope mine. It is also reported that the control of the Silver Lining mine has changed hands in San Francisco and active operations will soon be commenced upon it.

ANTELOPE.—Walker Lake Bulletin, July 21: The owners of the Antelope, Judge McKinstry, of San Francisco, and Judge Seawell and L. H. Newton, of Aurora, have let a contract to run a large drift from the main tunnel, which is 1000 feet long. This drift will run through unexplored ground and will strike the lode much deeper than it has hitherto been worked. The ore taken out in former years was very rich and extensive, and the result of this drift is anxiously awaited.

#### Eureka District.

ORE SHIPMENTS.—Sentinel, July 17: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Richmond works—Macon City mine, 1½ tons; Silver Plate, 2; Antelope, 16; Lincoln, 4; Bertrand, 2½; Western Contact, 2½; Tybo, 7; Kentucky, 2; Hamburg, 70; Geddes and Bertrand, 10; Mt. Hope, 12. To the Eureka Con. works—Murray mine, 3 tons; Dunderberg, 43; Williams, 40; Summit, 5; Bailey, 1½; Scott, 1½; Pentier, 5; Woodchopper, 4.

A NEW DOUBLE-COMPARTMENT SHAFT.—Eureka Sentinel, July 17: Superintendent McAulay, of the Bowman mine on Adams Hill, informed a Sentinel reporter last evening that he will shortly commence the sinking of a new double-compartment shaft on what is known as the Europa ground, some 600 feet distant from the old shaft. The company has great confidence in its property, and mean to prosecute exploration work systematically and energetically.

#### Jackrabbit District.

IMPROVING.—Pioche Record, July 14: The Onandago mine, at Jackrabbit, continues to gradually improve; every week's work enhances its value. It is pretty certain now that the ore goes down, and that it improves in silver as depth is attained, is satisfactorily demonstrated. The ore from this claim goes such a high percentage in lead that in Salt Lake City it will bring "more than it is worth." A shipment of a couple of carloads of ore from this mine will soon be made.

#### Moss District.

RICH ORE.—Pioche Record, July 14: The Montreal mine, in Moss district, Esmeralda county, is showing a vein of very rich ore, on which the mill will begin running in a few days.

#### Pine Grove District.

PROSPECTS.—Lyon Co. Times, July 15: The prospects for Pine Grove are now said to look more favorable than ever before. From now to the first of August it is estimated that \$20,000 worth of bullion will be shipped from the camp. The mill started last Tuesday on gold rock from the Wilson mine that will work from \$40 to \$50 per ton. Five contracts have been let in this mine and about 15 men are at work in the camp. Mark Erway, of Greenfield, now runs a stage to Pine Grove carrying the mail twice a week, Tuesdays and Fridays.

#### Pioche District.

LEAD ORE.—Pioche Record, July 14: Lead ore is all the go here now with chlorides. Silver appears to be only a secondary consideration with them. Ore going 40 per cent lead and \$50 silver is a more desirable article than \$125 chloride ore. Lead ores shipped to Salt Lake go like hot cakes and bring big prices. It is what the smelters need.

#### Railroad District.

BULLION AND COPPER MATTE.—Elko Independent, July 15: Stoker's teams brought in from the furnace at Railroad district, Sunday evening, 20,700 pounds of copper matte which was shipped yesterday by Warner & Co. to St. Louis. Warner & Co., also from the same source, received 53 bars of bullion, weighing 5270 pounds. They also received from the Tripoli mine, now the property of J. Henderson, 42 sacks—5900 pounds—of ore of high grade. The bullion will be forwarded to the Selby Smelting Works at San Francisco.

#### Wild Rose District.

WILL HAUL THEIR OWN ORE.—Silver State, July 15: Supt. McCurdy has bought the teams, wagons, etc., of T. C. Emery, which have been engaged for over a year past in hauling concentrated ore from the Paradise Valley mill to this town. He has also purchased a Tuscarora team, making in all about 30 animals and six or eight wagons, and the company will henceforth do their own hauling, bringing ore here and taking supplies to the mill and mine.

ORE SHIPMENTS.—Last evening E. Reinhart & Co. shipped 20,165 pounds of ore and 27,190 pounds of concentrations from the Paradise Valley Co.'s mines to Argo, Colorado. One of T. C. Emery's teams arrived yesterday with 16,070 pounds of concentrated ore from the Paradise Valley Reduction Works.

#### ARIZONA.

HUMBURG.—Prescott Courier, July 15: Messrs. Champie and Dodge reached Prescott yesterday from the mineral region south of Prescott. They went as far as Humburg district, where more than 100 men are engaged in mining. They found the Basin mill idle for want of water. Dawes, they say, is still pumping water out of the Peck. Mr. Jacobs, of Hassayampa creek, came in yesterday with a big lot of placer gold which he sold to J. L. Fisher. Agents of capitalists are in Walker district, examining properties belonging to C. V. Shelton. They think well of them, and may purchase. Mr. Graves has taken a fresh start in his deep placer claim on Hassayampa creek. He proposes to see the bedrock if it takes him all summer. The bottom of his claim is supposed to be chock full of gold nuggets.

#### COLORADO.

AT LEADVILLE.—Tribune-Republican, July 15: Leadville continues to maintain its unrivaled supremacy as the great ore-producing and ore-reducing camp of the Rocky Mountain region. The re-

serves of ore were never so great as at the present time, nor the indications for striking other bonanzas so certain as now. The faith in Leadville's ore treasures has increased year by year until not only observant men, but also all classes of citizens, are imbued with confidence in the permanency of her mineral resources. All kinds and conditions of people are interested in mining as a means of livelihood in Leadville, either as owners of claims or holders of leases. Everybody is mining for the money there is in the business. The scheme-worker has long since abandoned Leadville, and honest mining for mill settlements is now the rule, to which there seems no exception. Scores of camps in this State, which made a big blow about surpassing Leadville (when they had had time for development), can now humbly and profitably learn the lesson Leadville is so plainly teaching them, that steady work night and day with heavy shifts is the potent factor which delivers ore in bulk to the smelters. Leadville produces the most ore, but she also works more men, pays bigger bills, expends greater energy, takes heavier chances, and boasts infinitely less while so doing than any other mining camp in the State. The town of Leadville is so quiet and sedate nowadays that one can hardly imagine it as we knew it from 1877 to 1880. Earnest work for the extraction of ore or persistent work intelligently directed for the discovery of new ore chutes are the distinguishing features that impress one at Leadville, and are the reasons for her continued supremacy.

#### IDAHO.

THE STAR OF HOPE.—Ketchum Keystone, July 16: The Star of Hope mine is located on the headwaters of Lost river, opposite Muldoon, and the head of Little Wood river, in Custer county. It is now owned by Jos. Pinkham, Charles Ross and others, and is under the management of James Hickey, a well-known mining man of this region. Mr. Hickey left Ketchum last Thursday with new supplies, tools, etc., for the mine, and will immediately begin the construction of a flume and jigs for the concentration of large quantities of ore now on the dump. The water supply will come from a neighboring lake and the jigs will be built at the mouth of the main working tunnel. They will be ready for operation next week. A crew of 10 men will be employed during the summer. The ore vein of the Star of Hope is a remarkable one. It lies between lime and shale and porphyry—a contact vein—and it ranges from one to four feet in width. The ore is chiefly a heavy, high-grade galena, and has been practically tested by a recent shipment of 23 tons to the Philadelphia smelters, which netted \$3000.

THE IRVING MINE.—Mr. M. Cary, who has employed from 15 to 20 men on Boyle Mountain during the past winter and spring, has taken a new lease on the Irving mine, owned by the Philadelphia Mining and Smelting Co., which will not expire until June 1, 1887. He has already found new ore and is encouraged to believe that his new lease will prove fully as profitable, if not more so, than his former one. Forty tons of ore were recently worked at the smelters with satisfactory results.

ATLANTA.—Idaho World, July 15: Julian Hill arrived here last Friday from Atlanta. He says Atlanta is almost deserted. The mines there have not been worked out, as has been reported, but were shut down pending negotiations for sale. The Taboma has been sold, but the Buffalo and Atlanta companies have not yet effected a sale. The Buffalo mill will soon be running again. A man named Williams is putting a road through from Atlanta to Ross valley, a distance of six miles. A mill will soon be put up at the latter place to work ore from a gold-bearing ledge discovered years ago and abandoned. It was recently relocated. A pack-train has gone to Silver district to pack ore to Atlanta for reduction. The Ida Elmore Company, at Rocky Bar, will have a 50-stamp mill up and running at their mine the coming fall. The Idaho Elmore is 16 or 18 feet through—all pay ore—mostly low grade. With a small mill the entire ledge could not be worked at a profit. When the big mill goes up, all the ore from wall to wall will be crushed.

THE ASSAY OFFICE at Boise City now pays the same rates for gold dust and gold bullion that Eastern points and San Francisco do. So by disposing of dust and bullion at the Boise City office express charges to San Francisco or the East, amounting to about \$10 per \$1000, are saved.

PINE CREEK.—Coeur d'Alene Record, July 15: Friday afternoon Peter Lynam, from Pine creek, dropped in. From him we were pleased to hear from George Lemon, well and favorably known to many Murray people as a former employee of the Record. Messrs. Lynam, Lemon and Glick are the owners of the Burning King lode on Pine creek, about three miles from its mouth and about 10 miles from Wardner. It is said to show a well-defined three-foot ledge between slate walls. They have run in a tunnel 20 feet. Mr. Lynam tells us that there are probably 80 or 90 claims located on Pine creek, and about 50 men now prospecting there. We understand also that work will be commenced today on the building for the smelter to be erected at Pine Prairie. Several men are already engaged in getting out shakes for it. On the whole, the prospects of Pine creek appear to be very promising.

#### MONTANA.

THE DRUM LUMMON.—Helena Independent, July 15: During the month of June the 60 stamps of the Drum Lummon mills crushed 3065 tons of ore and cleaned up \$159,800 in gold and silver retort. The stamps were in operation, deducting all stoppages, 27 days in the month. This is the largest month's output the mine has ever made, and is, the Independent believes, the largest single month's return ever made to a quartz-mining company in Montana. The west side must now yield the palm to the east side for big outputs. The output of the Drum Lummon for the first six months of 1886 almost equals the total product for 1885. The figures are as follows: 1886—January, \$100,800; February, \$110,700; March, \$145,000; April, \$146,000; May, \$146,500; June, \$159,800; total, \$808,300. Total for 1885, \$850,000. It will be noticed that the figures for the six months of 1886 represent a constant progression, June crowning the list with \$59,000 more than January and over \$13,000 more than in the month preceding. It is safe to predict that the present month will exceed June, and when the company's

new mill is completed and in operation, which will be in September, it is beyond estimate to what fabulous figure the product of this immense mine may reach. The saving per ton of ore in last month's work was about \$52.15. This, it is needless to point out, means very rich ore.

THE GLOSTER.—The output of the Boston and Montana Mining Company for June is approximated by Manager Child at \$50,000.

BULLION AT THE ASSAY OFFICE.—By the courtesy of Mr. Spruille Braden, assayer in charge, the Independent is able to state that the total value of gold and silver bullion deposited at the United States Assay Office, at Helena, for the fiscal year ending June 30, 1886, was \$1,160,820.21.

AFFAIRS OF THE ELKHORN.—The Elkhorn mine is still flooded on the lower levels, simply because the pumps got swamped. When the new pumps ordered from Butte are set up, the water blockade will be raised. In the meantime, there will be no shortage in the milling results, as there is enough ore available for a year's work, even after the five new stamps are set up and in operation. It is a great property, and helps to swell the volume of territorial production of the precious metals. The Granite Mountain Mining Company paid its 20th regular monthly dividend of 25 cents per share yesterday, aggregating \$100,000; amount paid this year to date, \$620,600.

#### NEW MEXICO.

SOCORRO.—Bullion, July 15: One day this week 60 carloads of ore and material arrived for the Billing Works and Graphic smelter of this city. Eighteen carloads of ore passed Socorro on last Saturday consigned to Pueblo and Denver. This will satisfy the owners' ambition, and the balance will come to our Socorro plants. The output of gold from the mines at Golden is encouraging. Last Saturday Col. Webb, of Santa Fe, received the result of a three days' run of the Webb & Fish mill, which netted \$1550. Last week D. Langsdorf and J. Kelly made an important strike of high-grade argentiferous copper carrying gold, in their Quartzite mine of Water Canyon district. They will commence to ship ore on the 20th inst., and intend to follow this consignment at regular intervals. M. W. Bremen is pounding away at his amalgamating mill at Silver City, each stamp disposing of about five tons of ore per day. His improved machinery is working elegantly, and instead of having tailings containing, as heretofore, from eight to nine ounces, they do not exceed two ounces. There are at present 50,000 tons of ore in sight in the Graphic mine. The Graphic blew in the 80-ton stack on the 8th inst., and on Friday the 25-ton stack. The gold discovery creates intense excitement in Socorro, and mining men are arriving at Ruby camp from all directions. Nos. 2 and 3 stacks of the Billing smelter, with a capacity of 160 tons, are working under full blast. No. 1 will blow in shortly. Judge Keeney got over 30 colors of gold by washing one ounce of the Ruby gangue rock, in which no mineral was visible by the aid of a powerful mineral glass. The managers of the Flagler Reduction Works at Silver City are feeling very much encouraged. They have large quantities of ore on hand and in sight. Their matting furnace is nearly ready to blow in, and in a short time both it and the chloridizing furnace will be worked to their full capacity.

NOTES.—Socorro Bullion, July 15: Posey and Joyce are preparing to improve their Granger claim in Water canyon. The Homestake mine at Kingston, on the North Percha, is bonded for \$11,000. The Maggie Merchant and the General Canby are being worked in Water canyon. A rich company are about to commence extensive operations at Gold Hill, Grant county, N. M. T. H. Zeigler is delving systematically in his Index claim in Water canyon, with fine prospects ahead. When the price of bar silver, 1000 fine, in New York, is 97½, it is about 32 cents per ounce less than the assay value of that metal. The Magdalena Queen, an extension north of the Ruby, makes a fine showing of rich argentiferous lead ore. The property is owned by Gochenauer, Woodyard and C. T. Brown. It is not at all impossible that the Ruby lead traverses it. Millette is working in his incline on the lead lode. This claim is situated about 800 feet below the Ruby strike. He thinks he will have pay ore in a short time; he is sinking on precisely the same character of formation as found on the Ruby mine. Not over \$100,000 has been spent on the east slope of the Magdalena range in mining development. This is less than was expended in the Kelly alone, in exploring and opening up that property. Of this amount \$72,700 was expended in Water canyon.

#### UTAH.

REVIEW.—Salt Lake Tribune, July 19: The receipts of ore and bullion in this city for the week ending July 14th inclusive were \$190,745.90, of which \$73,572.98 was ore and \$117,172.92 was bullion. The previous week the receipts of ore were \$110,349.63; of bullion, \$152,663.48; a total of \$263,013.11. The product of the Ontario for the week was 20,782.14 ounces of fine bullion; ore sales, \$16,331.90. The daily output for the week was seven bars of bullion, \$9358.71; no ore sales. Base bullion receipts of the week, \$22,200; fine bars, \$30,200. The Hanauer smelter product for the week was \$27,215 in bullion; the Germania's, \$25,110.10. Ore receipts of the week were as follows: By Wells, Fargo & Co., \$26,513; by McCormick & Co., (including \$2485 Queen of the Hills and \$13,411 Crescent), \$36,171; by T. R. Jones & Co., \$10,888.98.

#### WASHINGTON.

COLVILLE.—Stephens Reporter, July 17: We learn that Mr. T. D. Fuller, one of the first prospectors of this camp, has struck a rich lead of ore on the headwaters of Deep creek, right east of the Old Dominion mountain, at the fountainhead of the Little Pend d'Oreille. The ore is what is called silver glance, and there is uncovered about five feet of actual mineral, and it will assay about \$300 per ton. On the north fork of Mill creek, Mr. Joseph Adams has discovered another rich lead of mineral, in which Mr. Fuller is interested. It is called by the classic name of Jump-off-Joe, and is in a district called Hog Em. This strike is galena and carbonates, and is about 12 miles from Colville,



# DAMAGED BY FIRE!

## Engines, Boilers, Wood and Iron Working Machinery, Belting, Etc.

### FOR SALE CHEAP!

The fire which destroyed our building, Nos. 25 to 31 Main Street, on the 20th of June, will have no effect on our business.

We have already secured one of the stores in the magnificent Donahue Block, Nos. 34 and 36 Fremont Street, near Market, the finest in the city.

We have removed our Machine Shop to Nos. 225 and 227 Beale Street, and are now in full blast.

Our Oil Warehouse is located at 519 Front Street.

Our Oregon Branch is still at 91 and 93 Front Street, Portland.

Constant arrivals of new stock will enable us to supply our customers with everything of the latest and best description.

In addition, we shall have all of our old stock of Machinery, much of which had just come in, removed from the burnt building to our new store, where we shall be able to offer it at **EXTREMELY LOW PRICES.**

When the fire occurred, we had, fortunately, finished shipping the mammoth mills for La Trinidad and Silver Queen Mines, of Mexico, and the 20-Stamp Mill for the Buchanan Mine, of Tuolumne.

Notwithstanding our fire, the Pacific Lumber Company, of Humboldt, awarded us the contract for their new mill over all competitors, preferring to wait till our New Shop was ready rather than get their Machinery elsewhere, though they are in a great hurry. We consider their action conclusive evidence of the superiority of our Machinery, as they are determined to have the finest mill on the Coast.

Our New Concentric Set Works and Headblocks, and the Sinker, Davis & Co. Band Log Mill, which we recently furnished the Humboldt Lumber Company, of Humboldt, are pronounced by them superior to any ever seen in Humboldt.

We are now at work on nine Headblocks for Pope & Talbot Mills on the Sound.

From the above facts, it would appear that we stand fire pretty well, and if our patrons will kindly continue to favor us with their valuable business, we will do our best to excel our former efforts.

## TATUM & BOWEN, San Francisco and Portland.



SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS!

### SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

**BEST SOFT LAKE SUPERIOR COPPER USED.**

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.**  
**E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

## CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

### Sporting, Cannon, Mining, Blasting and

## HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

**No. 1 (XX) is the Strongest Explosive Known.**  
**No. 2 is superior to any powder of that grade.**

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street - - San Francisco, Cal.

THE CONSUMERS' COMPANY.

## VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

**SUPERIOR TO BLACK OR JUDSON POWDER.**

**Vulcan Nos. 1, 2 and 3,**

The Best NITRO-GLYCERINE POWDERS Manufactured.

**SPECIAL INDUCEMENTS IN PRICES.**

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**

218 California Street, San Francisco, Cal.



## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

**GIANT POWDER or DYNAMITE,**  
 Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

**JUDSON POWDER IMPROVED.**

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

**BANDMANN, NIELSEN & CO.,**

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

## H. P. GREGORY & CO.

Nos. 2 and 4 California St., - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

# MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING MACHINERY.

FRANK & CO.'S WOODWORKING MACHINERY.

NEW HAVEN MANUF'G CO.'S MACHINISTS' TOOLS.

BEMENT & SON'S MACHINISTS' TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND EXHAUSTS.

SHIMER MATCHER HEADS.

BRAINARD MILLING MACHINES.

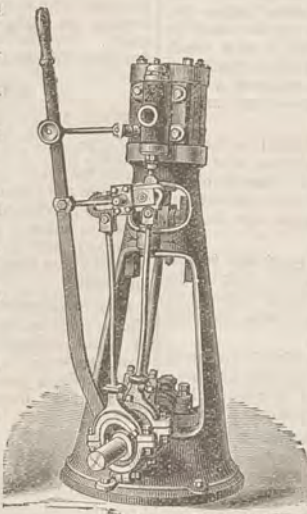
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISHERS.



WILLIAMSON'S BROS' HOISTING ENGINES.

ATLAS ENGINE WORKS ENGINES AND BOILERS.

PAYNE'S VERTICAL AND HORIZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECTORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

YACHT ENGINES.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

DEWEY & CO., { No. 252 MARKET ST. } PATENT AGENTS,  
 { Elevator 12 Front St. }



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.  
MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.  
UTAH OFFICE—SALT LAKE CITY, UTAH.

Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,  
JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

## Metallurgy and Ores.

**SELBY  
SMELTING and LEAD CO.,**

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY  
And Assay Office.

Highest Prices Paid for Gold, Silver and  
Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,  
LEAD PIPE,  
SHEET LEAD,  
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,  
Under Chamberlin Patent.

**JOHN TAYLOR & CO.,**

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco.

We would call the attention of Assayers, Chemists,  
Mining Companies, Milling Companies, Prospectors, etc.,  
to our full stock of Balances, Furnaces, Muffles, Crucibles,  
Scorifiers, etc., including, also, a full stock of  
Chemicals.

Having been engaged in furnishing these supplies since  
the first discovery of mines on the Pacific Coast, we feel  
confident from our experience we can well suit the de-  
mand for these goods, both as to quality and price. Our  
New Illustrated Catalogue, with prices, will be sent on  
application.

Our Gold and Silver Tables, showing the value per  
ounce Troy at different degrees of fineness, and valuable  
tables for computation of assays in grains and grammes,  
will be sent free upon application. Agents for the Patent  
Plumbago Crucible Co., London, England. Also for E.  
G. DENNISTON'S Silver Plated Amalgam Plates. The  
plates of this well-known manufacturer are thoroughly  
reliable, and full weight of Silver guaranteed. Orders  
taken at his lowest prices.

JOHN TAYLOR & CO.

**Nevada Metallurgical Works.**

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869.

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the  
most suitable Process for Working Ores.

Special attention paid to Examinations of  
Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

**THOMAS PRICE'S**

ASSAY OFFICE,

CHEMICAL

LABORATORY

Bullion Rooms and Ore Floors

No. 524 Sacramento Street,  
San Francisco.

J. KUSTEL. H. KUSTEL.  
★ **METALLURGICAL WORKS,**  
318 Pine St. (Basement),  
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my  
Process.  
Assaying and Analysis of Ores, Minerals and Waters.  
Mines Examined and Reported on.  
Practical Instruction given Treating Ores by im-  
proved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

C. H. AARON,

ASSAYER AND METALLURGIST,

NOGALES, ARIZONA,

Will attend to business in connection with mines in So-  
nora or Arizona.

WM. D. JOHNSTON,

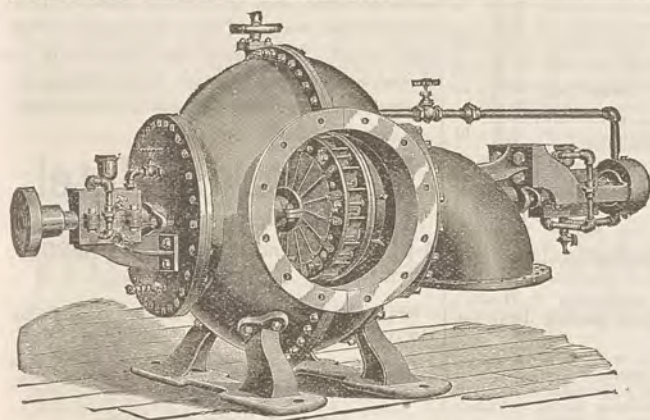
ASSAYER AND ANALYTICAL CHEMIST.

515 California Street,

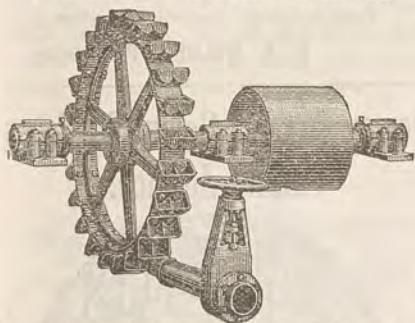
Bet. Montgomery and Kearny, SAN FRANCISCO.

ASSAYING TAUGHT.

Personal attention insures Correct Returns.



## PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED  
by the Idaho Company at Grass Valley, Cal., and  
gave 90 2 per cent., distancing all competitors. Send for  
Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street  
San Francisco, Cal.

**N. W. SPAULDING  
SAW COMPANY**

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

**Saws.**

SAW MILLS AND MACHINERY  
Of all kinds made to order. Send for Descriptive Cata-  
logue. 17 and 19 Fremont St., San Francisco.

NATIONAL ASSURANCE CO.,  
OF IRELAND.

ATLAS ASSURANCE COMP'Y,  
OF LONDON.

BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.

H. M. NEWHALL & CO.,

GENERAL AGENTS,

309 & 311 Sansome St., San Francisco, Cal.

## THE SCIENTIFIC PORTABLE FORGE



AND  
BLACKSMITH HAND BLOWERS.

GUARANTEED

The Lightest Running! The Strongest Blast!  
The Most Durable!

ADAPTED TO ALL KINDS OF WORK,  
Send for Catalogue! AND MADE IN STYLES AND SIZES TO SUIT.

THE FOOS MANUFACTURING CO., - - Springfield, Ohio



## ADAMANTINE Shoes, Dies and Crusher Plates

We manufacture the above Adamantine  
Shoes, Dies and Crusher Plates. They are in  
use on the hardest quartz in the United States  
and South and Central America, and have been  
for the last ten years; we warrant them to out-  
wear three (3) sets made of any other metal, and many report that they last from 4 to 8 times  
longer than any other make. They never break AT THE SHANK, and the wear is so light  
that little or no foreign matter gets mixed with the crushed ore.

Also CHROME CAST STEEL for Mining and General Use, of the finest quality.  
For further particulars, address

**CHROME STEEL WORKS,**

H. D. MORRIS, Agent, 22 Fremont St., San Francisco.

When ordering, a rough sketch, with full dimensions, is all that is necessary.

## CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

**STEIGER & KERR, Occidental Foundry,**

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.



## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey &amp; Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY &amp; Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING JULY 13, 1886.

- 345,404.—CHECK REIN ATTACHMENT—C. L. Bard, San Buenaventura, Cal.  
 345,567.—PIPE WRENCH—S. J. Benson, Boulder Creek, Cal.  
 345,280.—HEAT REGULATOR FOR INCUBATORS—L. H. Cutting, Stockton, Cal.  
 345,371.—TWO-WHEELED VEHICLE—S. P. Davis, Napa, Cal.  
 345,373.—ANIMAL EXTERMINATOR—H. Esborn, Petaluma, Cal.  
 345,385.—EXPANDING DRILL-BIT—C. C. Lane, S. F.  
 345,388.—SAW GUMMER—S. R. Mathewson, Porterville, Cal.  
 345,391.—STEAM COOKER—D. D. Mounts, S. F.  
 345,395.—BARREL-TILTING DEVICE—Potter & Gomez, S. F.  
 345,396.—KEY-HOLE GUARD—Katy Rumetsch, S. F.  
 345,333.—STEAM GENERATOR—J. E. Taylor, Walla Walla, W. T.  
 345,461.—CANDLESTICK—Samuel Tyrell, Grass Valley, Cal.  
 345,345.—GOPHER TRAP—John Weichhart, S. F.
- NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

## Mining Share Market.

Mining stocks have been more or less active this week, though there has been no actual advance in prices. The election of the Savage Mining Company insures an active management for the year, and important explorations have been projected. The west face of the station for the 3200 level from the Combination shaft, which was promptly stopped when the good ore vein was struck, will now be as promptly developed by straightforward advancement. A new drill hole in Potosi to exploringly crosscut the heavy ore vein found to exist to the east on the 3100 level, has been started, and more will be known regarding this good ore vein very shortly.

The north lateral drift from the Combination shaft 3200 station, to connect with the deep winze of the Hale and Norcross, on that level, is being energetically pushed ahead, and is now into Hale and Norcross ground. About 100 feet remains to be excavated to make connections with the drift south from the deep winze.

The work at the Osbiston shaft is confined to the preparations for deeper sinking. The rumored ore strike in Ophir, unfortunately, is officially pronounced to be a false alarm. The low-grade ore bonanzas of the Consolidated California and Virginia and in Yellow Jacket, Crown Point and Belcher, continue their regular yield.

It is stated that John W. Mackay will take position as superintendent of the north end mines, in place of W. H. Patton, who will go off on a vacation for two or three months.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Argus, July 17, \$7000; Martin White, 17, \$5900; Odessa mill, 18, \$6800; Oro Grande mill, 18, \$6359; Barbers mill, 18, \$6000; Hanauer, 13, \$904; Crescent, 14, \$3881; Germania, 14, \$8125; Hanauer, 15, \$5625; Germania, 16, \$1861; Hanauer, 16, \$2970; Queen of the Hills, 16, \$1335; Hanauer, 18, \$6200; Pascoe, 18, \$1365; Queen of the Hills, 18, \$1490; Alice, 20, \$14,530; Germania, 20, \$3805; Hanauer, 20, \$8950; Stormont, 18, \$3350; Queen of the Hills, 20, \$1350. Through Wells, Fargo & Co., Salt Lake, last week, \$78,913; McCormick & Co., \$53,386; T. R. Jones & Co., \$35,999; and Union bank, \$12,447.

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
 G. W. INGALLS—Arizona.  
 E. L. RICHARDS—San Diego Co.  
 E. G. HUSTON—Idaho and Montana.  
 GEO. McDOWELL—San Luis Obispo and Santa Clara Co's  
 FRANK W. SMITH—Idaho and Montana.

THE more misfit institutions, the better for Muller, the Optician, 135 Montgomery St., x

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.									
COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DEBITANT.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Belmont M Co.	Nevada.	40.	10.	Apr 30.	July 8.	Aug 3.	J. W. Pew.	310 Pine St	Montgomery
Bodie Tunnel & M Co.	California.	13.	25.	May 28.	July 6.	July 26.	C. C. Harvey.	309 California St	Montgomery
Bodie Con M Co.	California.	5.	50.	June 21.	July 26.	Aug 16.	G. W. Sessions.	309 Montgomery St	Montgomery
Best & Belcher M Co.	Nevada.	34.	50.	June 14.	July 20.	Aug 9.	W. Willis.	309 Montgomery St	327 Pine St
Con Amador M Co.	California.	13.	50.	June 14.	July 20.	Aug 31.	F. B. Latham.	309 Montgomery St	Montgomery
Crocker M Co.	Arizona.	3.	20.	May 25.	July 6.	July 28.	A. Waterman.	309 Montgomery St	419 California St
Dundley M Co.	California.	12.	25.	June 21.	July 27.	Aug 16.	J. Stadler Jr.	309 Montgomery St	Phe an Block
Golden Fleece G M Co.	California.	5.	20.	May 23.	July 31.	Aug 21.	W. J. Gleason.	309 Montgomery St	Montgomery
Gould & Curry S M Co.	Nevada.	53.	50.	June 21.	July 26.	Aug 17.	A. K. Durbrow.	309 Montgomery St	Montgomery
Mexican M Co.	Nevada.	32.	25.	June 17.	July 23.	Aug 12.	C. E. Elliott.	328 Montgomery St	Montgomery
Mayflower Gravel M Co.	California.	31.	25.	July 1.	Aug 9.	Aug 31.	J. Morizio.	339 Montgomery St	Montgomery
North Peer M Co.	Arizona.	3.	25.	May 19.	June 24.	July 19.	H. Deas.	339 Montgomery St	Montgomery
Ophir S M Co.	Nevada.	61.	25.	June 7.	July 13.	Aug 2.	E. B. Holmes.	339 Montgomery St	Montgomery
Potosi M Co.	Nevada.	24.	30.	June 25.	July 25.	Aug 19.	C. E. Elliott.	309 Montgomery St	Montgomery
Savage M Co.	Nevada.	66.	30.	June 17.	July 20.	Aug 9.	E. B. Hines.	309 Montgomery St	Montgomery

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Benton Con M Co.	California.	W. H. Watson.	332 Montgomery St.	Annual.	July 28
Lady Washington Con M Co.	Nevada.	W. H. Watson.	332 Montgomery St.	Annual.	July 28
Loreto M & M Co.	Mexico.	O. T. Bridge.	234 California St.	Annual.	Aug 5
McMillan M Co.	Arizona.	J. Morizio.	328 Montgomery St.	Annual.	Aug 4
New York Hill M Co.	California.	J. B. Leighton.	313 Montgomery St.	Annual.	July 29

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Holmes M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	25.	Mar 20
Mono M Co.	California.	G. W. Sessions.	309 Montgomery St.	25.	Mar 10
Silver King M Co.	California.	J. Nash.	328 Montgomery St.	25.	July 15
Young America M Co.	California.			40.	May 20

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING July 1.	WEEK ENDING July 8.	WEEK ENDING July 15.	WEEK ENDING July 22.			
Alpha.	.85	.95	1.00	.95	1.00	.75	.90
Alta.	.45	.55	.45	.55	.70	.60	.75
Andes.	.45	.35			.35	.40	
Argenta.							
Belcher.		1.25			1.20	1.25	
Belting.							
Best & Belcher.	.90	1.30	1.20	1.30	1.00	1.25	1.60
Bullion.	.25	.30		.40	.40	.40	
Bonanza King.							
Belle Isle.							1.10
Bodie Con.	1.45	1.55	1.40	1.55	1.40	1.55	1.45
Benton.		.05	.65		.05	.10	.75
Bodie Tunnel.							
Bulwer.	.85	1.35	.70	1.05	.70	.75	.95
California.	1.30	1.45	1.40	1.55	1.30	1.60	1.40
Challenge.		.40	.40		.40		
Champion.							
Chollar.	1.00	1.25	1.45	2.25	1.50	1.90	1.4
Confidence.		3.00		3.00	2.75	3.00	2.60
Con. Imperial.		.05					.15
Con. Virginia.	1.30	1.45	1.40	1.55	1.30	1.60	1.40
Con. Pacific.		.30					
Crown Point.	1.10	1.30	1.10	1.25	1.10	1.25	1.10
Day.							
Eureka Con.	3.00	3.50		3.00	2.50	3.30	3.05
Eureka Tunnel.							
Excelsior.	.20	.30	.25	.30	.25	.40	.20
Grand Prize.							
Gould & Curry.	1.05	1.65	1.30	1.60	1.05	1.40	1.15
Goodshaw.							
Hale & Norcross.	2.10	2.40	2.60	2.90	2.45	2.90	2.55
Holmes.		3.25	3.20	3.90		3.05	2.50
Independence.							
Julia.							
Justice.		.25	.30	.25	.35	.30	.45
Martin White.							
Mono.	1.90	1.90	2.00	1.90	2.00	1.95	2.10
Mexican.	.40	.50	.45	.60	.60	.70	.60
Mt. Diablo.		.25					
Northern Belle.	.70	.75	.70	.75	.70	1.15	.85
North Belle Isle.					.40		.50
Ophir.	.60	.80	.85	1.00	1.10	1.75	1.40
Overman.	.30	.40	.30	.35		.30	.25
Potosi.	.54	.65	.75	.90	.60	.85	.65
Pinal Con.							
Savage.	1.90	3.75	3.00	4.00	2.50	3.90	2.75
Seg. Belcher.							
Sierra Nevada.	.40	.75	.70	.90	.80	.90	.85
Silver Hill.							
Silver King.	7.75		.05	7.50		7.88	7.75
Scorpion.				.10	.10	.10	.10
Syndicate.		.15					.20
Tioga.							
Union Con.	.45	.55	.55	.60	.60	.80	.55
Utah.		.65	.60	.80	1.00	1.25	.55
Yellow Jacket.	1.25	1.40	1.30	1.55	1.35	1.65	1.25
							1.40

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., July 22.	750 Mexican.....	90@95c	
200 Alta.....	255 Mono.....	2.25@2.40	
100 Alpha.....	50 Navajo.....	.85c	
200 B. & Belcher.....	150 N. Belle Is.....	.50c	
1300 Bodie Con.....	2,775@2.85	1.60@1.65	
250 Bulwer.....	600 Overman.....	.25c	
100 Bullion.....	600 Potosi.....	85@90c	
1100 Chollar.....	2,250@2.35	3.40@3.75	
850 Con Va. & Cal.....	50 Sierra Nevada.....	.10c	
201 Crown Point.....	1,115	.90c	
200 Caledonia.....	10c	40 Silver Hill.....	.20c
100 Eureka (Con.).....	3.25	50 Syndicate.....	.20c
150 Gould & Curry.....	1,750@1.80	100 Utah.....	.20c
750 Hale & Nor.....	2,500@2.60	1000 Union Con.....	.70c
70 Jackson.....	1.65	80 Yellow Jacket.....	1.35

## New York Metal Market.

Telegraphic advices dated July 22d give the following New York prices:

BORAX—6½¢ @ 7½¢.  
 BAR SILVER—95½¢ per oz.  
 COPPER-LAKE—\$10.00 @ 10.50.  
 IRON—No. 1, \$17 @ 18.00; No. 2, \$15 @ 16.00.  
 LEAD—\$4.85 @ 4.95.  
 QUICKSILVER—43 @ 43½¢ lb.  
 The following is the latest by mail from the "New York Metal Exchange Market Report":  
 COPPER—Neglected; Lake offered at 9.90c @ 10.00c. Transferable Notices (Lake) offered at 10.00; Transferable Notices (Chili Bars) offered at 1.39 5/8.  
 LEAD—Steady at 4.85 @ 5.00c. Transferable Notices (Domestic) issued at 4.95.  
 TIN—Firm, closing at \$22.25 @ 22.40. Transferable Notices issued at \$22.45.  
 SILVER—New York, 96 per oz. London, 43½¢.  
 MAKER'S PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge, \$15.00 @ 16.00. Hudson River, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge \$15.00 @ 16.00. Southern, Grade No. 1, \$18.00 @ 18.50; No. 2, \$17 @ 17.50; Grey Forge \$15 @ 16.  
 Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers and sellers' views. All prompt delivery.—Australian Tin, \$22.30 @ 22.45; Biliton Tin, \$22.50 @ 22.80; Banca Tin, \$22.50 @ 22.80; Baltimore Copper, \$9.40 @ 9.75; Orford Copper, \$9.40 @ 9.75; P. S. C. Copper, \$9.40 @ 9.75; Foreign Lead, \$4.95 @ 5.05; Foreign Spelter, \$4.70 @ 4.80.

## San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, July 22, 1886.	
ANTIMONY—French Star.	91 @
BORAX—San Bernardino.	— @ 8
Amargosa.	— @ 6½
IRON—Glengarnock ton.	— @ 22 50
Eglington, ton.	— @ 21 50
American Soft, ton.	23 00 @ 24 00
Oregon Pig, ton.	21 00 @ 22 00
Clippier Gap, Nos. 1 & 4.	22 00 @ 23 50
Clay Lane White.	22 50 @
Shells, No. 1.	23 50 @
Shells, English, lb.	15 @ 25
Black Diamond, ordinary sizes.	10 @
Plow.	4 @ 5
Machinery.	5 @ 6
Sanderson Bros.	10 @
COPPER—	
Brassers' sizes.	19 @
Fire-box sheels.	20 @
Bolt.	19 @
Sheathing.	18 @
LEAD—Pig.	4 50 @ 4 65
Bar.	54 @ 55
Pipe.	7 @
Sheet.	8 @
Shot, discount 10% on 50 lb. bag.	1 65 @
Buck, 8 lb bag.	1 85 @
Chilled, do.	2 05 @
ZINC—German.	9 @ 10
Sheet, 7x3 ft, 7 to 10 lb, less the cask.	73 @
QUICKSILVER—By the flask.	35 75 @ 36 00
Flasks, new.	1 05 @
Flasks, old.	85 @
TRIPLE—Coke.	5 55 @
Charcoal.	6 75 @

## Business College Graduates.

Following is a list of graduates of Heald's Business College for the year ending June 30, 1886:

W. B. Fielding, H. A. Long, T. W. Chandler, Miss Lulu Drinkhouse, James Simon, F. Brown, J. N. Russell, Miss Mary Carlson, Henry Hartman, J. Kullman, J. M. Brewer, G. P. Neppert, Miss Jennie Rice, Leo C. Williams, H. S. Pelton, Walter R. Lovegrove, C. Westerfield, A. C. Pistolesi, John Hennings, R. C. Rosenberg, John G. Shannon, S. Walter, H. W. Appianus, David Thomas, Chas. K. Kirby, W. F. Pollak, Edward C. Doyle, Frank J. Walzman, F. R. Capp, C. H. Poujol, W. Cordozo, A. N. Aitken, A. Garat, C. L. Quast, San Francisco; Miss A. A. Heimbald, Wm. Martin, S. H. Wheeler, R. D. McKenzie, T. A. Kilgore, G. S. Wheaton, Geo. E. Perkins, Geo. Stetson, E. C. Hyde, Eva M. Wardwell, Oakland; Samuel Messick, Miss Winnie Morris, Alameda; Paul Brown, Wm. Swank, John Swank, Marysville; Geo. Mundorf, A. H. Booker, Sonora; Chas. A. Grissel, Geo. H. Kohler, Washington; R. S. Kirtick, A. B. Birmingham, Strawberry Valley; Jas. P. Fincher, Modesto; J. W. Flaherty, Boca; C. T. Lindsey, Visalia; F. W. Stickey, Little River; J. T. Howell, Merced; H. T. Wall, Healdsburg; F. E. Kimball, Seminary Park; A. B. Knowles, Ocean View; F. Worrell, St. Helena; J. W. Gibson, Woodland; B. T. Thomas, Amador City; W. L. Jones, Vallejo; Edwin Jones, Nortonville; W. C. DeNise, Cambria; J. T. Ward, Red Bluff; V. E. Pena, Vacaville; F. M. Strickland, Madison; E. McFadden, Dixon; John Murphy, Iowa Hill; Fred. A. Otto, Susanville; James R. Dailey, Folsom; Dennis Desmond, Blair; Miss Kate Schafer, Gilroy; H. J. Patterson, Colusa; H. L. Guero, Santa Rosa; C. J. Swithenbank, Garberville; Alfred E. Thomas, Alcatraz Island; J. R. Jameson, Sumner; Chas. M. Wiggins, Ferndale; Thos. W. Lynch, Honcut; Jas. W. Hyatt, Emigrant Gap; Frank W. Kerrigan, San Andreas; L. L. Compton, Princeton; W. F. Eschbacher, Downville; E. B. Ball, Bonville; F. L. White, L. E. Lee, Reno, Nev.; John Barrett, W. F. Hartman, O. F. Werner, Empire City, Nev.; Geo. E. Melzner, Gold Hill, Nev.; W. F. Aplin, Little York, Nev.; Edward R. Dailey, Hamilton, Nev.; Jas. E. Gale, Wells, Nev.; H. L. Stokes, Aug. Hildebrand, Astoria, Or.; E. Rackleff, Myrtle Point, Or.; N. K. Frazer, Pendleton, Or.; W. O. Van Schuyver, Portland, Or.; D. G. Beale, Empire City, Or.; E. Keating Strobbler, Haywards, O.; Wm. J. Martz, LeRoy, Minn.; Max Peters, New York; B. R. McDonald, New Westminster, B. C.; M. P. Morales, Guatemala, C. A.; E. Ullos, Paris, France.

## Haywards Hotel.

We take pleasure in calling attention to this well and favorably known resort. It has been long established and popular. The locality is elevated and healthy, the surroundings pleasant in the midst of the fruit region of Alameda county. The table will be found supplied with the best in the market, and the proprietor intends to spare no pains in making his house a pleasant and popular home for tourists and pleasure-seekers. Further particulars will be seen in the advertisement in this paper. San Franciscans and Oaklanders find it a very convenient and delightful place to tarry.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

**HEALD'S BUSINESS COLLEGE,**  
 24 Post St. S. F.  
 Send for Circular.

## Inducements to Subscribers.

To favor subscribers to this paper, and to induce new patrons to try our publication, we will furnish, to those who pay fully one year in advance of date, if requested, the following articles (while this notice continues) at the very greatly reduced figures named at the right:

- 2.—World's Cyclopedia, 794 pages, 1200 illustrations (exceedingly valuable). \$0.50
- 3.—Dewey's Patent Elastic Binder (cloth cover), name of this paper stamped in gilt. .50
- 6.—To New Subscribers, 12 select back Nos. of this paper. Free
- 7.—Any of Harper's, Frank Leslie's and most other first-class U. S. periodicals, 15 per ct. off regular rates.
- 9.—Pacific Coast and Eastern Dailies, Books and Periodicals, except special publications, we can usually give 10 to 15 per cent off advertised retail rates.
- 10.—Picturesque Arizona, 380 pages, in cloth and gilt. .25
- 11.—Californian, 100 pages, Magazine, 1880 to 1882 (3 Vols.) single Nos. .03
- Per volume, unbound, 5 Vols. .20
- Per volume, bound, cloth back and stiff paper sides, about 600 pages. (Send two-cent stamp for sample). .40
- 14.—Dewey's Pat. Newspaper Fileholder (18 to 36 in.). .25
- 15.—Life among the Apaches, 322 pages, stiff cloth. .15
- 17.—Architecture Simplified, 60 pages. .25
- Webster's Dictionary, 634 pages, with 1500 illustrations; very handy and reliable. .50
- De Groot's History of Mining in California, 16 pages. .05
- Beautiful Poetic Review, entertaining and instructive, 35 pages (a handsome and pleasing present). .25





**CALIFORNIA**  
**ARTIFICIAL STONE PAVING CO.**  
 (SCHILLINGER'S PATENT.)

FOR—  
 SIDEWALKS, GARDEN WALKS, CORRIDORS, OFFICES, CARRIAGE  
 DRIVES, STABLES and CELLAR FLOORS, KITCHENS, Etc.

The Courts here and in the East have decided that Artificial Stone Pavements with plastic concrete and in detached blocks, are infringements on the Schillinger Patent; and also, that when the plastic material is blocked off with a trowel and cut through far enough to control the cracking caused by shrinkage, that such pavement is in law the same as if laid in detached blocks, and is an infringement of the patent. All property-owners having such pavements laid without the license of the above Company, will be prosecuted.

OFFICE, 404 MONTGOMERY STREET, SAN FRANCISCO.

EGBERT JUDSON, President.

ALBERT H. REICHLING, Secretary.

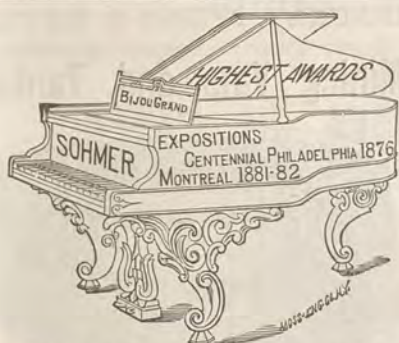
G. GOODMAN, Manager.

**THOMAS PRICE'S ASSAY OFFICE,**  
 524 SACRAMENTO STREET, SAN FRANCISCO.

**Working Tests of Ores by all Processes.**

SPECIAL ATTENTION PAID TO THE CONCENTRATION OF ORES.

**ORES SAMPLED and ASSAYED.**



**SOHMER & CO. PIANOS.**  
**PEEK & SON PIANOS.**  
 BYRON MAUZY,  
 SOLE AGENT,

922 Market Street, San Francisco, Cal.  
 SEND FOR CATALOGUE.

**THE RUSSELL PROCESS COMP'Y.**

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
 Room 709.

**ASSESSMENT NOTICE.**

**Gould & Curry Silver Mining Co.**  
 ASSESSMENT No. 53.

Levied..... June 21, 1886  
 Amount..... Fifty Cents per Share  
 Due in office..... July 26, 1886  
 Sale Day..... Tuesday, August 17, 1886

ALFRED K. DURBROW, Secretary.  
 Office—Room 69, Nevada Block, No. 300 Montgomery  
 Street, San Francisco, Cal.

**INVENTORS, TAKE NOTICE**

**L. PETERSON, MODEL MAKER,**  
 258 Market St., N. E. cor. Front (up stairs), San Francisco  
 Experimental machinery and all kinds of metal, tin  
 and Brasswork.



**THE BEST & SUREST**  
**ARKANSAW**  
**LIVER AND KIDNEY REMEDY**  
 UNCLE Sam has found it at last!  
 A sure remedy for Torpid Liver,  
 Sick Headache, Habitual Constipation,  
 Chills and Fever, and all affections of the  
 Kidneys and Liver. This is a New Com-  
 pound, and one trial will convince you  
 that it is the Cheapest and Best Remedy  
 in the Market for Diseases of Kidneys,  
 Liver and Stomach. If you want a pure  
 vegetable compound, that is positively  
 guaranteed to contain no mercury, go to  
 your Druggist, and get a Bottle of the  
 Arkansaw Liver and Kidney Remedy.  
 Price, \$1.00 per Bottle.

For Sale by all Druggists.

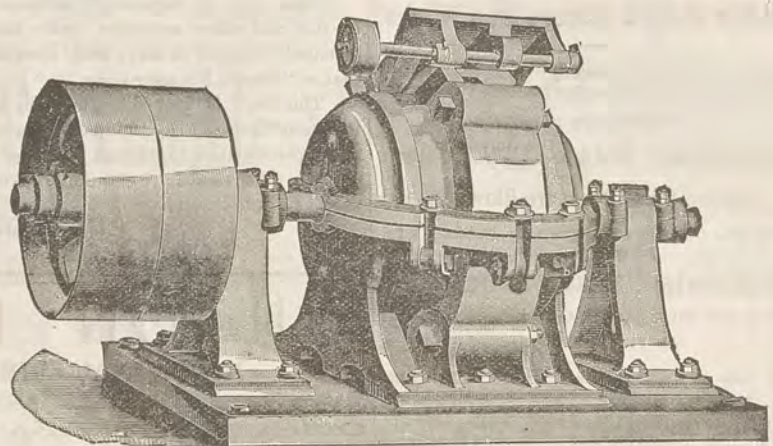
**THE GOLDEN GATE PLUG CLOSET.**



The only secure-locking device to keep sewer gas entirely  
 away from dwelling houses.

**JOSEPH BUDDER, Manufacturer, 43 Fremont Street,**  
 All kinds of Water Closets, Slop and Waste Hoppers  
 always on hand. Write for information.

**THE FRISBEE-LUCOP MILL,**



**A CENTRIFUGAL ROLLER MILL**

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or  
 other Mineral Substance to any degree of fine-  
 ness in a rapid and economical manner.

Any method of amalgamation may be applied.  
 At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh  
 dry, and from 3000 to 6000 pounds wet.  
 All wearing parts easily and cheaply replaced. May be seen in operation at the New York  
 Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.  
 Certificates as to performance of the Mills, and any information required, furnished on  
 application.

**THE FRISBEE-LUCOP MILL CO.,**

Office, 104 & 106 Washington St., NEW YORK.

OR PACIFIC IRON WORKS, SAN FRANCISCO.

L. C. MARSHUTZ.

G. T. CANTRELL.

**NATIONAL**  
**IRON WORKS,**

N. W. Cor. Main and Howard Sts.,  
 San Francisco,

...MANUFACTURERS OF...

**Stationary and Compound**  
**Engines,**

**FLOUR, SUGAR, SAW and QUARTZ**  
**MILL MACHINERY.**

**AMALGAMATING MACHINES.**

**CASTINGS and FORGINGS**

Of Every Description.

All Work Tested and Guaranteed!

**Improved Portable Hoisting Engines**

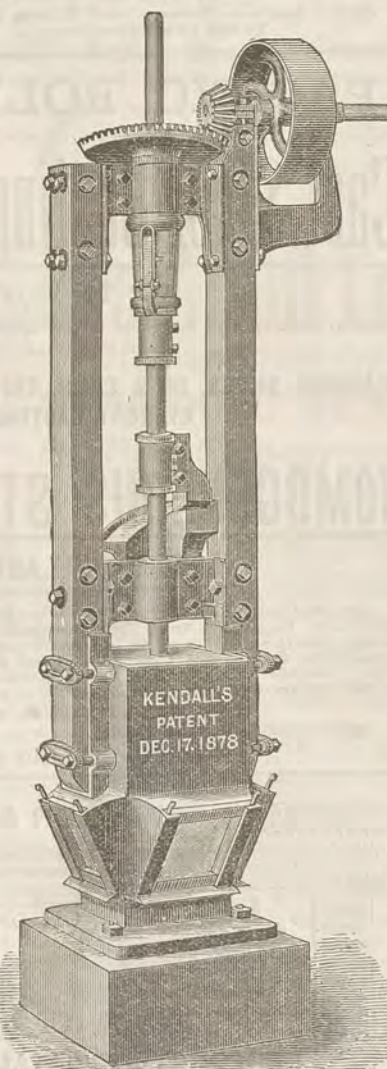
...SOLE MANUFACTURERS OF...

**KENDALL'S PATENT**  
**QUARTZ MILLS.**

Having renewed our contract on more advantageous  
 terms with Mr. S. Kendall for the manufacture of his Patent  
 Quartz Mill, we are now enabled to offer these mills at  
 GREATLY REDUCED PRICES. Having made and sold  
 these mills for the past five years, we know their merits,  
 and know that they have given perfect satisfaction to pur-  
 chasers, as numbers of commendatory testimonials prove.  
 We feel confident, therefore, that at the prices we are now  
 prepared to offer them, there is placed within the reach of  
 all a light, cheap, and durable mill that will do all that is  
 claimed for it and give entire satisfaction.

MARSHUTZ & CANTRELL.

Send for Circulars and Price List.



**RUPTURE!**

A New Invention! The "Perfection"  
 Belt Ties, with Universal Joint Move-  
 ment, and Self-adjusting Spiral Spring.  
 Worn with perfect comfort night and day  
 Gives universal satisfaction. Price, from  
 \$3 to \$6. Call or send for descriptive  
 circular. Address, J. H. WIDDER,  
 (Druggist) 701 Market Street, cor. Third,  
 San Francisco.



**A Good Opportunity for a Ma-  
 chinist.**

A variety of good Tools, Patterns, etc., with business  
 for sale cheap by a party retiring from business. A  
 splendid opportunity for an enterprising mechanic.  
 Address A. B. O., care of this paper.



## Iron and Machine Works.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S.F.

### California Brass Foundry,

No. 125 First Street, Opposite Minna.  
SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbit Metal Castings, Brass Ship Work of all kinds, Spikes Sheathing Nails, Rubber Braces, Hinges, Ship and Steam Boat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. **PRICES MODERATE.**

J. H. WEED.

V. KINGWELL.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

BUILDER OF

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines  
Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. **ORDERS SOLICITED.**

### UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

### STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,  
SACRAMENTO, CAL.



The California  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

### FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco

RICHARD C. REMMEY, Agent,

Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of  
all kinds of  
Chemical Stoneware  
—FOR—  
Manufacturing  
Chemists.  
Also Chemical Brick  
for Glover Tower.

### San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

811 and 813 Front St., San Francisco

### QUARTZ BREAKERS!

—AND—

Pulverizers Combined

To Run by Hand or Power.

Mining Machinery of Every Description; Drawings, Plans and Specifications.

E. I. NICHOLS, 316 Mission Street, S. F.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

## FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

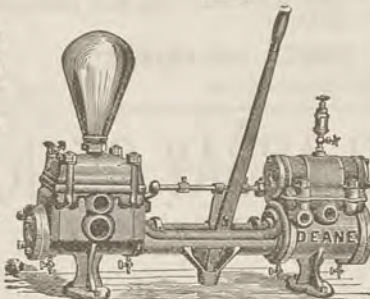
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

Deane Steam Pump.

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

—ALSO—

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

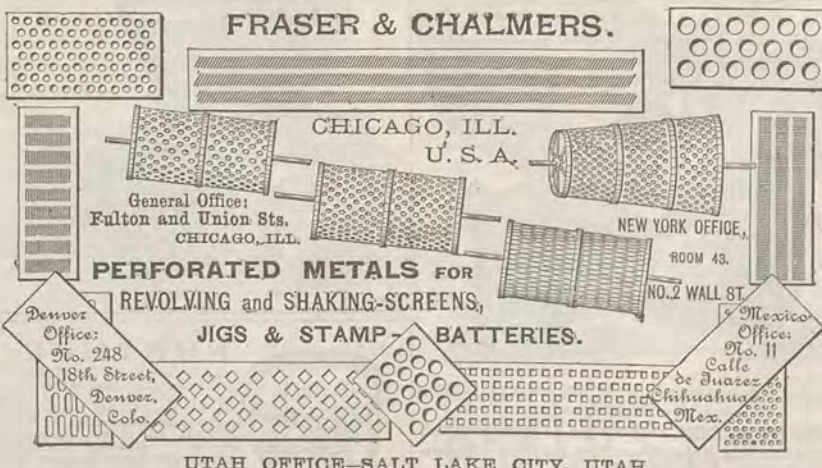
LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.



FRASER & CHALMERS.

CHICAGO, ILL.

U. S. A.

General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

NEW YORK OFFICE,

ROOM 43,

NO. 2 WALL ST.

PERFORATED METALS FOR

REVOLVING and SHAKING-SCREENS,

JIGS & STAMP-BATTERIES.

Denver  
Office:  
No. 248  
18th Street,  
Denver,  
Colo.

Mexico  
Office:  
No. 11  
Calle  
de Suarez  
Chihuahua,  
Mec.

UTAH OFFICE—SALT LAKE CITY, UTAH.

NOTICE TO  
MINING MEN,  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.

Engineers' Tables of Progress

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, etc., address:

INGERSOLL ROCK DRILL CO.,

REPRESENTED BY

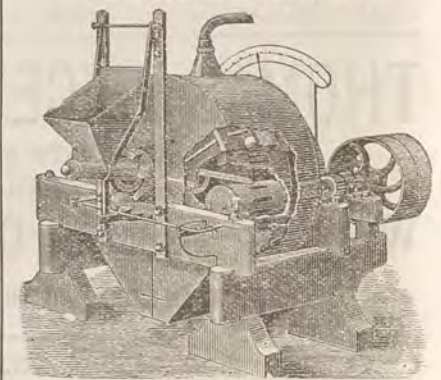
BERRY & PLACE MACHINE CO.

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

## Tustin's Pulverizer WORKS ORE WET OR DRY

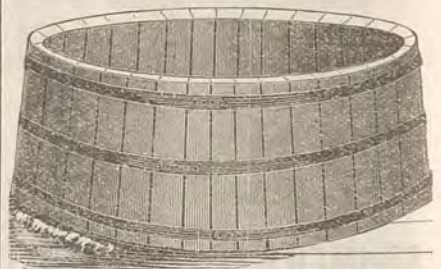
FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLEY, SPIERS & HAYES,

Mining Vats and Tanks.



LEACHING VATS with FALSE BOTTOMS.

PRECIPITATING VATS,

SOLUTION and WATER TANKS

For Mining Purposes.

WELLS, RUSSELL & CO.,

Mechanics' Mills, San Francisco.

## American Exchange Hotel,

SANSOME STREET,

Opposite Wells, Fargo & Co.'s Express, one door from  
Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50  
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

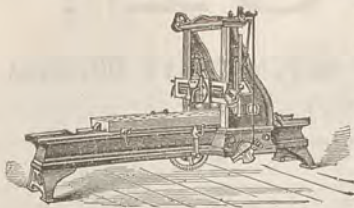
This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorsey, 529 Commercial St., S. F.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.

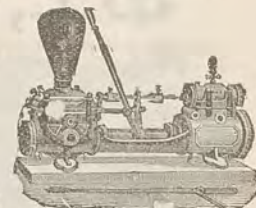


Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Knowles Steam Pump  
The Standard.

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.

# CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

## WIRE ROPE



Of all kinds, Flat and Round, any Sizes and  
Lengths, made from only the Best Material  
and in the most careful manner.



**WIRE** Of all kinds for Telegraph  
and Telephone purposes, Bal-  
ing Hay, and all purposes that wire can be put  
to. Brass and Copper—Galvanized.  
Annealed, Bright and Coppered Wire.

ASK  
YOUR  
DEALER  
FOR



TRADE MARK.

**Barbed Wire.**

Sole Licensees on the Pacific Coast for the manu-  
facture of Barbed Wire, Two and Four Point  
Wire and Flat Barbs.

**WIRE CLOTH.**

Brass, Copper, and Steel, all kinds, and meshes  
from 1 to 10,000 to the square inch, for Quartz  
Screens, Flour Mills, Gravel Screens, etc.

**WIRE FENCING**

Of various designs, for Storos, Banks, Asy-  
lums, Gardens, etc.

**WIRE GUARDS**

For the protection of Windows, Skylights,  
Prisons, etc., etc.

**WIRE RAILINGS**

For House Fronts, Window Sills, Stores  
Public Squares, etc.

**WROUGHT IRON**

Railing, Fencing, Crestings, Entrance  
Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.  
J. C. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

**STEAM, AIR, AND HYDRAULIC MACHINERY.**

**Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

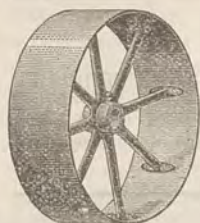
TRY OUR MAKE, CHEAPEST AND BEST IN USE.

## UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

**CLOT & MEESSE,**

Sole Licensed Manufacturers of the

**Medart Patent Wrought Rim Pulley**

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington  
Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and  
Best Balanced Pulley in the World. Also Manufacturers of

PAT. OCT. 25, 1881.

**SHAFTING, HANGERS AND APPURTENANCES.**

Nos. 129 & 131 Fremont Street,

San Francisco, Cal.

## THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

**MACHINERY AND CASTINGS**

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS  
LOGGING, PORTABLE, STATIONARY, MARINE  
AND LOCOMOTIVE ENGINES,

**AG'TS DYER CANNON BALL QUARTZ MILL**

222 & 224 FREMONT STREET, SAN FRANCISCO.

## CINCINNATI CORRUGATING COMPANY.

JOHN F. HAZEN, Pres't.

JAMES HICKS, Treas.

J. G. BATTELLE, Sec'y.

## Over 1500 Tons Iron in Stock!

FOUR WIDTHS OF CORRUGATIONS MADE!  
**STANDING SEAM PLAIN ROOFING!**  
**All Paint Re-ground in Pure Linseed Oil!**



Chicago Prices Beaten!

ESTABLISHED 1860.

**S. F. PIONEER SCREEN WORKS,**

221 & 223 First St., cor. Tehama, S. F.

**J. W. QUICK, Prop'r.**

Sheet Metals of all kinds perforated for Flour and  
Rice Mills, Grain and Malt Driers, Furnaces, Chases, Ce-  
ment and Smut Mills, Separators, Revolving and Shot  
Screens, Stamp Batteries and all kinds of Mining and Mill-  
ing Machinery. Inventor and manufacturer of the celebrated  
Slot Cut and Slot Punched Screens. Mining Screens a  
Specialty, from 1 to 15 (fine).  
Orders Promptly Executed

## JENKINS PATENT VALVES.

Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over all  
other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impos-  
sible to make them tight except by regrinding, which is expensive if done by hand, and if done  
by machine soon wears out the valve, and in most cases they have to be disconnected from  
the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is  
manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited.  
To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by  
DUNHAM, CARRIGAN & CO., San Francisco, Cal.

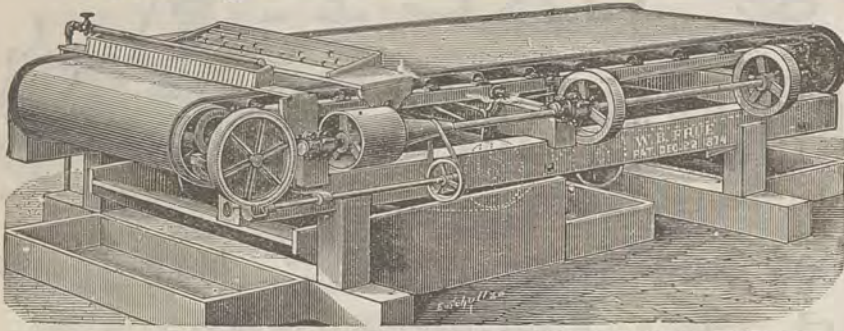


## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of ref-  
erences. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS.**  
(\$575 00), F. O. B.

**OVER 1,000 ARE NOW IN USE.** Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement. The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them. Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1885. Patents applied for. N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

**ADAMS & CARTER, Agents Frue Vanning Machine Co.,**

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

**GET THE BEST.**

## The BARAGWANATH STEAM JACKET FEED WATER HEATER AND PURIFIER.

Adapted to High & Low Pressure Engines.  
**OVER 5000 IN USE.**

The advantages of this Heater, briefly stated, are as follows: It loses no heat by radiation. That portion of the water chamber which in all other heaters is subject to the cooling action of the atmosphere is converted into a heating surface by the Steam Jacket. It has twice the heating surface of any other of equal size.

It delivers its water always above the boiling point, averaging from 215 degrees to 220 degrees. By boiling the water under pressure all impurities are thrown off.

It keeps the Boiler clean and free from scale, by which means a large saving in fuel is effected, as also a great saving in repairs, as well as the capacity of the Boiler largely increased.

It never causes any back pressure on the Engine, but acting as a surface condenser relieves any back pressure that may exist. Send for Circular.

A. P. BRAYTON, Jr.,  
Agent for the Pacific Coast.

PACIFIC IRON WORKS,  
127 First St., San Francisco, Cal.

**GET THE BEST.**

## THE BARAGWANATH HEATER.

WHAT IS SAID OF THEM BY  
PARTIES USING THEM.

"Heats water to 220 degs."

St. Louis, Mo., August 24, 1885.

Messrs. Wm. Baragwanath & Son, Chicago, Ill.—GENTLEMEN: We take pleasure to inform you that your Steam Jacket Feed-Water Heaters have given perfect satisfaction. We work the same in connection with three batteries of boilers, representing 650-horse power. They heat the water to 220° Fahr., and we warmly recommend them to all establishments using steam machinery. Yours truly,

ANHEUSER, BUSCH BREWING ASS'N.  
GEO. KRUMSICK.

WOODMAN LINSEED OIL WORKS,  
OMAHA, NEB., Dec. 21, 1885.

Messrs. Wm. Baragwanath & Son, Chicago, Ill.—GENTLEMEN: Your heater is working to our perfect satisfaction. Temperature of feed-water is 218° and purification is perfect. From all appearances the heater is in perfect condition. It has been in constant use for three years. Yours truly,

CLARK WOODMAN, Pres.

Wm. Baragwanath & Son—DEAR SIR: In answer to your favor of the 11th inst., we beg to state that we have purchased a large number of your Heaters for use of mining companies in the West and foreign parts. We have always received the highest possible testimonials regarding the operation of the Heater, and personally, we consider it equal to any Heater in the market, and give its use preference at all times. Yours truly,

FRASER & CHALMERS.

**GET THE BEST.**

## THE BARAGWANATH HEATER.

WHAT IS SAID OF THEM BY  
PARTIES USING THEM.

Saves a ton and a half of Coal per day.

F. MAYER & Co.,  
Manuf'rs Furniture, 300 to 341 S. Clinton St.,  
CHICAGO, August 23, 1880.

Mr. Baragwanath—DEAR SIR: We have been using your Steam Jacket Heater for several months, and find it fully up to your representations. It saves us about a ton and a half of coal per diem, and gives us a regular steam pressure. It works to our entire satisfaction in every respect. Yours respectfully,

F. MAYER & CO.

## PULLMAN PALACE CAR CO.

PULLMAN PALACE CAR WORKS,  
DETROIT, Mich., Feb. 25, 1882.

I beg to report the Steam Jacket Feed-Water Heater and Purifier, made by Baragwanath, of Chicago, has been in operation in our works for some time, and from careful test I find the heat of feed-water delivered from Heater 215 degs. Fahr. I do not find any visible back pressure on the engine. The engine had eight pounds of back pressure when working in connection with our old Heater. We save 30 per cent in fuel, and ONE FIREMAN. We have dryer and hotter exhaust for warming shops than before. I also find the Heater the best apparatus for removing scales I have ever seen.

CHARLES MERRY, Chief Engineer.

**GET THE BEST.**

## THE BARAGWANATH HEATER.

WHAT IS SAID OF THEM BY  
PARTIES USING THEM.

"Boiler Clean as Possible."

OFFICE OF CHAS. FIGLER,  
Manuf' of Flour, Feed and Meal,  
NEW AUBURN, MINN., March 11, 1882.

DEAR SIR: In response to your inquiry about the working of the Baragwanath Heater I bought of you last summer, would say it is the best Heater and Water Purifier to my knowledge. I would not be without it for twice its cost. My boiler is as clean and free from scales as it is possible to be, and I invite steam users contemplating to buy a Heater to come to my mills and examine mine before they buy elsewhere.

Respectfully yours, CHAS. FIGLER.

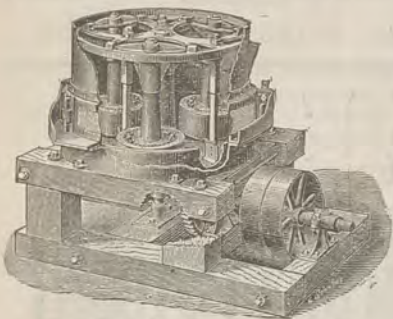
STANTON, MICH., March 17, 1881.

Wm. Baragwanath—DEAR SIR: After two years' use of the Heater, we can say your guarantee has been fully met. It delivers its water into the boiler at 217 Fahr., purifying it to a very great degree, and saving fully 20 per cent of fuel. No new scale has formed on the boiler since its use. It is a success, and the best Heater we have any knowledge of. Yours truly,

TURNER & REYNOLDS.  
October 30, 1885. Does all it ever did; never had a cent's repairs; know of nothing which equals it.—T. & R.

DETROIT LINSEED OIL COMPANY,  
DETROIT, Nov. 24, 1885.

Wm. Baragwanath & Son, Chicago—GENTLEMEN: We are using your Steam Jacket Heater and Purifier with great satisfaction, obtaining at all times the best results. Yours truly,  
SAML E. PITTMAN, Manager.



Centrifugal Roller Quartz Mill.

## F. A. HUNTINGTON,

MANUFACTURER OF

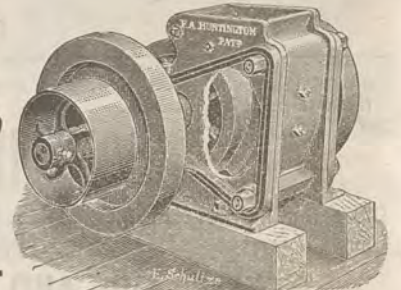
## Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,

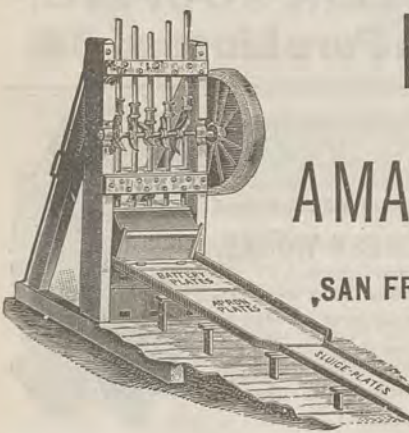
## Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.



## NOTICE TO MINING MEN! SILVER PLATED AMALGAMATING PLATES FOR SAVING GOLD!

Get our Prices before ordering elsewhere. Samples furnished on application.

SAN FRANCISCO NOVELTY AND PLATING COMPANY, Removed to 108 First St.

JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 & 523 Market St., San Francisco.

NOTICE TO MILL MEN.—All our plates are guaranteed to have the Full Weight of Silver agreed upon, and are all tested before leaving our Works, thereby avoiding the complaints about light-weight, made so often formerly before our starting in this branch of business. PLATES CAN BE FURNISHED AT ANY PRICE REQUIRED.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent

L. R. MEAD, Secretary.

## THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

**BUILDERS OF**

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. NOTE.—Have just completed order for 35 miles of 44-inch

pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube);

50,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship

Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain

Mining Company

Send for Circular and Price Lists.



# MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, JULY 31, 1886.

VOLUME LIII.  
Number 5.

## Temporary Steering Gear.

Capt. C. F. Swan, of this city, has devised a very simple and ingenious plan for steering a ship or steamer having a disabled rudder, and one which is so easily constructed that we have had engravings made to show the plan. It is not patented. The main feature is the method of securing the plank or drag to the steering lines or guys. A 16-inch plank, 16 feet long and 2½ inches thick, has iron bridle secured to it, one arm of the bridle being longer than the other. Then, when the strain comes by the motion of the vessel the plank is dragged at such an angle (the long arm being uppermost) that it submerges itself, no weight being necessary. The base inclines toward the ship, so the plank is kept down. The plank is veered astern by the guys. The inner ends of the guys are secured to the ends of a pivoted brace, and tackles led from these ends to the barrel of the wheel of the ship, so that it can be steered from the wheel.

The upper figure of the cuts shows the drag or temporary rudder towing directly astern, in line with the keel. The next figure shows it turned to one side, so as to swing the ship's head in the same direction. When the temporary rudder is swung to "port," it swings the ship's head to "port" and vice versa.

The bumpkin or spar projecting over the stern of the vessel is simply a matter of commerce, as the pivot could be put on the taffrail itself if necessary. In fact even the pivoted bar can be dispensed with, but it is more labor to use the device. The third, or lower engraving, shows, for instance, how the great steamer *Alaska* could have been steered when she lost her rudder, and they had so much difficulty managing the huge vessel. If they had rigged the bridled plank, the guys or steering lines could have been led to the quarters, and by slacking on one line and hauling on the other, the vessel could have been steered.

The faster the vessel goes the easier she will steer, as the drag is hauled down at an angle deep under water and gives resistance. It will not "tack" a ship because, as she comes in stays she slows up, and the drag rises to the surface. But it will "wear" a ship; that is, turn her from one tack to the other by running her off before the wind. Brace lines (shown in the upper figures) help strengthen the center of the plank.

If the ship is low in the water the guys or steering lines need not be very long, but if high out of water—say 25 or 30 feet—they should be 25 or 30 fathoms long. Capt. Swan used this steering gear on the *City of Brooklyn*, a 1700-ton ship, for two days without the slightest trouble. If the vessel goes slower than four knots an hour, the drag does not do as well, as it is apt to rise to the surface, where it is not so efficient. The gear used on the *City of Brooklyn* did not cost over \$100. The size of the drag should be in proportion to the vessel, but it should present a flat surface, as shown, and the bridle must be made as shown, to be effective. A large ocean steamer could have this gear ready at hand for use in case of accident to the rudder. It is the simplest device of a practical nature which has come to our notice.

ACCORDING to the *Merced Star* a talc mine has been discovered on J. W. Minges' farm on the Merced river. The material abounds in large quantities at the place of discovery.

A PACIFIC COAST CRUISER.—A Washington paper, devoted largely to army and navy matters, prints the following in regard to the new cruisers: "It has been suggested that one of the new vessels should be delivered to the Government at San Francisco by the contracting parties. This would give the builders in Cali-

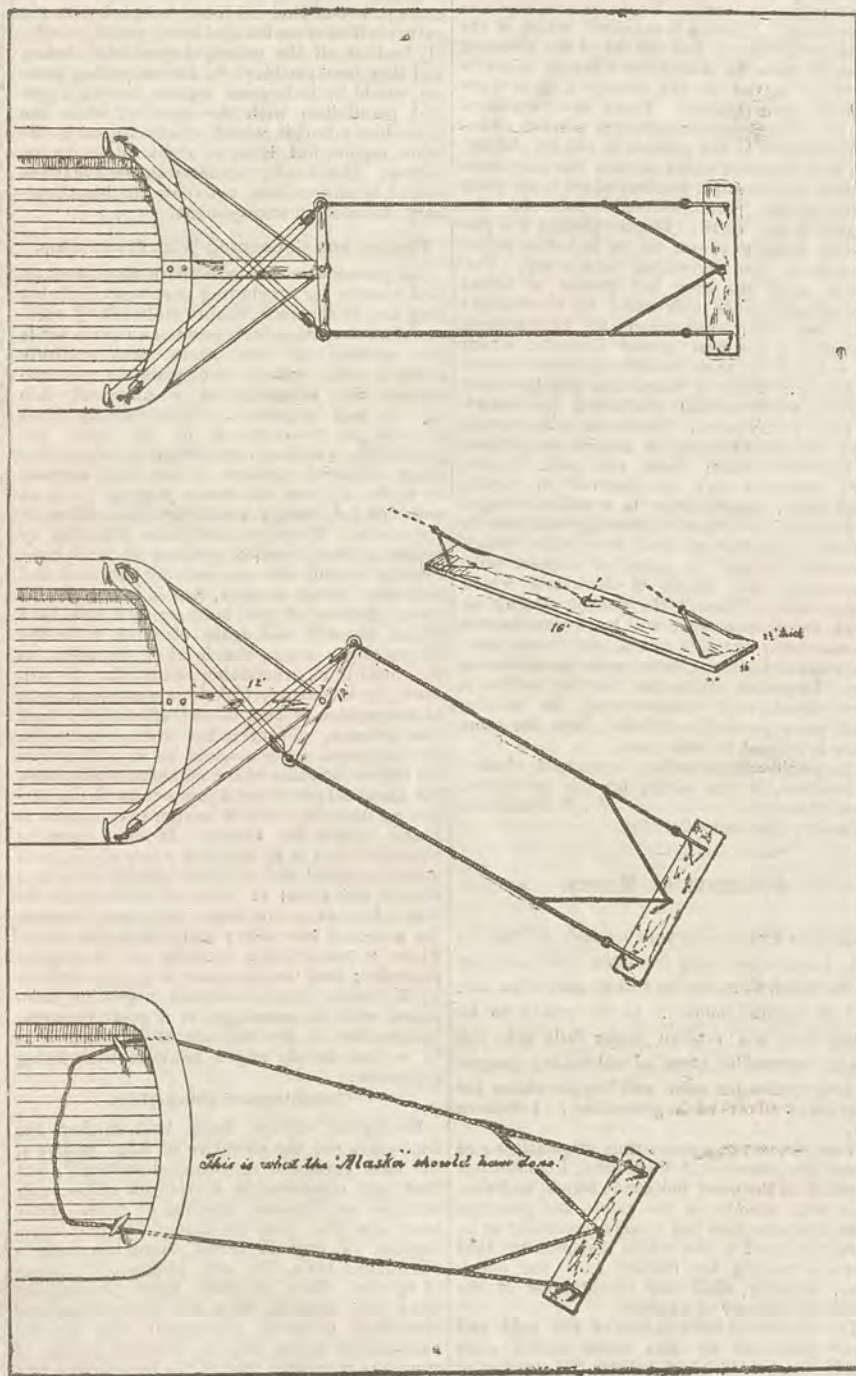
THE IRON WORKERS.—A Conference Committee of the Iron Trades Council has met the representatives of the Union Iron Works. The committee asked for the discharge of the non-union men, promising to make some arrangements by which they should not suffer for the loss of work, and further, that all the men

## Meadow Lake Again.

Meadow Lake district, Nevada county, five miles off the south boundary of Sierra county, is often referred to as one of the most striking examples of an abandoned mining camp. Years ago there was a wonderful excitement there and a town sprang up suddenly with brick buildings, hotels, warehouses, dwellings, quartz mills, etc. It did not take very long, however, to find that the ore was very rebellious. All sorts of plans were tried to work it, but they failed. Then the town was deserted; mills, hotels, buildings, etc., were abandoned, with all their contents, until only one or two men were left in the camp. Periodically since then a small excitement has been started, and some new processes inaugurated for working the ores. Some few persons have had continued hopes of improvement and have "hung on," but thus far all the trials to work the ore profitably have failed. Once more, however, a trial is to be made, and a prediction is made that there is to be an immediate revival in Meadow Lake. The *Truckee Republican*, in speaking of it, says: "There is to be an immediate revival in Meadow Lake mines. Several capitalists from below are interested in a new process of treating rebellious ores, and propose to try results on ore in that district, with every prospect of success. The machinery which attracted the attention of the reporter is the 'plant' to be used in the operation. It consists of the following items: First, a rock-breaker or crusher; second, a large cast-iron machine which looks as though it was to be used to grind the ore; third, two iron cylinders about six feet long, probably rotary ore roasters; fourth, a concentrator of new device; fifth, a small dynamo and electrical apparatus; also numerous shafts, pulleys, pipes, etc. It is consigned to A. P. Whittel, in care of S. C. & Co. The gentleman mentioned will be here in a few days, and more complete details of contemplated operations will be ascertained. There are a dozen or more men at the mines, and there will be a large amount of development done there this season. It will be a day of great rejoicing when a successful process of treating Meadow Lake ore can be discovered."

THAT "SULPHUR" SHOWER.—It was announced in the dispatches and newspapers of last week that a shower of sulphur had fallen at Carson, Nevada, covering the ground to the depth of from one-sixteenth of an inch to an inch deep. Quite a number of persons were satisfied it was sulphur, and the explanation was that a waterspout took up the sulphur from some lake and deposited it where found. The material, however, instead of being sulphur is found to be nothing except the pollen of pine trees. This fine, fertilizing substance is present in the atmosphere at this time of the year, and is frequently borne by the winds for a long distance. Of course, a heavy shower will precipitate it, sometimes in large quantities. Donner lake, the *Truckee Republican* says, was recently covered with it.

AN ECONOMICAL ARRANGEMENT.—At the Kentuck mine, on the Comstock, a Pelton water wheel on the 700 level, placed at the head of the winze, does the hoisting from the 800 and 900 levels. Its motive power is the seepage from the upper levels of the mine, with a pressure of 540 feet. This is a very economical and advantageous arrangement in the cost of working the mine.



SWAN'S DEVICE FOR TEMPORARILY STEERING VESSELS.

ornia a chance to compete with Eastern men, and would not cost the Government a dollar more if the vessels should be needed for the Pacific Coast. That one of these vessels should be sent out to the Pacific, there can be no question. Our interest on the west coast is increasing every day, and the only vessels now there are old, antiquated wooden vessels, built before and during the war, and they are decaying as rapidly as possible. These ships were good enough in their day, but that has passed. The Secretary should do all in his power to encourage the mechanical industries of the Pacific."

should be discharged and the works shut down for a week. The union would then select men who were not objectionable and the works could be started up. Mr. Dickie would not hear of the proposition, and refused to yield an inch from the original situation before the men struck. After an hour and a quarter's useless discussion the committee withdrew.

THE Arrow gold camp, near Calico, is shut down for the present. The last carload of ore shipped went three to five ounces in gold and five ounces in silver.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

## Gold Produced and Saved by Electricity.

EDITORS PRESS:—Some two years ago I endeavored to bring before the notice of the mining world, in your valuable paper, the urgent necessity of adopting some better method of saving gold than the stamp, mortar and copper-plate amalgamation; still, we are running along in the same old rut, really saving only by this old system not over 60 per cent, where the gold is fine. What a sad truth for our political economists to contemplate! How is it that this needful change cannot be brought about? Cannot our Legislature appoint a commission of practical men to devise some scheme by which this waste may be arrested? One reads endless discussions on the merits and demerits of stamp mills versus various and manifold forms of crushers, be they rollers—centrifugal or otherwise. A great deal of wasteful energy is thus thrown off by such controversies, whereas the main point is passed by. Any of these various mills are good enough in their way, so far as crushing ore is concerned. In where is the gain to crush so many more tons per day, if we cannot save the gold? Why, it is only creating more waste, exhausting the mines sooner and making a still greater loss; better to crush less and save more of the gold. This is simple economy. Then, let us discuss the best system of gold-saving.

Shall it be the "dry process"? In my mind it is far better than the wet; for is it possible to save "fine" gold by running it over copper-plates, with water flowing down-stream? But is not this the usual method of to-day? Thereby the purest and finest gold is lost—a very natural conclusion, or rather result. Tons of that same material are yearly lost in the mills all over the world, for the simple want of a better method of treating the precious metal. We have not materially advanced in this particular for the past 25 years. Is there no one bold enough to come forward to advance a plan by which a change in our system may be effected? But this change must be radical; my humble belief is that electricity is the power and the agent only that will create a new state of things in this particular, whereby fine gold now lost may be saved. I believe the present age will see auriferous rock disintegrated atomically, and the gold, no matter how fine, will be saved by agglomeration into one mass, by electricity, without the aid of any stamp mill, crusher, pulverizer, etc.; and better still, dispensing entirely with that very costly and much-wasted article, quicksilver.

Our great "Professor Edison" must look to his laurels, for most certainly the process will come, from facts known to myself, sooner or later. The baby will be born which will revolutionize gold-saving and prevent the present fearful waste and loss. I am more than ever convinced that electricity is the potent agent that has given us this precious metal in nature, and on the principle of "*Similia similibus curantur*," will, if we seek its aid, save it for us in its treatment. We, as miners, are striving tooth and nail to find and unearth this metal; and yet to know that so much is lost after all the dangers and cost of its extraction, brought to the surface only to be swept down again to the bottomless ocean. What little satisfaction is there in this direful fact? Let us ponder awhile. There cannot be day without night; there cannot be darkness without light; neither can there be positive electricity without negative. Now, assuming we have both these natural forces as terrestrial electrical currents traversing on, as well as in, the body of the earth's crust, the positive running in a north and south direction, shall we not have a negative current of an east and west course, crossing the positive at right angles? The fissures of the earth in gold-bearing regions, being filled with quartz, are the conductors of the positive force in the northerly and southerly direction.

Then, we find the dikes, or east and west series, conducting the negative currents to the point of contact, to or within the vein. The primary constituents of gold, according to my theory, were originally in a vaporous or fluid state, suspended in the north and south series. It was then, in its passage, arrested, transformed by the negative and positive action. The vapor or fluid matter became solidified and metallized, so to speak, deposited in the matrix in the form and character we now find it. Gold, the same agent, then, that produced it in nature, may it not now be used as a collector? I infer electricity produces crystallization of baser metals, catching up the iron, lead, copper, etc., mechanically holding particles of gold in its base embrace, these base metals being held in vapor or fluid state in the same manner as gold, and acted upon by the same agent, electricity, likewise solidifying it. Let us reflect. Do we ever find gold in matrix without iron? Firstly, and most largely, iron being a ready conductor of electricity, its presence is needed, and is always found wherever gold is, in some form or other. Lead and copper may be more secondary, but not as a necessity, for we do find gold without them. The iron is not chemically combined, but found in the matrix, gangue or bases, always near unto gold at all times.

Has not any miner that observes, seen that

where a crossing, as they call it, or negative seam, striking at right angles into the main vein, at or about that point his best pay ore—in fact, a "pay shoot"—is found? The walls may not show it, but if he explores into the wall he will find the indication sure, for no "pay shoot" will ever be found without such an indication; be it crossing of dike or thread, ever so small, it will be there as a negative conductor, which has caused the deposit of gold so found. I have held these opinions for over 30 years, have carefully studied these signs, as mentioned, in various parts of the world—Africa, Australia, New Zealand and California—until I am led to believe its truth, having in each country found as I have described. I am adverse to the theory of the natural chlorination of gold, as a general and accepted fact. The protoxide of iron present or not, as a precipitant, I cannot conceive nature making such a tedious laboratory test, when, in my opinion, electricity would, and can, arrive at the same end, and more quickly, by a single *coup de main*. Having now assumed in my opinion that electricity is the agent that by its positive and negative action produced the gold, so electricity is, and will be, the coming agent to extract it from the matrix, and finally save it, being now by science, so bridled and held in such subjection, must be made the future concentrator and collector. I do not propose, for space will not permit me, to go deeper into the matter, but will leave the question, for the present, with wiser heads than mine.

I have spent almost a life time in mining, and have been a close observer of the mysteries under the earth, and a more interesting study nowhere can be found. Books will not teach us everything. Practice is required, which is the helpmate of theory, but the aid of the scientist is needed here to determine whether there is anything or not in the theory I have thus crudely promulgated. Facts are stubborn things. The negative electricity plays as an important factor as the positive in electro-plating. The two combined under certain circumstances produce the beautiful wonders of art in our great electro-plating establishments—look for the parallel in the earth. Electro-plating is a plagiarism already shown to us in nature in the wonders of her terrestrial laboratory. Volcanoes, what are they but masses of latent pent-up gases made destructive by electricity? Gold has been discovered in Queensland, Australia, in the new geyser deposits, which are volcanic in their nature—principal agent electricity. There is found the negative and positive structures that conducted the electrical fluid, to my mind. Sandstone is the matrix there, the dikes causing or helping to produce the electrical action, hence the gold. Again, more especially may be observed in pocket mines here, where there is a well-developed "ore shoot," the negative crossing is always to be found, and often covered over with "black carbonate of iron" at point of contact with vein—again the result of electricity which miners call a "fuse." In pocket mining no gold is found, nor never will be, where there is no crossing or negative action, and found nearly always at right angles to main gold-bearing vein. In pocket mines the electric action is more direct and concentrated, in milling veins more generally diffused, but the same factor is present in both cases.

The whole earth's surface is one vast electrical machine, in the earth, on the earth and above the earth. W. F. DRAKE.  
Sonora, Tuolumne Co., Cal.

## Optimism of Miners.

EDITORS PRESS:—In your number of the 3d inst., I notice you copy from the *Chronicle* an article which to me seems full of prejudice and untruth against miners. Is it meant to be stated that the veteran miner falls into the wholly inexcusable error of mistaking gangue for ore, pyrites for gold and copper-stains for chloride of silver as a generality? I believe not.

Now, sir, when a paper thus stigmatizes and abuses the pioneers of California, I cannot but resent it in the most indignant terms, as I consider such attacks on the noble and generous class of prospectors and miners generally to be a wanton insult to the whole community that now are reaping the reward from the enterprise, sagacity, skill and truthfulness of the California pioneer and miner.

The statistical information of the gold and silver produced by this much-abused class yearly since '49 best refutes the slander of "veteran miners and prospectors" mistaking gangue for ore, pyrites for gold, and copper-stains for silver. Aye, sirs. When such slanders appear against a should-be honored class, we are apt to say that the newspaper press has ceased to be considered a conservator of public rights or morals, and is almost lost in popular contempt.

"Ye pioneers who braved the storm,  
And hewed the State to beauty's form!  
These are thy handiworks to emulate,  
That gives the prestige to the Golden State,  
And spread abroad an envied name  
Upon the page of history's fame."

"Oh, lead me back to forty-nine!  
Oh, give me back to-day  
The good old times of Auld Lang Syne,  
As now I close my lay."

OPTIMIST.

## Common Sense Geology.

NUMBER 4.

[Written for the PRESS by JUSTIN CHENOWETH.]

If geologists were right, globules of molten lead falling from the top of a tower, and solidified by cooling before reaching the bottom, would show a wrinkled surface and vesicular body instead of a smooth surface and solid body, which they always do. There is nothing to warrant the assumption that the existing configuration of the earth's surface in its details has to any great extent been produced by a contraction of the interior. It is much more probable that any effect on the surface resulting from contraction was more nearly assimilated to the character of surface cracks, such as are produced in a lump of clay drying in the sun, rather than crumpling or folding. One single circumstance proves that mountain ranges could not have been formed in that way. Had it been so, strata on the sides of them must in all cases have been inclined away from the summit. I know, of my own observation, that it is not so in the Sierra and Cascade range, and Humboldt states that it is not generally so with mountain ranges in any part of the world which he had visited; furthermore, that in some parts of the Alps the inclination of the sides was inward. If, at the time the mountains were formed, the main body of the earth was in a molten condition, having only a thin, solid crust, produced by cooling, the crust would certainly be thinnest and least rigid within the tropics. The consequence of that condition, coupled with the natural effect of centrifugal force, would inevitably be that all the principal mountain chains, had they been produced by the crumpling process, would lie in tropical regions having a general parallelism with the equator, while the subordinate ranges would chiefly appear in the same region, but lying at right angles to the former. It is hardly necessary to state that the actual condition does not show the least tendency to such an arrangement.

## Phenomena Connected With Mountains.

All phenomena connected with mountains afford reasons for concluding that most probably they are, in the main, simply sedimentary accumulations resulting from peculiar currents while the surface of the earth was entirely covered with water. Geologists do not controvert the allegation of a universal deluge by any argument. They simply meet it with an asseveration of its utter impossibility; yet they are obliged to admit that every explored portion of the land surface, even the highest mountain ranges, have, at some period, been covered by the waters of the ocean. They get over this difficulty by assuming that detached portions of land have been by some means successively elevated and depressed in such manner, that in course of time every portion of the land surface has been placed beneath and again elevated from the waters of the ocean, the level of the ocean, in the meantime, remaining immobile. I will show, by incontrovertible argument, that such an assumption as that is contradictory to their own theories. Formerly the drift phenomenon was supposed by geologists to be confined to the higher latitudes of the northern hemisphere, but about 20 years ago Agassiz created a sensation by declaring that it certainly occurred in Brazil within the tropics. It must now be admitted that it is manifest everywhere, both in the northern and southern hemispheres; that toward the close, at least, of that epoch the land where it occurs must have been beneath the waters of the ocean; that it exhibits everywhere a remarkable identity of lithological character; that there appears a general similarity of fossils, both animal and vegetable, associated with it, seemingly, in a great measure, independent of the latitude of location, in so far as their habits might relate to their living congeners.

## Teachings of Geologists.

Geologists always teach that neither the depression nor the elevation of large bodies of the land surface ever occurred suddenly, but that any considerable movement either way occupied an immense interval of time. They teach also that from the time of the first introduction of organic forms there has been a continuous extinction and progressive change of species. Now, if these three propositions were true, namely, that the depressions and elevations occurred piecemeal; that for the culmination either way an immense period of time was requisite; that in the meantime a progressive change of species was transpiring, the fossils of the drift deposit could not possess the universal similarity which they exhibit in all parts of the world, for, during the interval of time that must elapse between the habitancy of the first and last portions, there would be a marked change of species. Geologists attempt to explain the occurrence of tropical fossils being associated with the drift in high latitudes, and also in like manner the existence of Arctic fossils in the temperate and torrid zones, by presuming a temporary reversal of climate during the habitancy of the animals, or the growth of plants which these fossils represent. I will prove the fallacy of this explanation. Lyell, in his "*Elements of Geology*," when describing a portion of the Norfolk coast, in England, specifies three species of elephants, one of the rhinoceros, hippopotamus, common pig, horse,

bear, wolf, bison, deer, reindeer, beaver, walrus, narwhal and others, including altogether about 20 species, all now lying together in the same bone bed.

## Remains of Animals.

Hugh Miller, the great geologist, in one of his lectures on the geology of Scotland, while describing the boulder clay or drift of that country, says: "When this Norwegian pine flourished in Britain the island was inhabited by a group of quadrupeds now never seen associated, save in a menagerie. Mixed with the remains of animals still native to our country, such as the otter, the badger and red deer, there have been found skeletons of the tailless hare, now an inhabitant of the cold heights of Siberia, and horns of the reindeer, a species now restricted in Europe to Northern Scandinavia and those inhospitable tracts of Western Russia that border on the Arctic sea. And with these local forms there were associated, as shown by their bones and tusks, the elephant, the rhinoceros and the hippopotamus." In a paper read before a British scientific association on the exploration of Kent's cavern in Devonshire, there occurs the following statement, viz.: "Two thousand and two hundred teeth exhumed since August, 1870, belonged to different animals in the following ratio: Hyena, 335 per thousand; horse, 295; rhinoceros, 161; Irish elk, 55; ox, 35; deer, 27; badger, 22; elephant, 20; bear, 18; fox, 12; lion, 6; reindeer, 5; wolf, 4; bat, 2; rabbit, 1." These are not singular examples. They are typical of this universal feature of the drift wherever it has been carefully explored. The same incongruous admixture of fossil plants nearly always occurs in the drift. There could not have been any large rivers in that region at that time, by means of which those animal remains should have been brought together from climates of great dissimilarity. By the popular theory, therefore, notwithstanding the extreme difference of their natural requirements in relation to food, temperature and constitutional habits in nearly everything, the living animals from which they were derived must have been congregated very nearly within the same locality, through all the changes of the successive seasons. It will avail nothing in support of the popular theory to assume a modification of climate; for to make the water at the same time, in the same place of congenial temperature for both the walrus and hippopotamus, is blowing hot and cold with the same breath in a manner as inconsistent as it really appeared to the honest-minded satyr whom *Æsop*, in one of his fables, represents as indignantly driving a traveler from the shelter of his hut for such reprehensible practice. The elephant and reindeer both feed exclusively on the products of the dry land, but they are the veriest antipodes among the highly organized animals in their constitutional habits, being absolutely confined by their nature to extremely opposite isothermal zones. To bring together extinct species of these extremely different classes of animals, and presume that in former times they may have derived their daily sustenance from the same region, each enduring continually the same degree of heat and cold throughout the year, is in no wise more reasonable than it would be to attempt the same treatment of their living representatives. Such an assumption involves an utter negation of the recognized principles of classification in natural history, and, if successfully maintained, would render nugatory the deductions of the comparative anatomists, whether they be applied to either living or extinct species.

No theory accounting for the origin of the drift deposit has ever been propounded which did not embrace within itself fatal inconsistencies, other than that which ascribes it to the action of a universal deluge; and all the phenomena relating to the sedimentary rocks may be more logically explained on that hypothesis than any other that has been proposed. I have before stated that

## Geologists Meet this Hypothesis

Simply with the assertion of the utter impossibility of such an occurrence. Nevertheless it evidently did happen, and no doubt from causes as easily explained as those which produce an ordinary river flood, if it were only possible that men might be accorded the same facilities for investigation as they have with regard to the latter. In consideration of the fact that these are now known to be meteoric cycles, it is not unreasonable to suppose that there may be cycles of much longer period whereby such a catastrophe as universal deluge might result from some cosmical cause of a nature different from that of the meteoric cycle. But I have neither the capacity nor the inclination to extend speculations backward beyond an observable basis to the incipient stages of world-making. It seems to me ridiculous that the world-making scientists should persist in the promulgation of these absurd theories in the face of Newton's mathematical demonstration of the impossibility of the planets and their satellites having been produced and thrown into their existing orbits by the natural effect of centrifugal force, without the special intervention and direction of some intelligent creative power. It is reasonable to presume that the production of a deluge would be by means of an

## Excessive and Long-Continued Rainfall

Which, of course, would be principally within the tropics. That would produce a rapid flow toward the poles. This flow would bear with it immense numbers of dead bodies of tropical



animals, and uprooted tropical trees, and great quantities of the smaller growths of tropical vegetation. The violent action of the waves and currents would destroy to a considerable extent the surface of the rocks, and re-form in connection with the debris of all pre-existing loose materials. In consequence of its volume, warmth, and rapidity of flow, the tropical waters would melt the ice and penetrate far into the polar regions, still bearing with them a large proportion of their burden of tropical animals and plants.

When the rain had ceased, and the waters had begun to subside, it would be by evaporation, which would principally occur within the tropics. This would produce a reflex of currents from the polar regions. In the meantime the tropical animals and plants, along with the Arctic forms which had been destroyed, would have become incorporated with the polar earth and ice. Detached floes and icebergs containing such remains indiscriminately mingled would be carried much farther toward the equator than ever occurs with similar formations at the present time. As the waters subsided the ice would be stranded on the land surfaces, where, by its melting, the contained animal and vegetable remains would be released and become incorporated with the drift as they are now found. As the waters advance from the tropics certain classes of animals and plants, either in consequence of having originally possessed a small degree of buoyancy, or from having become water-soaked, would become incorporated with the earthy materials which the tropical flow deposited.

In this manner would

#### The Coal Veins

Be formed, and comparatively sparse deposition of certain classes of animal remains in the rocks containing them occur. Before the reflex of waters from the poles transpired the deposition of the tropical currents had become consolidated in the form of stone. That effect might have been produced from chemical causes in a short space of time while it was still covered with water, in a manner similar to that of puzzolana or a conglomerate made with Portland cement. Admitting the occurrence of a deluge such as is described in Genesis, it is not unreasonable to suppose that the immense quantity of tropical animal and vegetable remains now found distributed over the temperate and polar zones might have been transported there by its agency.

Hugh Miller, in his "Cruise of the Betsy," says: "That much of the wood used in building in the smaller and outer islands of the Hebrides

#### Must Have Drifted Across the Atlantic,

Borne eastward and northward by the great Gulf stream," some of it "with roots and branch attached, bearing marks of having been swept to sea by transatlantic rivers. Nuts and seeds of tropical plants are occasionally picked up on the beach. My friend gave me a bean or nut of the *Dolichos urens* or cowitch shrub of the West Indies, which an islander had found on the shore some time in the previous year, and I attach some little interest to it as a curiosity of the same class with the large cones and the fragments of carved wood found floating near the shores of Madeira by the brother-in-law of Columbus, and which, among other pieces of circumstantial evidence, led the great navigator to infer the existence of a Western continent." It is probable that the currents of the ocean, and particularly that great current which issues from the Gulf of Florida, and hence denominated the Gulf stream, aid very much in transporting across the mighty Atlantic these American products.

They are generally quite fresh and entire, and afford additional proof how impervious to moisture and how imperishable nuts and seeds generally are. One of the other "pieces of circumstantial evidence" to which Miller refers as leading to Columbus' discovery of America was the finding the dead body of a man drifted on the Azores, in a condition so well preserved as to show that it did not belong to any race of men known at that time by Europeans. It must have come from America. The Alentian islanders at the present time rely entirely for their supply of timber on driftwood cast upon their shores by the great Japanese current from the tropical coasts of Asia.

In view of these facts the conjecture is quite plausible that at the time of the deluge, when the tropical ocean was covered with the floating carcasses of animals and the wreck of tropical forests, and raging with a swiftness of currents, and swept by a violence of winds unparalleled by any similar phenomena of the present time, they might have been transported in numbers as great and quantities as large as they each appear when their remains are now found. I will now present a fact, which, by fair induction, gives

#### Strong Additional Proof.

In correspondence with others I have stated in confirmation of the conclusion, that not only the drift but the hard surface rock on which it immediately reposes resulted from a cataclysm, and furthermore, that immediately preceding its occurrence the earth on the same parallels of latitude was possessed of a climate identical with that which now prevails.

A few miles below where the canal and locks are now being built at the cascades of the Columbia river and the same side, imbedded in a soft, horizontal stratum of conglomerate, there are several trees varying in size from that of less than one foot to as much as four feet in

diameter. This conglomerate lies between high and low water mark of the river.

It is immediately covered by a hard, dark-colored rock which geologists call basalt, which at that point projects in a shelving manner over the softer conglomerate, in consequence of the latter having been eaten away by the action of the river current. This covering rock here forms the face of the Cascade mountain, rising very abruptly to the height of about one mile. The fossil trees all project endwise, horizontally from the bank. The bodies have been transformed to a compact, black stone; but the bark is so little changed either in texture or color as to render its identity quite certain with that of the grand fir which now greatly predominates in the forest growth of that region. Although some of these trees are separated from the covering rock by a distance of only a few inches, they do not, any of them, give the slightest indication of having ever been subjected to any great degree of heat.

#### If That Great Mass of Rock

Had been deposited on them in such near proximity in a molten state before the trees became petrified or else transformed to charcoal; if it had occurred after they were petrified, the great heat must inevitably have vitrified their entire substance. There is another circumstance of my own knowledge connected with this so-called basalt that proves conclusively that it is not of igneous origin. The same kind of rock as that which covers those fossil trees extends continuously downward to the mouth of the river and upward as far at least as 150 miles; how much farther I do not know, having never visited the country higher than about that distance. About 80 miles above the Cascades, opposite the mouth of a small tributary named John Day's river, in this same basaltic rock where it rises abruptly to the height of fully 1000 feet, there occurs a horizontal stratum of soft, coarse-grained, grayish-colored sandstone, lying a few yards above the river surface. Where the sandstone is in contact with the massive black rock which incloses it, it does not in any manner give indication of having been subjected to great heat.

It certainly would have done so had it been directly covered with so large a mass of molten matter. Geologists who have explored

#### The Valley of the Columbia River

Ascribe all of this extensive-body of black rock to an immense outflow of ancient lava, presumably emanating from the Cascade mountains. I will direct their attention to another objection which probably has hitherto escaped their notice.

On the south side of the Columbia river, in the vicinity of Fifteen Mile creek, between Cascades and Dalles, this so-called basalt presents clear lines of stratification of even thickness, gently inclining toward the heart of the Cascade range; consequently, if they be right, at that point at least, several successive lava flows must have pursued the even tenor of their way "on an uphill grade. I apprehend, however, that they will find little difficulty in properly adjusting their theories to an apparent inconsistency so inconsiderable as this, in a manner satisfactory to themselves, at least after having successfully adapted a universal glacial sheet to the unphilosophical procedure of shoving it—get uphill on the same principle as a man might attempt to lift himself by tugging at his boot straps—from the north polar region over a large portion of the north temperate zone.

#### Neither the Tropical Animals

Whose remains are now found in such great abundance in the polar regions, nor the tropical plants, the remains of which are found in the same locality, could have possibly ever lived or grown there. Astronomers have proved that there never can have been an entire reversal of the poles of the earth, nor ever any considerable change from the position which they now hold in relation to the other celestial bodies of the universe. It is well known that tropical animals and plants at the present time cannot exist nor grow without artificial protection where the days and nights are not of nearly equal length and the temperature of little change during the entire year. Reasoning by analogy we must conclude that it has always been so with the same classes of animals. Regardless of other conditions, it is impossible that there ever could have been any near approach to equality of temperature in a region where the sun was almost continually below it during the other half. But if at some former period the polar regions were, as geologists teach, teeming with tropical animals, and the same regions over-run with tropical vegetation, they must admit that the change from that condition to the succeeding glacial one which they own occurred, could not have been gradual, but must have occurred suddenly, overwhelming everything at one fell stroke, else the bodies of tropical animals would not now be found there, frozen in ice or earth, in a state of almost perfect preservation.

#### I would Here Ask Geologists

If such a catastrophe as that is any more comprehensible or more easily explained by any known law of nature than the occurrence of a universal deluge, which they aver is an impossibility. Prof. Geikie, in his recent work on geology, speaks of the so-called Siberian mammoth as an Arctic animal. He is probably not aware that Humboldt states that fossils of the mammoth exist in the tropical regions of South

America. The statement occurs in one of Humboldt's books entitled "Humboldt on Rocks." Probably Prof. Geikie and other modern geologists regard such books as being of a character too antiquated to be worthy of any attention. By the same rule of logic geologists might class the common Indian elephant with Arctic animals, for I have seen, myself, the tusks of the so-called Siberian mammoth and the tusks of the Indian elephant taken from what was virtually the same bone bed in the Willamette valley of Oregon.

I now propose to prove, by what I consider incontrovertible argument, that the drift formation could not have been produced by glacial action as is now popularly taught. According to the teachings of geologists the animal and vegetable remains now found in the drift must have been of those suddenly overwhelmed at the beginning of the so-called glacial epoch, and consequently must have been lying immediately on the surface of the ground. Now, if it were true that a solid sheet of ice covering the greater portion of the Northern hemisphere accumulated on those remains to a depth of 6000 feet and was, by some means, impelled southward, every vestige of those remains, whether animal or vegetable, must have inevitably, under such conditions, been ground to impalpable powder instead of appearing distributed everywhere in the drift as now found.

(Concluded.)

#### School Experts and Practical Miners.

EDITORS PRESS:—The man who wrote that article in the PRESS recently strikes the keynote of the whole trouble. This business is not understood at all, and there will be no harmony until it is. The practical man is disgusted with science, because he knows that theories do not agree with the facts, and the scientific man curses him because he does not make the facts agree with the theories, and both sides try to make a fool of the printer, which only adds to the confusion. Each should know exactly what to expect of the other, and then we would advance firmly and surely and soon understand far more than we do to-day. I understand the need of a scientific education as well as any man, and feel the need of it as keenly. But my way is to do the best I can with what tools I have on hand, and not fret and stand idle because I cannot possess the whole kit. And if "Joe" has found out something I do not know, I compromise with Joe, rather than make an ass of myself by trying to appear smart about something I do not understand. But perhaps self-importance would rather make a fool of himself before the whole world than to knuckle to "Joe."

"The Old Man of the Mountains" is right. We miners should organize immediately and firmly, and try and save for the country's good what little is left to us. H. CLENDENEN.

THE WILLOW CREEK MINE.—This mine of argentiferous galena, situated on the line of the Virginia & Truckee Railroad, between Washoe City and Steamboat Springs, is still in process of active development by means of the main tunnel run into the hill at the rear of the concentration mill. The tunnel is now in 570 feet, and must soon strike the ledge, 215 feet below the croppings. A considerable proportion of the ore in the ledge is a solid mass of mineral, needing no concentration, and the Frue concentrators are found to be very effective in concentrating the rest; but the low price of silver is rather discouraging at present, all the more so from the fact that the amount of gold in the ore is only three or four per cent. The average percentage of gold in the general ore of the Comstock is about 40 per cent, which is a very material consideration; otherwise the vast amount of low-grade ore now being worked would have to remain in the bowels of the earth. Colonel C. C. Stevenson, the managing power of the mine, however, is, and always has been, one of the most practically enterprising mining men of this State, employing numerous men for many years at regularly established wages, and he proposes putting the Willow Creek mine into the most advantageous shape for economical extraction and reduction of the ore, whether it pays or not.—*Virginia Enterprise*.

TIN SMELTING IN WEST VIRGINIA.—In 1867 a party at Point Pleasant, West Virginia, formed themselves into a joint stock company for the purpose of developing the mineral resources of a large body of land in the Hanna district, Mason county. The matter remained passive until last year, when new life was infused into some of the incorporators, and they put experts to work upon the land. Several tests were made with smelting furnaces, and the reports of the experts confirmed, and arrangements have now been made for the immediate erection of a \$30,000 furnace for smelting the ore.

THE CONTINENTAL AND ENGLISH RAILROADS are beginning to pattern very closely, in their car building, after the most approved American patterns. The demand for the divan of the compartment car is quite strong. It is a system that now finds favor with only a very few of the extreme aristocratic class of travelers. The American plan of dividing off one or two separate apartments is all that is necessary. The American aristocrat, when he chooses to travel "in style," charters an entire car, if he does not happen to own a palatial railway vehicle.

#### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

TRIGGER ATTACHMENT FOR DOUBLE GUNS.—Chas. E. Burgans, Oakland. No. 344,896. Dated July 6, 1886. The invention relates to an attachment for double-barreled guns having two locks and two triggers, whereby they may be fired independently, and it consists of an intermediate plate with a spring device which operates between the forward trigger and the sear of the lock which it operates, so that after the first barrel has been discharged the forward trigger may be drawn back until the finger engages with the rear trigger so as to fire the other barrel without changing the fingers from one trigger to the other.

DISK SEEDER AND CULTIVATOR.—B. C. Dorsey, Porterville, Cal. No. 344,450. Dated July 6, 1886. This consists in a peculiar wheeled frame, having a seed-box and carrying inclined or angled bars, the outermost ones of which are fixed, and the innermost are automatically adjustable; in two inclined disk-gangs mounted on the inclined bars, the inner or adjacent ends of the disk-gangs being made to overlap; in novel boxes, in which the shafts of the disk-gangs are mounted, and in details of construction. In this machine all the disks of the gangs cut to the same depth; and they are arranged so that there is no uncultivated strip in the center.

AUTOMATIC GAS CUT-OFF.—Chas. Leech, Oakland. No. 344,916. Dated July 6, 1886. The invention relates to that class of devices intended to shut off the flow of gas, when by any accident the flame is blown out and the key is not closed. The invention consists in a metallic wire or strip above the burner-tip, a valve within the burner adapted to find a seat against the base of the tip, and a connection between the valve and the metallic strip above, whereby the expansion and contraction of the latter operates the former to cut off or open the flow of gas. The invention further consists in details of construction relating to the means for mounting the metallic wire or strip, the means for adjusting it, and the means for limiting the movement of the valve and relieving the metallic wire or strip of its weight when lowered. The object of the invention is to provide simple and effective means for cutting off the supply or flow of gas without reference to the ordinary key, so that there shall be no danger in inadvertently or ignorantly blowing out the light.

PROGRESS IN ACCURACY OF LEVELING.—Remarkable accuracy is now attained by engineers in cutting tunnels through mountains, working from both ends. Thus at the Musconetcong tunnel, of the Lehigh Valley Railroad, the alignment tested to 0.04 foot, or less than one-half inch. In this case levels were run over a mountain 5000 feet long and 450 feet above the line; also into the tunnel at each end about 2500 feet to the point where the headings meet. These tested to 0.015 foot, or less than 1-5 inch. The chaining carried by the steel tape measurements over same distance tested, on the headings coming together, to 0.52 foot, or 6.4 inches. This accuracy is, to a large extent, a development of recent years. In the annals of the State of Pennsylvania it is mentioned as a remarkable specimen of accurate leveling that in a circle of 12 miles that was leveled the error was only 1.2 foot. This was in 1824. About 50 years afterward, or in 1878, engineers engaged in running a line of levels between the Chesapeake and Delaware bays, for the purpose of determining the feasibility of a ship canal, testing some new leveling instruments furnished by the Government. A line of test levels was run over ten miles, and the difference of level on the closing bench mark was only 0.005 foot.

ORIGIN OF CARRIAGES.—The oldest carriages used by the ladies of England were called whirlicotes or turning coaches. These became unfashionable after Ann, the daughter of Charles IV and Queen of Richard II, about the end of the 14th century, showed the ladies how gracefully they could ride on a side-saddle. Coaches were first known in England in the year 1530. They were introduced from Germany by the Earl of Arundel. They came into general use among the nobility in the year 1605. The celebrated Duke of Buckingham was the first who rode in a coach and six horses; to ridicule this pomp, the Earl of Northumberland put eight horses to his carriage. Coaches to hire were first established in London in 1625. There were only 20 of them kept at the principal inns. In the year 1637 there were 50 hackney coaches; in 1654 there were 200; in 1694 they were limited to 700, and in 1755 to 800; there are now 1100.

OLD ROMAN LEAD.—While some excavations were recently in progress at Chester, Eng., at a spot formerly occupied by the ancient Romans, a pig of lead was unearthed which bore an inscription showing that it was cast during the fifth consulate of the Emperor Vespasian, which time coincides with our date of A. D. 74. This lead was therefore cast over 1800 years ago. Further discoveries were anticipated.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
 Take the Elevator, No. 19 Front St.

W. B. EWER.....SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, July 31, 1886.

## TABLE OF CONTENTS.

EDITORIALS.—Temporary Steering Gear; Meadow Lake Again, 65. Passing Events; Prices of Metals; Native Metallic Iron; Our Guests; Drift and Crosscut; Alpine Mines in London, 68. Fire Extinguishing Appliances; Mining Accidents; Refining Coppery Bullion Produced by Amalgamated Tailings, 69.

ILLUSTRATIONS.—Sloan's Device for Temporary Steering Vessels, 65. Section of Dissolving Tub, 69. CORRESPONDENCE.—Gold Produced and Saved by Electricity; Optimism of Miners; Common Sense Geology, 66. School Experts and Practical Miners, 67.

MECHANICAL PROGRESS.—Improvement in Smelting Iron Sands; How Iron Breaks; The Heating Properties of Exhaust Steam; Future Supply of Iron Ore; Balancing Pulleys; Tests for Lubricants, 70.

SCIENTIFIC PROGRESS.—How Rain is Produced; Colors of the Ancients; Profits of Electric Lighting; Hot Water from Artesian Wells; Influence of Temperature on the Strength of Iron and Steel; The Waste of Life, 70.

USEFUL INFORMATION.—Foaming and Priming; Life's Decay; Pianos in Winter; All Paner; How to Keep Moths Out of Carriages; The First Watch; Natural Gas as Fuel for Locomotives; An Ancient Stone Plow; Gasoline as Forge Fuel; Ivy and Dampness; A Good Paint; Frozen Milk in Fever, 71.

GOOD HEALTH.—Pasteur's Method of Vaccination; Sunstrokes; The Philosophy of Vaccination, 71.

MISCELLANEOUS.—Notices of Recent Patents, 67. Washington Territory Mines, 71.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 72-73.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 76.

## Business Announcements.

Dividend Notice—Paradise Valley Mining Co.  
 Draughtsman—W. H. Smyth.  
 Miss Bisbee's School—Oakland, Cal.  
 Pumps—Dow Steam Pump Works.

See Advertising Columns

## Passing Events.

This week has seen the arrival of thousands of visitors from the East and interior, to take part in the festivities of the Grand Army of the Republic, which take place in this city during the whole of next week.

The region along the Carson & Colorado railroad, Nevada, is showing evident signs of mining advancement, and several of the districts will in time become very prosperous. In San Diego county, in this State, the mines once abandoned are again producing bullion and paying good profits.

Good news comes from Alaska mining regions, and capitalists are now examining other mines on Douglas island with a view of opening them and putting up extensive reduction works.

The Legislature is still in session and discussing the irrigation question, but no decisive action has yet been taken.

## Drift and Crosscut.

In a recent article we remarked on the difference between "a shoot of ore" and an "ore-chute," terms which are very frequently mixed up badly in descriptions of mining property, and often by men who ought to know better. Two other mining terms often used in a confusing manner are those of "drift" and "crosscut," the distinction being seemingly unknown to many. The stratification of the country rock may strike north and south, for instance, as clearly as the ore bodies themselves, yet a crosscut through it will be called a drift just as much as an excavation on line of the ore body

itself. The late Joseph Wasson well explained the difference several years ago in saying: The average miner will apply the word crosscut merely to a cut across the ore body itself, from wall to wall, no more; everything beyond that, however much it may run crosswise of the country rock, is designated a drift. Webster, as well as the mining dictionaries of any thoroughness, defines the word drift "to follow a vein." "To drift with the current" is a natural expression outside of mining; and an ore body is but another word for current; its walls answer to the banks of a stream. Crosscutting in mining is but searching for another stream, channel, branch, etc.; drifting in mining is but following the current of the stream when once found.

In the glossary of mining and metallurgical terms compiled by R. W. Raymond, Ph. D., Secretary of the American Institute of Mining Engineers, which as an enlargement and revision of that prepared many years since by Chas. G. Yale, editor of the MINING AND SCIENTIFIC PRESS, for Gregory Yale's work on "Mining Claims and Water Rights in California," the term "crosscut" is thus defined: 1. A level driven directly across the course of a vein. 2. At an angle with the grain of coal. The word "drift" is defined: 1. A horizontal passage underground. A drift follows the vein, as distinguished from a crosscut, which intersects it, or a level or gallery which may do either. 2. The unstratified deluvium resulting from glaciers or icebergs.

## Prices of Metals.

The downward tendency of silver is most discouraging to silver miners. It has now reached the lowest point ever recorded, and does not seem to have stopped yet. London advices advance the opinion that the decline is caused by an unsettled feeling regarding the policy of the new Government toward India, and its action regarding the China and Burmah difficulty. The question of the decennial presents formerly paid to China by Burmah is still unsettled, and manifestations of Chinese sympathy for the Dacoits in Burmah are growing daily more direct, and a large number of Black Flags have joined the Burmese rebels. The Viceroy of India asks for the prompt rearming of the artillery and infantry. The native organs oppose this kind of expenditure and point with justice to oppressive taxation and undoubted misery of the poorer classes, the serious condition of the land question and the numberless social problems which remain unsettled and untouched. It is believed the Government will not parley with the military necessities, and as the arms of India are absolutely inefficient the Government will have them replaced without further ado at India's expense. It is feared that the influence of Churchill will widen the breach between China and England and increase political agitation in India that will probably result in insurrection; hence the little or no demand for Eastern exchange and the reduced bids for council bills. Whether this is really the cause or not, the fact remains that silver is so low that the discount from par value is very damaging to silver-mining interests. Though quoted at 94 cents, 93 is as much as is bid in this city, and the metal is so demoralized that dealers do not know what to do. A year ago silver was \$1.08.

Copper has been for a long time very low, and several large copper mines in this country have had to close down for the time being until prices improve. Heavy supplies are the cause of this low price, together with slackness of legitimate—not speculative—demand.

Iron has been in a bad way for a long time, and a good many works have remained shut down in this country and England during the past half year. On this coast the Clipper Gap mine has shut down permanently, and the Oswego works, Oregon, are also closed.

Antimony has continued dull and prices have fallen lower and lower. Borax, of which this coast produces large quantities, does not bring anything like the price it did a few years since. Lead, though somewhat higher than last year, is not high enough to make the lead miners very happy. Tin and quicksilver are the only two metals showing an upward tendency. Quicksilver has gone up of late owing to low stocks, small product and pretty good demand. In tin there is a good business being done, with improved prices.

On this coast the prices of silver, lead and

copper are the most important to us. Within the past few years many copper mines have been opened, and now many more would be worked should prices of product warrant. The depression in the other metals, however, has given an impetus to gold-quartz mining from which this State, as the leading gold-producer, is profiting.

## The G. A. R. Encampment.

The Twentieth National Encampment of the Grand Army of the Republic will convene August 3d, in San Francisco, and continue in session for a week. It will probably be the most interesting and brilliant affair of the kind ever witnessed on the continent. Already the advance guard is arriving and the hotels are lively. A train of 28 Pullman cars is on the road, crowded with Boston veterans and their wives. From the latest advices, in a few days more there will be not less than 30,000 Grand Army visitors among us. They are coming from all parts of the Union—Maine with its six months of winter, Minnesota and Kansas with their frosts and blizzards, and Kentucky and Tennessee, the land of big-boned men, lots of children, cornpone and hominy. They are coming with great brass bands, big drums and fifes, and will make the air sonorous with the best of martial music. The female drum corps from Minnesota will be a novel feature. Those frisky old fellows, the Veteran Corps of Elizabeth, New Jersey, propose to parade in a different uniform on each of the six days of the Encampment. Many of the Sir Knights of De Molay Commandery, Louisville, who carried off the first trophy at the Templar Conclave of 1883, are coming back to see us as soldiers of the Grand Army.

They are welcome, thrice welcome, these valiant men who bore aloft the flag through that terrible war. They will find San Francisco gorgeous as a tropical forest, its streets one long emblazonry of military symbols and devices. The bare and gloomy walls of Mechanics' Pavilion will blossom into banners, pendants, badges, battle-pieces and historic memories. Merchants, shop-keepers and householders will vie with each other in welcoming them by their magnificent display of decorative art and other ways. Even old Mammon will get a sniff of patriotism and put on his best clothes for a holiday.

The grand march and grand camp-fire will be the chief features of the program. The march will be along streets profusely decorated with the national colors, and under an arch 80 feet high surmounted by a monster eagle, 30 feet from wing tip to tip, and ornamented with the figures of General Grant and Admiral Farragut, and of Presidents Washington and Lincoln. Our visitors will not make as showy a pageant as the Knights Templar; but they are no kid-glove soldiers. They are men who have smelt powder, worked in the damp trenches, toiled in the weary marches, and fed on hard-tack, beans and glory. San Francisco will put its best foot forward to make the days of our gallant visitors pass enjoyably, and Oakland, Sacramento, San Jose, Los Angeles and other places are making elaborate preparations to give them a reception. The fact is, there is a deep-laid plot, a deliberate conspiracy, to lure away these Grand Army folks into the country, feed them on climate, and capture as many of them as possible and hold them willing prisoners in the land of the orange and vine.

## Native Metallic Iron.

[Written for the Press by ARTHUR F. PRICE, F. C. S.]

The presence of native iron in rocks of terrestrial origin has been seriously doubted by many leading scientists. This occurrence of the metal is well known in aerolites, which are, however, of celestial origin, and contain the iron associated with other metals.

I have recently received from Arizona a piece of rock containing metallic iron in flat scales and rounded lumps, and in such quantities as to settle beyond dispute the fact that iron does occur native in rocks which are undoubtedly of terrestrial origin.

The composition of the rock containing this iron, as analyzed in the metallurgical establishment with which I am connected, is: Silicate of alumina, silicate of magnesia and oxide of iron, the last doubtless resulting from the oxidation of the metallic iron. The metallic iron contained amounted to over 7 per cent.

## Alpine Mines in London.

We have just been reading in a London paper one of those fine mining prospectuses which the English agents get up when they are floating a company. In this sort of thing our cousins across the water greatly excel us. They can really promise more from a mining venture than we can, which is saying a great deal. In this case the company is called the "Nevada Consolidated, limited," because the mines are in California, and have nothing to do with Nevada, though the mines are described as 45 miles from the Comstock, Nev. The group of mines is stated to contain "nearly five miles of gold and silver-bearing lodes." There are three groups—the Colorado and Advance, the Sauquet, and the Marian. The prospectus says: "These lodes possess the characteristics of true fissure veins, and in the Colorado No. 2, on which the principal work has been done, the ore is met with in masses, similar to those which formed the great bonanzas of the Comstock mine. Soft ore from these masses is worth \$1000 to \$1500 per ton of 2000 pounds, and by simply washing the clay, the sulphurets and free gold left have yielded as much as \$3000 per ton."

Mr. Ottokar Hoffman is quoted as saying the formation is similar to that of the famous Trinidad mine, in Mexico, and Silver King, in Arizona. The average value of the ore is \$230.84 gold and \$333.19 silver, or \$564.03 per ton.

"On the Advance mine a two-compartment shaft has been sunk 320 feet, being 396 feet below the lowest tunnel in Colorado No. 2. This shaft is provided with a good set of hoisting and pumping machinery, and from it it is proposed to work the mines at a greater depth than can be reached by the present levels. Upon the Sauquet portion of the property a double-track tunnel has been driven 1400 feet, intended to develop this group of lodes, measuring 11,000 feet in length, and all of them promising, from assays which have been made, good results in gold and silver. This tunnel strikes the various lodes which are parallel to each other at depths varying from 715 to 2060 feet, and when completed will be 6200 feet long. All lodes which it may intersect in its course belong to the company over and above those shown on the plans. There are on Colorado No. 2, a 20-stamp mill, chlorination works, bullion furnaces, and all necessary appliances, so that the company can immediately commence work; and returns of bullion can be made within three months thereafter. The ore being of a soft nature, the 20-stamp mill can crush 50 tons per day, giving two tons of concentrations, worth, according to Mr. Hoffman, \$564 per ton, less mining and milling \$5 per ton, or \$250, leaving a net daily profit of \$870, amounting (for 300 days' work) to \$261,000 or £52,000 net per annum.

"The above amount may be more than doubled by increasing the number of stamps, the erection of which will be immediately proceeded with; so that a sum of over £100,000 per annum should be available for dividends from Colorado No. 2 alone."

The capital of this company is £400,000 in 400,000 shares, and it is stated that \$500,000 has been subscribed. The purchase price is £300,000, or about one million and a half dollars, to be paid entirely in shares. Returns of bullion are promised in three months; and the Colorado No. 1 is stated to be alone capable of yielding \$500,000 a year.

Some of these mines have produced bullion in times past, and may do so again; but they have no specially great reputation in California; and the estimated profits, as given above, if at all likely to be realized, ought to have made the owners hold on to the mines themselves and not sell for stock. Mining in Alpine county in this State has not produced any very remarkable results thus far, unless it has been in the line of expenditures. It seems strange, when the mines are opened as described, and have chlorination works, mills, and all appliances, ready to produce bullion in three months, they were not worked at once by the owners. To say the least, if they needed any money to start, and any such showing as this prospectus gives could have been legitimately made, they would have had no difficulty in getting it here at home.

GOLD quartz crushing has been resumed in the old Meadow Lake district, Nevada county, by a new process.



## Fire-extinguishing Appliances.

The Fire Commissioners of this city have asked the Supervisors for permission to purchase two more fire-engines. It is high time this should be done. The several large fires which have occurred in this city in the past few months have shown that our local department is deficient in apparatus. The organization has not grown as rapidly as the city has. There are only 15 engines, and not half enough full-paid men. The city is now large enough for a complete metropolitan system with all the men in full pay, having nothing to do but attend to fires. As it is, the majority now follow other occupations, and are not regularly at the enginehouses where they can ride to fires. Wherever they are at work they have to run to the fire, and often arrive there in an exhausted condition. For a large city like this, where there are so many wooden structures and high winds prevail, the plan is crude and unsatisfactory.

South of Market street, in the section where the great foundries and large mills are, there is not a single engine. Moreover, the wholesale trade is moving that way and fine large structures are going up. One of the new engines, which it is proposed to buy, ought to be stationed in that region so as to be near at hand in case of fire. Moreover, the department ought to own a water-tower, by means of which the combined streams of several engines could be thrown on high buildings. It should also own a chemical engine for extinguishing incipient fires in buildings, where water would do great injury to valuable goods. Some of the light cotton hose in use in Eastern cities should also be procured for use in high buildings. Its lightness admits of its being carried up-stairs more readily than the heavy hose in use.

Eastern cities are much better provided with fire apparatus, in proportion to population, than our own; and it is false economy to deprive our department of any advantages that may be derived from improved appliances. We are much behind the times in this respect. Our department is composed of brave and efficient men, skilled in their work, and no one can find fault with their efforts. But the force should be stronger and the appliances increased. In the last six months the property burnt amounted to \$1,395,217; insurance, \$510,312; unpaid loss, \$884,904. This shows that citizens have as much at stake as underwriters. With a more completely equipped fire department there would be much less liability of loss.

## Mining Accidents.

A serious accident occurred last week at the Kennedy mine, Amador county. A miner named Nicola Gerceit had been sent to fix a chain across the shaft, at a point about 110 feet from the bottom. The skip was about 10 feet above him. After fastening the chain, and before he had time to get out of the way, the skip came down upon him, crushing him across the abdomen and breaking the left leg between the knee and ankle. Notwithstanding his injuries, he managed to hold himself in his position by catching hold of something in the shaft until extricated.

A fatal accident occurred at the Lane mine, Angels, Calaveras county, on Wednesday of last week, caused by the bursting of the mud drum in the furnace. At first it was believed that the boiler had exploded, but as soon as the smoke, dust and steam lifted itself from the horrifying scene it was discovered that the mud drum in the furnace had exploded, but through what cause is unknown. The engine was considerably smashed, the building partly unroofed and the front and sides blown out; the masonry work of the furnace was thrown in heaps all over the premises, being blown completely to atoms. The machinery was not in motion at the time of the accident, having been shut down but a few moments previous. Mr. James Lane, brother of Charles Lane, one of the principal owners and superintendent of the mine, was in charge of the engine at the time of the accident and was in the furnace-room at the time of the explosion. As soon as access to the furnace-room was considered safe the mill men hastened to the assistance of Mr. James Lane, whom they found struggling in the throes of agony, frightfully scalded and bruised and partially buried beneath the hot rocks of the furnace. The unfortunate man died soon after.

## Refining Coppery Bullion Produced by Amalgamating Tailings.\*

NUMBER 3.

## Roasting White Bullion.

A charge was generally about 300 pounds, the actual amount being determined at any time by the quantity on hand, the furnace being treated as much as 400 pounds.

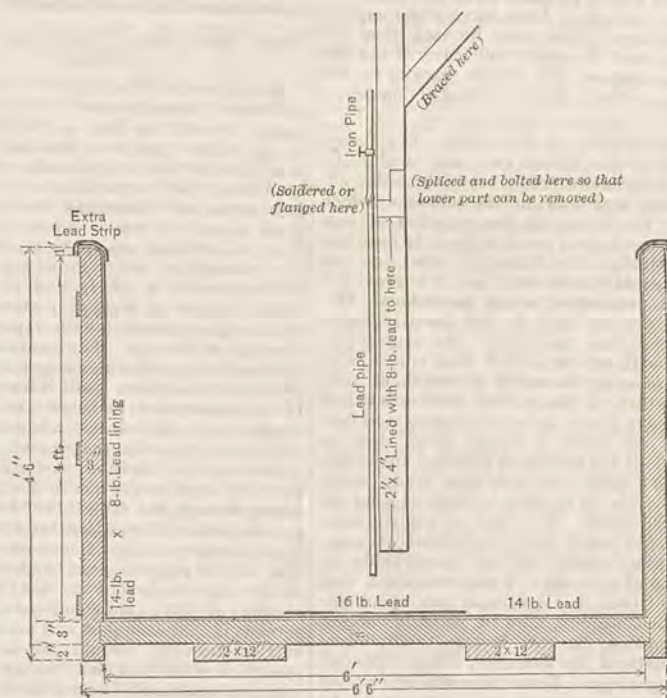
The sulphurized material roasted quite easily, and no special difficulties were experienced in working up to a certain degree of excellence. But it seemed practically impossible to sulphurize all the silver, or to prevent the formation of a very large percentage of lumps. No matter how gently the temperature was raised, or how diligently the material was rabled and pounded, the mass was in the beginning so shaky that almost the same proportion of lumps were found at the end of the operation as when the process was conducted more hurriedly.

The fire was increased gradually from the beginning, but the furnace was at no time very hot. For some two hours the charge was stirred constantly and vigorously, to expose all parts equally to the heat, and to prevent the formation of lumps, or to crush up those already formed as much as possible. About three hours after the roasting had fairly commenced,

Several times, perhaps a dozen or even more, when, according to the tests, the charge had passed through the condition of maximum sulphatization of the silver; and, beyond this, so that the silver sulphate had been decomposed to a large extent, that is, the tests had yielded decreasing amounts of chloride, by continued hot firing the charge has been brought back to its usual proportion of silver sulphate; that is, the tests have shown an amount of chloride gradually increasing up to the usual point. For instance, when a charge has been ready for drawing at 1 or 2 o'clock P. M., but has remained in the furnace until, say 4 o'clock, the tests at this last hour show very little sulphate, but by firing strongly and stirring the charge with moderate vigor, the amount is increased according to tests, until about 6 o'clock, the average proportion of silver sulphate, so far as the eye can judge, is again reached.

## Dissolving.

The roasted bullion passed next to the bluestone works, where it was treated with hot dilute sulphuric acid (chamber acid), the base and white being manipulated separately (as a rule), but in exactly the same manner. This state of affairs was brought about commonly by some accident; for instance, my detention from the furnace at the time for making tests. But I have also caused it deliberately, although



SECTION OF DISSOLVING TUB.

the first test was made of the condition of the silver. The test consisted simply in putting a small quantity of the hot charge into a porcelain saucer, partially filled with water, and adding a dilute salt-solution. The color of the solution, the appearance of the charge and the relative quantity of silver chloride formed, show the condition of affairs. The eye is soon trained by experience. The "spangle-reaction," mentioned by Prof. Eggleston, in his paper on the "Boston and Colorado Smelting Works," that is, the reduction of the sulphate to bright, glittering spangles of metallic silver by suboxide of copper, was often seen in great beauty.

When the sulphate of copper was almost entirely or even quite decomposed, that is, the test solutions had become nearly or quite colorless, the amount of sulphate of silver (or of chloride in the test) was at its maximum, and the charge was drawn. When the roaster lighted his fire in a cold furnace at 7 A. M., the charge was usually out of the furnace about 2 P. M. If the furnace was warm in the beginning, the time was often reduced materially.

As before mentioned, it seemed impossible to get all the silver into the state of sulphate. The highest proportion ever noted was 75 per cent, while the yearly average attained was about 60 per cent.

The roasting process was conducted essentially according to the directions given in the text-books, and in its action conformed to the descriptions given. But, at times,

## A Phenomenon was Observed,

Which, as far as I have been able to learn, has not been described before in print.

\*Read before the American Institute of Mining Engineers by A. D. Hodges, Jr.

with fear and trembling each time.

Mr. C. A. Stetefeldt has suggested to me a possible explanation of the apparent regeneration of the sulphate of silver in the over-roasted charges. At the Mansfield Works, in Germany, the roasted copper matte in the Ziervogel-process is leached first with pure water and then with water acidified with sulphuric acid. This, it was said, favors the solution of sulphate of silver, a part of which may be present as a basic salt insoluble in pure water. While the text-books on chemistry do not record the existence of a basic silver-sulphate, there are indications that such a salt occurs; and it would seem very possible that, in over-roasting the sulphurized bullion at Dayton, the common sulphate was partially decomposed to a basic sulphate, and this, in turn, on continued treatment, was changed back to the ordinary sulphate through the action of the sulphides in the undecomposed lumps, a comparatively small quantity of sulphuric acid being required to effect the regeneration.

The original charge in the furnace consisted, in round figures, of about 500 parts silver, 500 parts copper and 17 parts sulphur, with very small amounts of gold and of iron. I am not aware of the presence of any other metals.

The roasted bullion was sifted through a No. 8 wire screen. The average amount of lumps in 1876 was 17 1/2 per cent of the original charge. I have no notes showing anything as to the percentage of lumps from overworked charges. The highest amount ever recorded was 22.3 per cent. The lumps contained copper oxides, copper and silver sulphates and copper and silver sulphides principally. By vigorous manipulation a considerable part could be rubbed through the screen, but this was not permitted.

When possible, the lumps were allowed to accumulate, until amounting to enough for a furnace charge, when (after crushing) they were roasted by themselves, the operation requiring only two or three hours.

The dissolving tubs, shown in the cut on this page, are six feet in diameter and four feet deep, clear dimensions. The sides are composed of 45 staves, three by six inches, and four feet six inches long, dressed to the proper shape and hooped with three iron bands three-eighths inch thick by two and a quarter inches wide, provided with angle irons. The bottom planks are 3x12 inches, the lumber dapped into sides, with two cross-pieces, 2x12 inches, nailed below them.

The bottom of the tubs and sides, for a height of 12 inches above the bottom are lined with 14-pound lead, the rest of the sides with 8-pound lead. Directly under the steam pipe in the center of the tub, a piece of 16-pound lead, two feet in diameter, is laid on the bottom lining, and "burned" to it as a protection in case the steam pipe should blow out. A strip of old lead is bent over the upper edges of the sides to protect the lining against the wear of the paddles.

The steam pipe is three-quarter inch AA lead pipe, soldered to iron pipe above the level of the tub. It is closed at its lower end, which reaches within a few inches of the tub bottom, but has four holes bored in its sides, near the end, so that the steam issues in a horizontal direction, instead of impinging vertically on the lead. The steam-pipe is stiffened by clamping to a central timber, two by four inches, hung from and braced to the ceiling, and lined with 8-pound lead where in contact with the bath. Water and acid pipes are provided.

The normal charge was 1200 pounds base, or 1000 pounds white bullion; but the common charge was 1000 pounds of base, or 800 pounds of white. The amounts were regulated by the exigencies of the occasion.

The amount of acid used could not be limited to the exact theoretical quantity requisite to form  $Cu_2O$ ,  $S_2O_3$ , although the men on the tubs were kept within certain limits. For instance, in treating 1000 pounds of material assaying 75 per cent, theoretically 2083.4 pounds of acid, 45° Beaume, would be requisite; this corresponded exactly to 11 1/2 inches in depth of the acid tank. In order to be sure of dissolving out all the copper (and iron), and because a moderate excess of acid did no special harm, being utilized afterward in dissolving ore charges, and as some metallic silver was always dissolved, the men were allowed to use one inch more, or 8.7 per cent. Any amount beyond this limit caused an investigation.

Again, in leaching the charges and in other operations extra acid is necessarily used, at the lowest figures over 10 per cent. Moreover, accidents seem practically unavoidable at times.

The result in practice was that, instead of only 2.8 pounds of 45° acid being used for each pound of metallic copper, an average of nearly 3.7 pounds was purchased by the refinery at Dayton during the year 1876. An unknown proportion of this excess was regained in the other department of the bluestone works, but no allowance was made in the books.

The acid was measured out of a tank whose contents were known. The measuring was by twentieths of an inch. A table was prepared for the men, showing how many inches of each degree of strength were necessary for 100 pounds of charges of given percentage in copper. Two men were employed at each tub.

A COMPANY with an authorized capital of \$2,000,000 has incorporated in Los Angeles for the purpose of boring for gas and petroleum and dealing in the same in Los Angeles county. The company has purchased a tract of land on the west side of the city limits, between Pico and Ninth streets, near the gas wells, and will go to work promptly in sinking wells. There is plenty of gas in that locality to burn for fuel in the engine used for drilling.

THE temporary dam at the mouth of the Big Bend tunnel is nearly completed, and as soon as finished, the water of the river will be turned into the tunnel and work commenced on the permanent dam.

SEVERAL thousand men are wanted at good wages to work on railroad construction in British Columbia.



## MECHANICAL PROGRESS.

## Improvement in Smelting Iron Sands.

Many attempts have been made, during the last few years, to utilize the magnetic iron sand which occurs in immense deposits along ocean shores. It is found in greater or less quantities along the Pacific Coast from Oregon to this city, and still farther south. Experiments have been made in this city to utilize this finely-divided iron ore—the most valuable form in which it ever occurs, so far as the iron product obtained from it is concerned, but hitherto with no practical results. This sand or ore is found, perhaps, in the greatest abundance on the coast of New Zealand, where the most persistent experiments have been made, on a large scale, for its utilization—experiments which have, with these and with New Zealand sands transported to Europe, been of quite practical utility. But we now learn, through the *Auckland Star*, that a still newer and more practical method has recently been discovered by Mr. James Kelly, of Auckland, to which the *Star* refers as follows: The course hitherto pursued by himself and other experimenters has been to extract the magnetic iron instead of uniting the two. Mr. Kelly came to the conclusion that the wrong course had been adopted, and at once instituted a series of experiments with a view to discovering a suitable fluxing material in order to unite the two. After trying many things, Mr. Kelly, having noticed that if common scoria ash got in the furnace it melted at a low temperature, decided to utilize that article. The experiment was accordingly tried, and the result was highly satisfactory. Scoria melts at a comparatively low temperature, and this has the effect of preventing the iron from oxidizing. It is well known that hitherto the oxidation of the iron has been an insurmountable obstacle in the way of the successful smelting of iron sand. It is Mr. Kelly's intention to try experiments with the iron sand in a large way, as he is confident that iron can be produced in large quantities, equal to ordinary pig iron, at a less cost than that of the imported article. Mr. Kelly has patented his discovery.

## How Iron Breaks.

Hundreds of existing railway bridges which carry 20 trains a day with perfect safety would break down quickly under 20 trains an hour. This fact was forced on my attention nearly 20 years ago by the fracture of a number of iron girders of ordinary strength under a five-minute train service. Similarly, when in New York last year, I noticed, on the case of some hundred of girders in the elevated railway, that the alternate thrust and pull on the central diagonals from trains passing every two or three minutes had developed weaknesses which necessitated the bars being replaced by stronger ones after very short service. Something the same thing had to be done recently with a bridge over the river Trent, but the train service being small, the life of the bars was measured by years instead of months. If ships were always among great waves, the number going to the bottom would be largely increased. It appears natural enough to every one that a piece even of the toughest wire should be quickly broken if bent backward and forward to a sharp angle; but perhaps only to locomotive and marine engineers does it appear equally natural that the same result would follow in time if the bending were so small as to be quite imperceptible to the eye. A locomotive crank axle bends but 1-84 inch, and a straight driving axle a still smaller amount, under the heaviest bending stresses to which they are subject, and yet their life is limited. During the year 1883 one iron axle in 50 broke in running, and one in 15 was renewed in consequence of defects. Taking iron and steel axles together, the number then in use on the railways of the United Kingdom was 14,848, and of those, 911 required renewal during the year. Similarly, during the past three years, no less than 228 ocean steamers were disabled by broken shafts, the average safe life of which is said to be about three or four years. Experience has proven that a very moderate stress, alternating from tension to compression, if repeated about 100,000,000 times, will cause fracture as surely as a bending to an angle repeated only ten times.—*Power and Transmission.*

## The Heating Properties of Exhaust Steam.

There has been more or less written and claimed about the use of exhaust steam for heating, some going so far as to say that it is equal to live steam for that purpose. In claiming this they have not analyzed the subject, nor ascertained the heat left in the exhaust, or what is possible to be got out of it. In some places great gains are claimed by taking out condensing engines, replacing them with engines running under a large amount of back pressure and using exhaust for heating. In doing this they have not taken into account the entirely different conditions or stopped to inquire whether they were getting the best possible results from their live steam. Let us see first what is possible from the exhaust. We can

find this from an indicator diagram. We should remember that this is a diagram of work and shows the average pressure that was required to perform that work, and the terminal pressure shows the steam that is thrown away and is useless for further work in that cylinder. It shows only what heat exists in the form of steam, and does not give any account of the condensation in pipes, or cylinder, or amount used in performing work. If we find from test that we are using 30 pounds of water delivered to boiler per hour per horse-power, and we use all the steam for heating, we have the full amount of heat leaving the boiler minus the heat radiated from the pipe. I use it in an engine first. We will probably find, with a good engine, 22 pounds accounted for by indicator, which will be available for heating purposes, which shows a loss of 27 per cent, which is accounted for as follows: The heat from 2.65 pounds of water will be absorbed in work; 33,000-foot pounds per minute or 1,980,000 per hour is one-horse power; and as 772-foot pounds equals one heat unit, 1,980,000 divided by 772 equals 2564.76 heat units, and 2564.76 divided by 966, the heat of vaporization of one pound, equals 2.65 pounds of water which has been actually converted into mechanical work, and the 22 pounds accounted for by indicator plus 2.65 equals 24.65, leaving 30 minus 24.65 equals 5.35 pounds of water condensed in pipes and cylinder and carried over with the steam from boiler. It is evident, therefore, that we have but 22 pounds of water or 73 per cent that leaves the boilers, that is available for steam-heating after the steam has left the engine, and with other circumstances the same, it is possible to do but 73 per cent of the work that live steam will do. After leaving the engine, however, larger pipes must be used than for live steam, and if equally well covered the loss from condensation will still be greater in the large pipes.—*Corr. Boston Journal of Commerce.*

**FUTURE SUPPLY OF IRON ORE.**—Dr. Percy, president of the British Iron and Steel Institute, recently delivered a very interesting address before that body, in the course of which he said: "The future of our supplies of iron ore is a subject of no small interest to members of the institute. The Bilbao and other fine ores are being rapidly exhausted, and it is predicted that such exhaustion is not far distant. Our secretary tells me that he has been informed by an American gentleman thoroughly acquainted with the iron and steel trades, who has been scouring the world in search of suitable ores, that, in his opinion, such ores before very long are likely to become scarce, and consequently to fetch a higher price than at present. This is a somewhat startling announcement. But there are doubtless many unexplored localities in which it is probable good ore will be discovered. The cost of transit, however, and the other local circumstances, may, in some cases, render the ore unworkable on the ground of economy. I may mention a fact which my friend Mr. Bauerman has communicated to me—namely, that in recently visiting South America, he saw in one locality enormous deposits of fine hematite, which extended over a long range. These deposits are as yet untouched, and access to the coast would be very expensive in the absence of roads, as is the case at present."

**BALANCING PULLEYS.**—A correspondent of the *American Machinist* writes that paper: "Supposing the pulley is to be put in good 'standing balance' only. If no spirit level is at hand, the balancing bars may be roughly tested by laying the mandrel on the center; and if it rolls with the same apparent ease in either direction we know the bars are about level. After placing the pulley on, hold it still for an instant and let go, but instead of letting it roll back and forth until it stops, check it a little until you get the oscillations down to about four inches travel of the rim; hold your chalk in readiness, and as it rolls toward the right and stops, dash a small mark on the edge of the rim plumb over the center; as it returns to the opposite stopping point, mark as before. Make a central mark between these two and you have the light spot. Now attach the weights and test it by rolling down to a position horizontal to the center and let go. If it stands still roll it to the opposite side, and if it will stand here also it is correct, but if it rolls down, the bars are low at the end. If you are using cast weights, and find that of two sizes, between which there is very little difference, one is too light while the other is too heavy, give the preference to the light one, as it makes the pulley nearer in balance when running."

**TESTS FOR LUBRICANTS.**—The manager of any mill may, at very little expense, determine for himself all the conditions of safety and economy in lubricants as indicated by the standard of heat developed upon any given shaft. The apparatus required for this purpose is merely a thin brass tube closed at the lower end and two thermometers. The method of using this apparatus is as follows: Place enough water in the tube so that the bulb of the thermometer will be immersed; insert the tube in one of the holes in the cap of the journal, so that the lower end of the tube will be in actual contact with the shaft; hang the other thermometer free alongside; then gauge the relative heat developed with oils and with greases. Each man may thus satisfy himself as to which is best and safest.

## SCIENTIFIC PROGRESS.

## How Rain Is Produced.

Did it ever occur to the reader that there is just as much water in the air above him on a clear, bright day as on a cloudy or rainy one? Rain does not come from somewhere else, nor is it wafted over you by the wind from elsewhere. The water that was over you is simply waited on to some other place. Water is absorbed in the air above us at a certain temperature, and it becomes insensible. Cool that air by a wind draft of cooler atmosphere, or by electrical or chemical influences, and the moment the air becomes cooler it gives up some of the watery particles that were insensible or invisible at the higher temperature. These small particles thus given out unite, and when enough of them coalesce, obstruct the light and show as clouds. When enough of them unite to be too heavy to float in the air, they begin to descend; pair after pair of them come together until a rain-drop is formed. One of these minute rain-drops is made up of millions of infinitely small watery particles.

Air passing over the cold tops of mountains is cooled down so that it gives up a good deal of the concealed watery vapor, and hence little rain falls in the region along the ice side of such mountains. This is why so little rain falls in Colorado, and in other places north and south of that State. The prevailing winds blow from the west, and the cool tops of the Rocky mountains lower their temperature, and thus take out the moisture that would otherwise fall in rain.

## How Rain Drops, Hail and Snow are Formed.

In a paper on "The Formation of Rain, Hail and Snow," recently read before the Meteorological Society, by Mr. A. W. Clayton, F. G. S., the author points out that all observations tend to show that, except under quite abnormal conditions, the temperature of the atmosphere falls as the height above sea level increases; and there seems no reason whatever for assuming that the law does not apply to that portion of the atmosphere which forms a cloud. Hence, if a drop were to be formed at or near the upper surface of a cloud, it would fall down into a region saturated with vapor at a temperature above its own. The result will be further condensation producing a larger drop; and this process will continue until it leaves the cloud. If its temperature be below the dew point of the air it falls through, condensation will continue until it reaches the ground. However, it is obvious that this subsequent gain cannot bear any very large proportion to the growth while falling through the saturated cloud, from which the conclusion follows that the size of the drop must increase with the thickness of the cloud. The author suggests that condensation begins on the upper surface of the cloud by the cooling of some of the liquid cloud particles. If this particle is cold enough it will solidify, and snow will be formed. Should it not be quite cold enough to solidify at once, owing to its minuteness, but remain still below the freezing point, hail is formed. Finally, if the temperature is not low enough for either snow or hail, rain is produced.

## Colors of the Ancients.

Layard says that the colors which have revealed themselves during the excavations at Nineveh display sufficient evidence that they are not inferior to those of the ancient Egyptians, either in number, variety or brilliancy. Instead of the common earthy bole or reddish of the latter people, the Assyrians have left us a color almost equal to vermilion itself. The monochrome pictures which represented the Chaldeans on the wall (Ezekiel xxiii, 14) are said by Gesenius, the Septuagint, and the Vulgate, to have been painted with sinoper or rubrica, a native earthy oxide, like Indian red, while both the great English versions of the Bible now in use, as well as the rabbis, translate the word at issue ("shashar," Jeremiah xxii, 14) vermilion.

At Khorsabad it appears that the red approached in hue to that brilliant color, while the sculptures at Nimroud exhibited a bright crimson or lake tint. Layard thinks there is no doubt of their having made great use of vegetable colors, the materials for which are so plentiful in the vicinity of Nineveh. The rapid evanescence of some specimens of blue and red on plaster, which were bright and perfect in color when first exposed, would appear to favor a vegetable origin, as no susceptibility of the kind is known to characterize any mineral reds or blues with which we are at present acquainted. Layard claims for the older Assyrian period the same colors which have been attributed to the early times of the Egyptians, viz., blue, red, yellow, black and white. He also speaks of a green on the earlier monuments of Nimroud, and of green, purple, violet, brown, etc., enameled in paintings of figures on bricks at the northwest palace.

In allusion to the analysis of Sir Gardner Wilkinson's specimens of the Alexandrian blue, by Dr. Ure, Layard conjectures that the coloring principle may be the same, but affirms that the Assyrian blue is much brighter. He concludes that the color was derived from copper, as he found an old mine of that ore in the neighborhood of Nineveh. Layard considers the

greens of Assyria to be similar to those of Egypt, which are in many instances composed of iron ochre and copper blue. The yellows and blacks he conceives to resemble those from Egypt; and as specimens of the latter class of pigments he mentions calcined bone and black iron ochre. The whites are of alabaster and gypsum. At Khorsabad, the French antiquarian, M. Potta, found green, red, black, white, yellow and blue, the latter very lively in color.

**PROFITS OF ELECTRIC LIGHTING.**—With a view of setting at rest the question as to whether electric lighting has thus far proven profitable as an investment, the editor of the *Scientific American* recently addressed a circular letter to the managers of a large number of electric lighting companies asking for their experience in the matter as a subject of scientific, as well as economic interest. The inquiry was addressed more especially to those employing the Thompson-Houston system. The answers received are generally to the end that electric lighting is paying a better dividend than a majority of new enterprises. The highest returns were from Omaha, where a company, operating four 30 light dynamos, had earned at the end of the first three months after incorporation 4½ per cent on the investment, or at the rate of 18 per cent per annum. Replies were also received from Washington, St. Louis, Worcester, Terre Haute, Auburn, Me., Salem, Mass., Quincy, Ill., Kansas City, etc., which confirm these results, and state emphatically the belief of the writers in the desirability of electric lighting as an investment. These conclusions, although derived from the working of the particular lighting system named, may be equally valid and reliable for other systems now before the public. There is room for great extensions of these local lighting companies in all parts of this and foreign countries.

**HOT WATER FROM ARTESIAN WELLS.**—Parties, partially under the patronage of the city authorities, are boring for hot artesian water at Pesh, in Europe. The expectation is to secure a city supply of hot water. The well, at last reports, was down 3000 feet, with a supply of 175,000 gallons a day, at a temperature of 161°, rising to a height of 35 feet above the surface, and the work is to be continued until the temperature, which progresses regularly as the borings descend, rises to 178°, and then no doubt is felt that there will be a bubbling perennial stream sufficient to meet all the wants of the city and to convert the surrounding region into a tropical garden. According to the degree of success already met with, the project seems quite certain to fulfill the expectation of the projectors. Both hot and cold water flowing from an artesian well through pipes into a house would not only be a novelty, but would be regarded in the nature of a blessing. It is reasonable to suppose that hot water can be obtained almost anywhere if wells are bored deep enough, and if the already partially successful Pesh experiment should demonstrate the feasibility of such schemes, it is easy to foresee that wells would be generally sunk to supply such a universally required thing as hot water.

**INFLUENCE OF TEMPERATURE ON THE STRENGTH OF IRON AND STEEL.**—B. Papkoff gives in the *Russian Mining Journal* an account of an extensive series of experiments on the influence of cold on the strength of iron and steel in various forms and under various kinds of strains, but circumstances obliged him to abandon his intentions after a very few tests had been made. He thinks, however, that the results he was able to obtain are worth being made known, because they seem to point to conclusions totally opposed to those generally received. All the specimens tested were taken from soft steel and iron plates, three samples being cut from each plate. One sample of each group was tested at the ordinary and two at the low temperature. It was found that both the ultimate strength and percentage of elongation increased very sensibly with the decrease of temperature; the author remarks that such a result was to be expected, because the contraction caused by cooling has the effect of bringing the particles of matter closer together, and consequently of intensifying the force of cohesion; but he also observes that a law which may be found general for strains gradually imposed may not apply at all when they assume the nature of shock or of impact.

**THE WASTE OF LIFE.**—An English naturalist remarks it is a sad reflection that while the turbot lays 14,000,000 eggs, not more than one, on the average, ever lives to reach maturity. In fish generally it takes yearly at least a hundred thousand eggs for each individual to keep up the average of the species. In frogs and amphibians a few hundred are amply sufficient. Reptiles often lay only a much smaller number. In birds which hatch their own eggs and feed their young, from two to ten eggs per annum are quite sufficient to replenish the earth. Among mammals, three or four at a birth is a rare number, and many of the larger sorts produce one calf or foal at a time only. In the human race at large, a total of five or six children for each married couple during a whole lifetime makes up sufficiently for infant mortality and all other sources of loss, though among savages a far higher rate is usually necessary. In England an average of four and a half children per family suffices to keep the population stationary.



## Washington Territory Mines.

The Stephens Reporter says: The Colville mining country presents greater inducements to capitalists who wish to operate in argentiferous lead ores than any mining camp at present known to the writer. Why? Because the present owners are nearly all prospectors, and if they felt inclined to develop their mines and reduce these ores to bullion they are entirely unable to do so, and it is doubtful if more than one-half of the prospectors will be able to do the required \$100 worth of assessment work on each location, and the properties must go to the second or third parties before realization commences.

The geography of the country is such that the ores from a large number of mines can be concentrated at a given point for reduction, thus rendering it unnecessary for the operator to use the vast amount of dead flux as is generally the case where only one or two classes of ore are available, as the "charge" can be made up of the different classes of ore with the exception of a little iron, which can be had for the mining and hauling. A good quality of charcoal timber, varying in size from six inches to three feet in diameter, is inexhaustible, and should be delivered for not to exceed ten cents per bushel in quantities, as the producer will neither be obliged to chop or grade roads nor go to the canyons as is usual in other mining localities. The whole country, while covered with good timber, is free from underbrush and open enough to drive a wagon through without risk or trouble.

The ores are usually high in lead, and, with some exceptions, worthlessly low in silver, and yet the field presents surer and more reliable profits for capital than many of the camps where the ores are of a higher grade in silver.

It is a well-established fact that the character of the mines found here are permanent and go down to the deep, while the free, rich chloride mines are always doubtful, and while lead holds above 45 cents we can stand a further decline of 10 cents per ounce of silver, and still make a good profit in the reduction of these ores.

One of the best places for a plant for the reduction of these ores is at or near the Little Dalles, about 30 miles north from this place on the Columbia river. The company could have their own boat, and could ship their bullion up the Columbia river to Farewell, on the Canadian Pacific Railway, thence to Portland, San Francisco or Omaha, or any point in the East. The cost of freight to San Francisco via the Columbia river and the Canadian Pacific would not exceed \$12 per ton. The boat could be run for at least seven months of the year, but the reduction works could go on forever. With absolutely no wind in winter time, and about 14 inches of snow, mining, smelting and milling could be carried on as well as in summer. We are not at the mercy of one single giant carrier that would extract the last penny for freight, only leaving us enough of the profits to go on and extract another cargo.

We claim to be good country-loving loyal Americans, and if our Dominion cousins will handle and deliver our freight cheaper than the Northern Pacific Railway, we shall feel in duty bound to patronize them, as we happen to be in a position to talk back this time.

After the N. P. has extended its Spokane branch to this point there will be room for about a dozen plants in the immediate vicinity of Colville.

**PROSPECTING SOUTHWARD.**—Since the opening of the season the attention of prospectors has been attracted to the very interesting mineral section traversed by the Carson & Colorado Railroad. It is a comparatively undeveloped region, rich in mineral veins and deposits of all kinds not explored enough to give any adequate or definite idea as to its real merits. During the past few months very valuable mines have been brought prominently into public notice through real merit or demonstrated by actual bullion productiveness, as for instance the famous Lapanta, the rich Hindley mine, the Farrington mines, etc.; and now an other strike of very rich ore is reported in North Canyon, about eight miles from Hawthorn. There are many other good mines and prospects being opened and developed besides those mentioned, all of which will be munificently heard from in due time. It is a good county to prospect for gold mines at the present time, when a purely silver mine, even though rich in that popular metal, is considered comparatively poor property, owing to the cost of working and the fearful discount on the bullion product. On either side of the road the mountain ranges are seamed with mineral veins, awaiting the inspecting pick of the enterprising prospector, and the requisite supplies of all kinds are now advantageously accessible at the various towns along the route, or speedily procured by railroad. Prospectors are working in the hills for miles back from the line of the railroad, and many are quietly finding the competence they have so long vainly sought for elsewhere. It is a mining region which is really only in its infancy, and which has a future before it little appreciated at the present time. The Lapantas and the Hindleys are not all discovered yet.—*Virginia Enterprise*.

CAYENNE PEPPER blown into the cracks where ants congregate will drive them away. The same remedy is also good for mice.

## USEFUL INFORMATION.

## Foaming and Priming.

The tendency of the water in a steam boiler to rise into the cylinder is generally attributed to the presence of dirt, grease and other similar substances; but, according to a correspondent of the Cincinnati *Artisan*, the tendency frequently arises from a disturbance of the relation existing between the temperature and elasticity of the steam in the boiler, as when the discharge of steam is out of proportion to the steam room in the boiler the high temperature required to generate steam with sufficient rapidity to supply the demand causes violent ebullition, and the agitation is greater when the relation between temperature and pressure is disturbed. This is often the case with tug boats when just starting a heavy load, or a locomotive starting a train of cars, and even with stationary boilers having too small steam capacity when a heavy load is put on.

The most common causes of foaming are insufficient steam room, foulness of boiler, excessive firing, and the effects produced by the intermittent action of steam valves. The supply of steam to the cylinder being cut off for a considerable period during each stroke, the effect is to throw the water in the boiler into a slight undulatory motion, as may frequently be observed in glass water-gauges. Foaming in locomotive boilers is generally caused by impurities in the water, usually confined to sections of country known as alkali regions, these impurities consisting essentially of potash, soda, ammonia and lithia. When surface water is used, locomotive boilers are apt to foam, if allowed to get dirty, on account of decayed vegetable matter held in suspension in the water, such sedimentary accumulations adding to the strength of the ingredients above referred to.

Foaming is sometimes confounded with priming, but they arise from very different causes and are productive of very different results. Foaming may cause permanent injury to the boiler, or even induce explosion, while priming can only cause waste of fuel and loss of power. Foaming is always made manifest by the violent agitation and rising and falling of water in the gauge; also by the muddy appearance of the water and the particles of sediment brought up from the lower part of the boiler.

Priming may, and does, go on unseen, but can be discovered by the white appearance of the exhaust steam, which descends in the form of mist, while "dry steam" has a bluish color and floats away in the atmosphere. Priming also makes itself known by a "clicking" in the cylinder, caused by the piston striking and forcing the water against the cylinder heads. This is also the cause of one kind of "pounding" or "knocking," and if the water is not let out it is liable to break the cylinder head.

In cases of foaming, close the throttle and keep closed long enough to show true level of water. If that level is sufficiently high, feeding and blowing will usually suffice to correct the evil. In cases of violent foaming, caused by dirty water, or change from salt to fresh, or vice versa, in addition to the action before stated, check draft and cover fires with fresh coal.

**LIFE'S DECAY.**—Charles Kingsley once said: "One of the kind wishes expressed for me is long life. Let anything be asked for me except that. Let us live hard, work hard, go a good pace, and get to our journey's end as soon as possible. Then let the post-horse get his shoulder out of the collar. I have lived long enough to feel, like the old post-horse, very thankful that his end draws near. Long life is the last thing I desire. It may be that as one grows older one acquires more and more the consciousness of the difference between what ought to be done and what can be done, and sits down more quietly when one gets the wrong side of 50, to let others start up and do for us things we cannot do for ourselves. But it is the highest pleasure a man can have who has (to his own exceeding comfort) turned down the hill at last, to believe that younger spirits will rise up after him and catch the lamp of truth, as in the old, lamp-bearing race of Greece, out of his hand before it expires, and carry it on to the goal with swifter and more even steps."

**PIANOS IN WINTER.**—Winter is the heavy season for piano tuners. The heat of a fire soon puts a piano out of tune. This is not due to the expanding and contracting of the strings, as generally supposed, but to the variations produced in the sounding-boards under the influence of the increased dryness of the air, especially in furnace-heated houses. Sounding-boards are made of spruce because of the superior resonance of that timber, but spruce, of all woods, is most affected by changes in moisture.

**ALL PAPER.**—At the late Melbourne exhibition there was a unique exhibition, consisting of a complete dwelling-house, made of papier mache, as was all its furniture—chairs, sofas, tables, beds, bedding, carpets, etc. There was also a paper stove, with paper frying-pans, kettles, etc., in which a bright fire was constantly kept burning. During the exhibition the builder and exhibitor gave a banquet at which all the table furniture—plates, cups, saucers, knives, forks, spoons, goblets, etc.—were likewise made of paper.

**HOW TO KEEP MOTHS OUT OF CARRIAGES.**—As this is a subject of very great importance, especially at this season of the year, we will not wait until we have tested the remedy suggested by an old trimmer, who has been using it for a number of years back, and claims for it a comparative victory over those destructive pests known as moths. His plan is an invisible one, and strikes at the very harboring places they infest. The plan is a mixture of the paste, and will not in any way impair the quality of the paste nor stain the linings, as might at first be supposed. The paste is made up in the usual way with fine tar mixed in it, in the proportion of two tablespoonfuls to a gallon of paste. By putting this in the paste you will readily see that the preventive is distributed throughout the whole carriage. The odor, it is said, remains a long time, but is not sufficiently strong to render it disagreeable to smell; hence the advisability of using it in the carriage business.—*Carriage Monthly*.

**THE FIRST WATCH.**—The first description of a watch extant is found in the "Cosmographia Pomponii Melæ," under the heading "Nuremberg." After a description of the place comes a sentence in Latin which, freely translated, reads: Peter Hele, quite a young man, is making articles here which excite the admiration of even the most learned scientists; out of a small quantity of iron he makes a clock with numerous wheels which will register and strike 40 hours in whatever position it may be laid, and even when carried in the bosom or in the purse. This Hele was born about 1480, and is claimed as the inventor of the pocket-clock, as it is called in Germany. No specimen known to be his work beyond a doubt has come down to us, but some of the Nuremberg eggs were probably contemporaneous with the works of his later years.

**NATURAL GAS AS FUEL FOR LOCOMOTIVES.**—The Pittsburgh *Commercial Gazette* says: "The Philadelphia Co. is arranging to pipe gas into the yards of the Pennsylvania railroad, into a big reservoir that is to be put up there for the purpose of supplying the tanks of engines that are to be run by natural gas. 'The scheme is perfectly practicable,' said an officer of the Philadelphia Co. 'It has been said the gas is so volatile that no tank can be constructed that will hold it. This is all nonsense. We shall demonstrate not only the practicability of confining gas, but the fact that it may be used as a fuel aboard engines so cheaply that, in a short time, not a locomotive running into or out of this city will use coal.'"

**ANY CIRCULAR SAW** should balance perfectly in any position, before and after toothing. By the use of inserted teeth, circular saws may be enlarged from one to two inches effective diameter. Care must be taken with inserted-tooth circulars to have the guides clear the teeth. If the mandrel is a tight fit when cold; it will be apt to spring the saw when it is heated. In order to prevent wearing out the guides of a circular, it will be well to hold the end of a new oil-stone against the disk where the guards touch it; this will polish and furnish a track.

**AN ANCIENT STONE PLOW**, weighing about 300 pounds, has been unearthed in New Jersey, at the old Smith-Clark quarry. The Milford *Leader* says: "It had the appearance of having been cut into the shape of a plow by an ancient people. It was complete in nearly all its parts, and bore a strong resemblance to that sort of agricultural implement used by the Assyrians and Egyptians centuries ago."

**GASOLINE AS FORGE FUEL.**—It is said that the most satisfactory results have been obtained at the Government arms factory in Springfield, Mass., from the use of the vapor of gasoline as a forge fuel. The expense is said to be not even half that of coal, and there are other minor advantages. This success has greatly interested New England metal-workers, who are already beginning to adopt it in several factories.

**PRINTED MATTER MAY BE COPIED** on any paper of an absorbent nature by dampening the surface with a weak solution of acetate of iron and pressing in an ordinary copying press. Old writing may also be copied on unsized paper if wet with a weak solution of sulphate of iron, mixed with a small quantity of solution of sugar syrup.

**IVY AND DAMPNESS.**—An English experimenter finds that, contrary to general opinion, a growth of ivy over a house renders the interior entirely free from moisture. The ivy extracts every possible particle of moisture from wood, brick or stone, for its own sustenance by means of the tiny roots which work their way into even the hardest stone.

**A GOOD PAINT FOR SHEET IRON** is made as follows: Good varnish, one-half gallon; boiled linseed oil, one-half gallon; add red lead sufficient to bring to the consistency of common paint. Apply with a brush. Applicable to any kind of iron work exposed to the weather.

**FROZEN MILK IN FEVER.**—Dr. E. J. Janeway, a New York physician of some note, acting on a suggestion from a colleague practicing in the country, has given frozen milk to patients whose stomachs did not tolerate ice-cream, and speaks highly of its use in fevers.

## GOOD HEALTH.

## Pasteur's Method of Vaccination.

If a section of the spinal cord of a rabid dog be inserted into the brain of a rabbit by trephining, the latter animal becomes mad in about 15 days; and when the virus from this rabbit is transmitted to a second, and from the second to a third, and so on, by the same method of inoculation, the rabies soon become more and more pronounced, and the developing or incubation period becomes shorter and shorter, until, at the end of 50 inoculations, a most severe form of madness results in about seven days. The virus from the last rabbits is of great purity and of invariable strength, so that similar sections of spinal cord may, therefore, be relied upon to produce exactly similar effects. It has been further shown that the virulence of the pieces of cord slowly and quite regularly disappears when kept in dry air and remains unaltered when preserved in carbonic acid gas. An understanding of these principles makes it possible to have constantly on hand hydrophobic poison varying in strength from harmless mildness to deadliest virulence. It is upon these graduated poisons that Pasteur depends for his remarkable method of protecting the animal system from hydrophobia. Experimenting first with dogs, a little meat broth containing weak virus was injected under the skin the first day, and was followed daily by injections of increasing virulence—that is, preparations from cord of shorter exposure to air—until in a few days the fresh or strongest virus was used, when it was demonstrated that, without injury to the animals, had become entirely refractory to rabies from bites—even when inflicted before treatment—or inoculations of any degree. The method was first tried on a human subject in July, 1885, when immunity was conferred within ten days on a boy considered to be in great danger. Since then several hundred bitten persons have been treated, and thus far the only failure to prevent hydrophobia has been in a single case where the inoculations were attempted too late.

## Sunstrokes.

One of the peculiarities of the late warm spell is the occurrence of sunstrokes in the hot valleys of the interior portion of the State. Some of our contemporaries have connected them with the thunderstorms which have recently occurred not only in the bay counties but in the Colorado desert region. One of our city contemporaries says: We have already called attention to the fact that our last storm had its counterpart 10 years ago, and that season was remarkable for its sunstrokes, seven cases occurring near the town of Turlock in one day. Much higher temperatures are felt almost every year than characterized the late heated spell, and no such results have followed. It is embarrassing, however, to be obliged to explain to our Grand Army visitors how exceptional thunderstorms and sunstrokes are in this State, for there are some who will be ungenerous enough to be incredulous.

The following cases of sunstroke were reported within a day or two after the late electric display: At Oroville the deaths include Mrs. T. J. Coffin, a nurse, and Mrs. John Pollock.

Four cases of sunstroke are reported from Moore's Station, Butte county.

In Tehama county there were two deaths from sunstroke on Friday and Saturday. Both were harvest laborers, one being named Leslie and the other Domingo.

Two more deaths are reported near Stockton—James Dooley, a laborer from San Francisco, and Christ. Wall, who was a deckhand on a schooner.

At Sacramento, Saturday, Patrick O'Brien died suddenly from the effects of the heat.

**THE PHILOSOPHY OF VACCINATION.**—Professor Tyndall explains the philosophy of vaccination as follows: "When a tree or a bundle of wheat or barley straw is burned, a certain amount of mineral matter remains in the ashes—extremely small in comparison with the bulk of the tree or of the straw, but absolutely essential to its growth. In a soil lacking, or exhausted of, these necessary constituents, the tree cannot live, the crop cannot grow. Now, contagia are living things, which demand certain elements of life, just as inexorably as trees or wheat or barley; and it is not difficult to see that a crop of a given parasite may so far use up a constituent existing in small quantities in the body, but essential in the growth of the parasite, as to render the body unfit for the production of a second crop. The soil is exhausted, and until the lost constituent is restored, the body is protected from any further attack from the same disorder. Such an explanation of non-recurrent diseases naturally presents itself to a thorough believer in the germ theory; and such was the solution which, in reply to a question, I ventured to offer nearly 15 years ago to an eminent physician. To exhaust a soil, however, a parasite less vigorous and destructive than the really virulent one may suffice; and if, after having by means of a feeble organism, exhausted the soil without fatal result, the most virulent parasite be introduced into the system, it will prove powerless. This, in the language of the germ theory, is the whole secret of vaccination."



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**CLEANUP.**—Amador Ledger, July 24: The total cleanup of the Volcano Gold Gravel Mining Company's claim at Volcano for the season's run, amounted to \$19,117, considered a very satisfactory yield. Within the last five days the sale of the St. Julian mine of 1400, feet located at Middle Bar, between the Little Sargent and the Nevill mine, was negotiated by Col. Robertson to Mr. Wm. M. Curtis for the controlling interest, 62,500 shares, owned by A. Caminetti, at about 10 cents per share; 10 per cent down in 45 days; ten per cent in six months, balance, one year. The same rate paid for the control will be paid for the rest of the stock should the parties desire to sell. Col. Robinson is sinking on his Middle Bar mine at Middle Bar, and will likely consummate a sale soon to San Francisco capitalists for one-half interest for mill and hoisting works. The ore assays \$20 per ton. The Amador Queen mine and mill have been idle for several weeks. Half a dozen laborers' liens, to secure wages aggregating \$500, were filed against the property last Wednesday.

**SUTTER CREEK.**—The Mahoney Co. have decided to commence operations again on the surface. They have two or three men at work laying a track to the mill, and in a few days they will have a number engaged in running surface dirt to the mill. There is any quantity of rock, and every reason to believe that it will pay the company handsomely for crushing. Operations at the Amador Consolidated are still at a standstill. It is known that it is the intention of the company to keep the water out, but beyond this everything is involved in uncertainty. The break that occurred in the pipe that carries water to the Lincoln has been repaired, and everything is running in regular order once more. The 10-stamp mill of the Iowa will be completed this week, and in all probability the stamps will start next Monday.

**SHUT DOWN.**—Amador Dispatch, July 24: The mill at the Live Oak mine has been shut down for awhile, as the owners are engaged in sinking the shaft and prospecting lower down.

## Calaveras.

**ANGELS MINING NOTES.**—Mt. Echo, July 21: The Tozer mine, though lying idle at present, will start up anew shortly. Steam is generated tri-weekly for the purpose of freeing the mine of water until all the necessary preparations are made for resuming work again. The Lane mine is running in full blast. The batteries are kept in constant motion, and it is reported that very good rock is being extracted. Everything has the appearance of life and activity at the Stickle mine at present. Work is being executed vigorously day and night in the mine and at the mill. High-grade ore is being mined, and an unparalleled yield is anticipated at the next cleanup. The Jones mine, situated at the mouth of Carson creek, has recently been pumped out. As soon as the requisite repairs are made operations will be resumed. The Gold Cliff mine is running night and day and a vim never heretofore exercised for proving the true value of this immense ore deposit is being indulged in in a manner born of true energy. The stamps send forth their thundering roll over hills and plains, mingling their sound with the numerous other mills in this vicinity, sending gladness to the hearts of our miners and residents in general.

**MINING ACTIVITY.**—Calaveras Chronicle, July 24: There has been considerable activity noticeable of late in the mining interest. And while we feel some shyness in placing too much confidence in the little boom which we are having, from the fact of having experienced a number of such awakenings in this interest which resulted in making us sadder and a little wiser, still, for all our several disappointments, we have again occasion to renew our hope and expect good developments in the quartz interest in this part of the county. It can hardly be called a boom, for the stir is not sufficient to warrant the designation, and we are not sorry for that, either, because we have had all our faith in a "boom," according to the common acceptance of that term, knocked clear out of us. But the late moderate activity partakes more of the air of business, with the noticeable absence of any "splurge," or desire to make great bluster and blow, which, in mining operations, looks very suspicious, and which experience has taught will be followed by no good results. Those persons who are looking for chances for profitable mining investments in this vicinity at present are plainly of the kind who do not court publicity as does the adventurer, who, without means, depends upon an outward show and boom to afford a temporary good living, by the wholesale swindling of too credulous creditors and unsuspecting laborers. Whether or not the renewed activity will prove of permanence and turn out profitable will remain to be shown. We can say, however, that the evidences warrant the belief that there will be a marked revival of the quartz-mining interest in this vicinity, and there will be good mines opened. In the Middle Bar district things are looking very flattering, the best prospects, however, being confined to the Amador side; but it is a very sure thing that valuable quartz discoveries will be made on the Calaveras side. A great deal of prospecting is going on in that neighborhood, and the results are encouraging for the prosecution of work on several locations there. The Quaker City mine, located at the Junction, about three miles south of this place, is a piece of property which has lain idle for a number of years. About a year ago a tunnel was started to reach the lead which had been worked to a certain depth by means of a shaft. Work in pushing the tunnel was prosecuted only at intervals and not continuously during that time, but now the mine has been bonded to San Francisco parties and work in the tunnel has been resumed. Seventy-six feet more of tunneling will tap the lead at a depth of 250 feet. At Rich gulch a mill is being constructed on the Eureka mine, which will soon be completed and running. In the Blue Mountain district the famous Fine Gold mine continues in operation, and though

no report relative to the mine has lately reached us, we believe everything is working with satisfactory results. We are expecting to be able to chronicle some successful operations in that neighborhood at an early day. We have received no report from mines in West Point district for some time past, but we believe that the enterprises in that locality are being steadily pushed ahead. The Tiger mine, at Rich gulch, has recently been sold for \$20,000 to an Eastern company. A new 10-stamp mill has been erected at Railroad Flat on the mine of Messrs. Carigan & Jones. In a word, the signs are encouraging in the prosecution of quartz mining.

## El Dorado.

**MT. PLEASANT.**—Placerville Republican, July 23: The old Mt. Pleasant mine continues to send up first-class ore from the 700-foot level, and the entire people of the neighborhood are jubilant. One hundred tons of fine-looking ore from the Eagle King mine near Grizzly Flat is being crushed at the Mt. Hope mill and promises a good return.

## Inyo.

**BOTH GOLD AND SILVER.**—Independent, July 24: For some time past Reynolds and Treglown have been working a mine at Eclipse, about seven miles south of Independence Station. They worked only for galena ore, but under this, and separated from it by a few inches of clay, is a vein of quartz. Some few weeks ago a few tons of the quartz was saved and milled, and yielded \$24 a ton. Now all of the ore is saved, and will be shipped to the Maxim mill to be worked. During the past ten days the mill has been overhauled and put in thorough repair, and a side track is being put in from the C. & C. railroad. The quartz vein in the mine is two feet wide, and being mined with the galena ore the cost of getting it out is but little. The condition of the veins in this mine appears to be very much like that of the neighboring Brown Monster.

## Lake.

**MORE ORE.**—Lakeport Democrat, July 24: The Great Western mine has recently been reported as worked out and shut down. On the contrary, it has just struck a rich deposit of ore, and is driving ahead with better prospects than for many years. The Bradford brothers have a very excellent mine, and are working it in a small way and all making money. There is reason for believing that it will prove to be the richest quicksilver mine in the county.

## Mariposa.

**BUENA VISTA.**—Cor. Mariposa Gazette, July 24: Last week I went around the several mines to get a few items. The Buena Vista mine is getting in good order and ready for a start. Everything about the mine and mill is getting ready for crushing the quartz rock. The mine looks like an everlasting good mine; it is 10 to 12 feet in width, and very extensive, and has a 10-stamp steam power mill already to start.

**THE PADDY MCCANN MINE** on Sherlock's, run by Dr. Robinson, who is chief engineer and manager, is getting ready to start up a five-stamp mill on the same. This mine is a talc formation, carrying coarse and fine gold; it is very soft and easily crushed. Everything about the mine is in good shape.

**THE DILTZ MINE.**—Captain Diltz is still hard at work on his mine, and is showing up a splendid vein. There is sufficient rock already out to run a 10-stamp mill a good many years with a big profit. A good mill is what is most needed.

**SCHANZ MINE.**—Joe Schanz is at work on a vein just below the Diltz mine on Sherlock's creek with a fine prospect. The rock is rich in fine gold. Nothing like grit, and Joe is full of it. Ellingham, Grove & Co. have a mine on Whitlock's creek, and a prospecting mill of two stamps. Their vein is good size and prospects well, and it is thought they have a valuable mine.

**RUMLEY MINE.**—Rumley has gone to the mountains and left David Egenhoff and F. Davis in charge. They are sinking a shaft on the mine in hopes of finding the other end of a rich pocket.

## Mono.

**BENTON ITEMS.**—Bodie Miner, July 21: Miller's mill is running along steadily. The chlorides on the hill and up in Montgomery canyon are doing fairly well. Tucker & Mitchell shipped two tons of silver-lead ore on Tuesday. M. Harrington is taking out some good ore again. P. Dowd, Joe McDermott and several other persistent prospectors have been making a few developments on some of the gold ledges of Clover Patch and in the vicinity of the Wild Rose.

## Nevada.

**BADGER.**—Grass Valley Union, July 20: Since the Badger mine has been pumped out, a good-sized vein shows in the incline and drift, but it is found that much waste material left from former workings will have to be cleared out before systematic development can be commenced. The vein carries good-looking sulphurets.

**NEW MILL.**—North San Juan Times, July 24: We learn that a quartz mill for the new quartz mine on Armstrong's ranch below Sweetland has been ordered from Downieville. It will cost \$500 and crush from 15 to 20 tons of rock in a day. It is said that the company have 1000 tons of rock mined ready for crushing, which will pay from \$6 to \$10 per ton, if not more.

**BEATS THE DAYS OF '49.**—Nevada Transcript, July 21: John Curry, who, on the 10th of this month, struck a pocket of rich ore while sinking on the old Joe Lopez ledge out on Rush creek, brought to town recently a gold bar worth about \$850, it being the result of two days' work in the claim. In pioneer times an ounce a day was considered pretty good pay for mining. Curry thinks there is plenty more gold left where he got that from which he brought in yesterday. It is the same ledge in which Joe Lopez a few years ago struck a pocket that produced \$18,000 or \$20,000 in a few days.

**GENERAL NOTES.**—Foothill Tidings, July 26: The Idaho has just paid its 20th dividend, and on the first Monday in August the grand old mine will pay another dividend, and if no unforeseen accident happens it will keep on paying for years to come. The Badger mine is now entirely pumped out, the main shaft being to the depth of 175 feet on an in-

cline, while the shaft sunk about midway on the main shaft is down about 190 feet from the surface. The water is now easily controlled, and a contract has been let to sink No. 2 shaft 25 feet deeper. Z. Mansau is preparing to erect machinery on the Coe mine, and as soon as it is in place, work will be commenced. Work is steadily going ahead at the Horseshoe. The ledge in the drift is 2½ feet thick, and of good healthy quartz. There is every prospect for a good mine there, and the company is in exuberant spirits over the discovery of such good-looking quartz in such a ledge. This is supposed to be an extension of the famous Allison Ranch. Back of Watt Park, R. Connolly and R. Ryan, with their partners, have erected a pumping engine and a whim for hoisting, and now have a shaft down 100 feet on a well-defined ledge, the ore from which yields from \$13 to \$15 per ton. We could not learn the name of this prospect. The miners have only been working upon it a short time. The Gold Point mine has a 2½-foot ledge. There are now 1200 feet of drifts in the mine, 500 feet being on the course of the ledge. The company will soon introduce water power into the mine, having already made a contract with the Grass Valley Water Company to furnish water for them. There are now about 100 loads of ore from the Gold Point waiting to be crushed. The Central mine, on Greenhorn creek, is looking well, and the company is pushing work ahead as fast as possible. A Hill roller-mill will be in operation on the property by the first of next week. Orlando Stoddard has charge of erecting the machinery, and Wm. Fowler has been appointed superintendent. Three Triumph concentrators are already in place ready for their work. The ledge in the Central (old Greenhorn) runs all the way from 3 to 6 feet in thickness, and is good bearing. The North Star mine is looking better all the time. A quartz mill, like that built by W. C. D. Body at the Empire, will soon be erected on the North Star. Bids for sinking the shaft on the St. John (Knights of Malta) will be received through the postoffice. The mine will soon be put into condition for thorough development. The Crown Point mine is still turning out pay ore, and soon a larger and greatly-improved mill will be erected. There is good ore coming out of the Pennsylvania. The lessees feel greatly encouraged with their prospect. The Lone Tree Company is busy making arrangements for the erection of machinery on the mine. It will take but a few weeks to complete this work. The Leami Company (gravel) is now preparing to resume work. The owners in this claim feel confident that they are on the old Alta channel.

## Placer.

**NEW DITCH.**—Placer Republican, July 21: Mr. Burleson, superintendent of the Lee mine near Rocklin, has been making a survey for a new ditch, by which it is proposed to take water out of the American river above Lyons' bridge. It is designed to supply water to the Rocklin mines and to the ranchers along the route. The proposed capacity is 3000 inches.

## Plumas.

**NORTH FORK.**—Plumas National, July 23: There is a good deal doing in our North Fork mines, and a good deal of prospecting is going on in various localities. Jeff. Buffington lately made a good strike at Cariboo. Baptiste Piazoni has reached gravel in his drift diggings. All work has been stopped at Dutch Hill in consequence of the hydraulic injunction. Work has recommenced at Sunnyside. About all the Big Flat country has been located in gravel claims.

## San Diego.

**MINING PROGRESS IN THE SOUTH.**—Los Angeles Herald, July 24: There is a steady improvement in mining matters wherever the heat of the weather does not interfere with business. There is no great bonanza discovery, but a steady increase of small mills and mines. The Julian mines of San Diego county seem to be steadily improving. The Stonewall continues pouring out a steady golden stream. The Owens mill has just crushed 60 tons of ore that yielded the remarkable sum of \$15,600, or \$260 per ton. The Shenandoah has made a rich strike, and now the strife will be between the Owens, Shenandoah and Stonewall mines to see which shall be the greatest. There are many other mines that are being opened with gratifying prospects in the neighborhood of the Shenandoah. The mines on the desert near Yuma are wonderfully rich, but are not pushed now on account of the heat of the weather. Pinacate is also a steady bullion producer of gold. There are many other districts in that county where gold is abundant and only needs a railway near and some capital to bring it out, so that San Diego may be called a permanent and large-producing county.

**JULIAN.**—San Diego Union, July 22: Bailey brothers, of the Ready Relief mine, have a fine body of rich ore opened, and are doing well. The Owens mine, situated on the hill just above the town, is in good shape and is a very valuable property. The main or working shaft is down 200 feet, and still sinking deeper. The levels running from the shaft develop a body of pay ore from three to four feet wide, and as far as developed 200 feet in length. The mine is provided with a fine new 10-stamp mill, which is kept running day and night, when they have a sufficient quantity of water. This defect will soon be overcome, and then look out for a large yield of bullion. They have about 300 tons of ore on the dump, which good judges say will not average less than \$25 per ton. The Stonewall mine, situated in the Cuyamaca valley, is doing a fine business. They have a pay chute of ore from 4 to 20 feet in width and 200 feet in length. Many good judges say that this is the best gold-bearing mine in the State. They also run a 10-stamp mill day and night. One thing sure—we may all look for a good record from the Julian mines for the next two years.

## Shasta.

**MILL.**—Shasta Democrat, July 21: We are informed that Mr. Day has bought his partner's, Hart's, interest in the Georgia & Texas mining property in old Diggins district, and is preparing to rebuild a 10-stamp mill. Last week an eight-foot vein was struck in the Snyder mine, Squaw creek, and the best of it is the ore prospects and shows lots of free gold. The strike is a big thing for the camp. Mr. Myers, who owns a promising mine in French Gulch district, adjoining Scorpion, last week shipped a boiler and engine here, purchased in Grass Valley,

with which he will run his cannon-ball mill. He expects to be crushing by the last of this month. The coal discovery east of Millville promises to be a bonanza. There are three distinct veins which have been traced for over a mile. A force of men is at work putting up the machinery on the Salt Creek tellurium mine. Mr. Scheerer thinks the works will start up in two weeks.

**IRON MOUNTAIN.**—Courier, July 24: There are various rumors as to what will be done at the Lost Confidence mine at Iron Mountain. There is a hitch between parties interested in the mine and machinery, and until these differences are terminated nothing definite will be known. We are informed that unless a satisfactory arrangement can be made the immense plant of machinery will be removed from the mountain, and in that case the district would be put back for half a generation. Sam Blue, who owns a very good mine on Iron Mountain, came down to town this week, the lonesomeness of the mountain being too oppressive for him. Three months or so ago there were about 250 men on the mountain; now the number can probably be represented by counting the fingers of the human hand one time, and the wheels of the great new mill stand unturned and the stamps give forth no sound. We hope to see all differences between parties interested in the mill and mine adjusted, so that the scene may be quickly changed.

**FRENCH GULCH.**—Free Press, July 24: Tom Green's new stamp mill has commenced running and is working well. The mine is very rich and splendid results are anticipated. On Friday, July 16th, the Scorpion Co. blew their whistle for the first time. Col. Gannon is here looking after things. They have a vein of good ore. Mr. Myers, proprietor of the Enterprise mine, has just returned from below with a new boiler, and the mill will be running again in a few days. The Niagara mill keeps pounding away on good ore. The contract tunnel will be in by the last of the month. The Washington Co. is taking out good ore.

**AT SUNNY HILL.**—Anderson Enterprise, July 23: Here we found things much after the old order, unless we except Gray Eagle mine and mining operations. Mr. Loomis, the superintendent of the Sharp Mill and Mining Co., was very polite, and kindly showed us through the mill. From that gentleman we learned that the mine was turning out large quantities of very good milling rock, the rock averaging about \$25 per ton, and the mill working about 15 tons in 24 hours. Everything about the mill and mine is well arranged, and we congratulate the owners of the Gray Eagle mine upon having what we believe to be a rich and permanent mine. We did not visit the Tim Quinn mine, but learned that Messrs. Frank & Driscoll were working the same with favorable prospects ahead.

**THE CALIFORNIA MINE.**—This is the name of a new mining location made on Monday last, and the editor of this paper is the fortunate owner of a half interest in the same. The location is north of the Gray Eagle, and has an immense surface showing. This mine will prove a bonanza because Joe Davis is connected with it. It is not for sale.

## Sierra.

**TOO MUCH WATER.**—Tribune, July 23: The Butcher Ranch mine was closed down Wednesday morning on account of there being more water in the shaft than could be handled. The pump was taken out and the 15 or so employees discharged. Mr. Van Slyke, the owner, intends to run a tunnel into the ledge.

**THE BALD MOUNTAIN** owners have been running a tunnel into some new ground, and it is said they have struck a large body of gravel that looks well. However, they have not got in far enough yet to determine the value of the deposit. It may afford them a couple of years' work yet.

**GRAVEL.**—Mt. Messenger, July 24: Good prospecting gravel was struck, last week, in Deadwood, Northern Sierra. D. Rouse contracted for half the mine, to run the main tunnel to the pay streak.

**GOOD PROSPECTS.**—Tribune, July 23: The Grover Cleveland mine is located about three miles northwest of the Young America, and is owned by Sierra Valley parties. The prospects are that this is going to be a big mine. Very rich rock has been struck, and naturally the owners are jubilant. From 25 cents to \$1 per pan is obtained from decomposed rock that comes from the ledge. An assessment of \$2000 has been levied by the company for the purpose of thoroughly prospecting the claim, and we are told that if the prospects continue as favorable as they are now a mill will be erected in a short time.

**A SEASON CLEANUP.**—A cleanup for the season was made at Hughs' & Osterman's gravel claim a few days ago, and \$6000 obtained. The claim is located near Gold Lake, and is worked on a small scale. P. Lamping was down from the Primrose mine Sunday. He has several men at work there getting things in readiness to put in the pump and clear the shaft of water. A saw-mill is also to be rigged up for the purpose of getting out lumber with which to erect a boarding-house and make other improvements. A San Francisco company has come into possession of the Way & Cobb quartz mine at Cold Spring, six miles southwest of Forest City, and it is said that a 60-stamp mill will be erected on the claim.

## Siskiyou.

**ORO FINO.**—Cor. Yreka Union, July 21: The mines have all shut down. The Eastlick claim, making a run of 166 days and finished cleaning up and retorting on the 13th, carried their gold dust to the Fort on the 14th inst., and report having 1531¾ ounces, which would make a total of \$23,733.25 at \$15.50 per ounce. Wright & Fletcher have cleaned up, but I am not advised as to the result. Many rumors are afloat, placing the amount all the way from \$2000 up to \$10,000. R. H. Campbell, I understand, took out \$7000 and worked mostly top dirt this season. He will put on a lifter this coming season and no doubt will make another \$25,000 cleanup or more next year, as he has some of his best ground to bottom the coming season.

**SCOTT BAR.**—Robinson, Classen & Co.'s quartz lead still continues to pay exceedingly well. They have a good piece of property which, if it continues to pay as it does (which there is no reason why it won't), they will have all they want; the only trouble



is that they have no practical way of working it other than with a mortar. Tompkins' lead continues to pay well. It is a continuation of Robinson & Co.'s. Bennett & Co. are hoisting out the gravel, but as yet they have not cleaned up. Magoffey and Ingram have made quite an opening in their claim, but they have not struck anything wonderful as yet. The Quartz hill miners cannot put in over half time on account of the intense heat and the scarcity of water.

**ETNA.**—Cor. *People's Cause*, July 24: The miners in this section are not so unfortunate, having the Klamath river into which to deposit their tailings, there being no farming country nor navigable waters to interfere with. I had the pleasure of seeing a large shipment made from here to-day of over 300 pounds from Wells, Fargo & Co.'s office at this place, R. H. Campbell acting as special messenger as far as Yreka. There is about \$100,000 shipped annually from the Etna express office, Fort Jones and Callahan's about the same, making \$300,000 annually from Scott valley, besides what goes from Yreka, making perhaps a half million shipped each year. I am told that the mines in this county are only worked on a limited scale. With the railroad now coming into this county, I have no doubt that capitalists will invest in Siskiyou county mines, which will then rank foremost with the best gold-producing counties in the State. Mr. Campbell is also interested in a mine on the south fork of Salmon river that is paying handsomely. It is managed and superintended by G. C. Spooner, an old hydraulic miner of 30 years' experience in Nevada county.

## NEVADA.

## Washoe District.

**CHOLLAR.**—*Enterprise*, July 24: The south lateral drift from the 3200 level, Combination shaft, is now in 55 feet, following along the east clay of the recently developed ore vein in the west face of the station, keeping to the east of it. Formation, dry porphyry with a little quartz. The north lateral drift from the station is out over 100 feet, being now about 40 feet into Norcross ground. It is intended to follow along the east clay wall of the recently developed ore vein in the west face of the station, but the last 20 feet grazed into the vein, showing better ore than was found in the station face. This is a significant circumstance, as showing improvement to the north and east. Connection with this drift and that from the Hale and Norcross deep winze will be made to-morrow, if not sooner. It will take a few days then to straighten up the joint drift and put it in proper working order, after which three crosscuts west will be started, one in the face of the station and two further north.

**SAVAGE.**—On the 600 level no further advancement has been made in the face of the main south lateral drift, which ended in a vein of good ore stated to be 15 feet or more in width. Crosscut No. 1, south of the Gould and Curry line, stopped in the east clay wall, and a crosscut west, opposite it, is now out 75 feet from the main south lateral drift in very favorable ore-vein matter. About 100 feet further south an east crosscut was run 65 feet to the east clay wall, and from it a drift is now being run southeast along the clay wall. The face of this drift is now in good ore, and nearly opposite the ore body developed in the face of the main south lateral drift. These points being 65 feet apart indicates a greater width of the ore body than has been supposed, and the further development thereof during the next few days will be of considerable interest to Savage mine-owners or holders of the stock.

**HALE AND NORCROSS.**—On the 3200 level the lateral drift south from the bottom of the deep winze will make connection with the north lateral drift coming from the Combination shaft this evening or to-morrow. A crosscut east was started yesterday 100 feet south of the winze station to run through to the east wall in order to see what is to be found in that direction. The lateral drift north from the winze station is out 77 feet. All the new drifts on this level in this mine or in the Chollar from the Combination shaft are in dry ground, no water being encountered. Good ore has been found on this level near the south line as mentioned in the Chollar report.

**BEST AND BELCHER.**—Connection was made yesterday with the fourth line of Cornish pumps below the lowest or 2310 level, ready for the further regular reduction of the water preparatory to deeper sinking. The heavy stone bulkhead on that level to shut out the inflow of water from the northward is being commenced. Both these measures will materially reduce expenses hereafter as far as handling the water is concerned. On the 600 level the northwest branch drift from the main west drift has been cleaned out for 200 feet, and this work is being continued in resumption of explorations in that direction.

**POTOSI.**—Chambering out for the header for diamond drill hole No. 6 near the Chollar line is concluded, and the drill will be started east into the vein to-morrow. Drill hole No. 5, farther south, had to be abandoned after reaming out and pushing the drill a few feet further ahead, the hole being too long for easy working, yet the east side of the vein was not reached. It is apparently 200 feet or more in width at that point.

**CON. CALIFORNIA AND VIRGINIA.**—The southwest drift on the 1550 level, and the northwest drift on the 1400 level, are both making good progress, and the repairs to the shaft station on the 1500 level are about concluded. About 350 tons per day is the regular yield of the mine, assaying according to battery samples at the mills about \$11 per ton.

**CROWN POINT AND BELCHER.**—About 300 tons is the regular daily yield, keeping the Mexican, Santiago and Vivian mills steadily supplied. The ore breasts and stopes being worked are from the 1700 up to the 1100 levels.

**OPHIR.**—On the 1300 level the south drift from the shaft is advancing well in favorable vein material. On the 300 level the crosscut west makes good advancement.

**SIERRA NEVADA.**—North lateral drift No. 2, from the west crosscut on the 520 level, has been advanced 50 feet, making a total of 350 feet. Material, vein porphyry with a little decomposed quartz.

**GOULD AND CURRY.**—On the upper level, 150 feet above the track floor of the 600 level, the exploration drifts west and north are progressing well in favorable vein material giving low assays.

**MONTE CRISTO.**—About 40 feet further remains to be run with the drift west on the 150 level from the new shaft in order to crosscut the old ore vein of the mine.

**YELLOW JACKET.**—The old ore stopes and breasts are holding out finely, and shipping to the Brunswick mill the regular daily yield of about 140 tons per day.

**ALTA.**—On the 700 level the west crosscut is expected to cut the old Keystone ledge during the coming week.

## Eureka District.

**ORE SHIPMENTS.**—*Sentinel*, July 24: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Eureka Con. Works—Dunderberg mine, 50 tons; Lord Byron, 9½; Scott, 1½; War Eagle, 1½; McElroy, 3½; Last Chance, 2; Mexican, 2½; Morey, 14; Bay State, 12. To the Richmond Works—Silver Lick mine, 46 tons; Marguerita, 2½; Last Chance, 1½; Wide West, 2; White Pine, 7; Jackson, 71.

## Lewis District.

**THE PITTSBURG MINE.**—*Tuscarora Times-Review*, July 21: It will surprise many to learn that the Pittsburg, lying four or five miles from Lewis, and 25 from Battle Mountain, is a magnificent mine. It is now owned by J. A. Blossom, who has negotiated half of it in exchange for a fine 40-stamp mill with machinery to double its capacity. General Foreman is at the mine arranging for the erection of the works. The ore goes \$40 in gold and works over \$24 a ton. It has turned out over \$100,000. The ledge is from 8 to 12 feet wide everywhere. It breaks out on the side of a canyon and four tunnels start in on the ledge and run in on ore all the way. The bottom one is back 500 feet and every one has ore. All the prospecting and developing have been paid for by ore from the mine worked in a little Huntington mill.

## Tuscarora District.

**NORTH BELLE ISLE.**—*Times-Review*, July 24: The crosscut near the shaft on the 150-foot level has been extended 9 feet.

**NAVAJO.**—The south drift on the east vein, 350-foot level, has been extended 16 feet. The south drift on the west vein, 150-foot level, has been advanced 10 feet. The stopes on the 150 still yield the usual amount and grade of ore. Mill running as usual.

## ARIZONA.

**SILVER BELT MINE.**—*Prescott Courier*, July 23: The Silver Belt mine, in Big Bug district, is one of the properties that will soon again be contributing to the wealth of the country. When properly worked it never failed to pay, but, like most mines in new countries, it has had its setbacks, not because of the poverty of its ores, not because the ledge was too small, but mainly on account of high prices, isolation and a lack of harmony among its owners. It is situated about 16 miles east of Prescott, in a section of country that is easy of access. Not long since rains threatened to cause a cave in the shaft, and in digging a drain to conduct the water much rich ore was discovered near the surface, a fact which proves that nothing like the full ledge had ever been seen in sinking the shaft.

**HASSAYAMPA MINES.**—There are no better mines than those which prospectors have partially developed in Hassayampa district, some 12 miles south of Prescott. They carry gold, silver and lead, are of good size and surely permanent. The best of them belong to David Grubb, G. H. LaBerte, W. C. Flint, H. A. Bigelow, Wm. Jennings, Theodore Otto, Geo. Wickler, P. A. Craigue and Jack McDonald. Other miners, whose names we cannot recollect, have properties almost, if not quite, as good. The Senator and Dosoris have yielded hundreds of thousands of dollars. The Catocin, another valuable mine, is near the section we speak of. With reduction works at or near Prescott these mines, with those of Walker, Weaver, Groom, Turkey, Peck, Bradshaw, Cherry and other adjacent districts, will be made to yield carloads of the precious metals, and yet there are people here in Prescott who know very little about these mines or the wealth they contain.

## COLORADO.

**LAKE COUNTY.**—*Herald-Democrat*, July 20: Mr. Hassell and other large stockholders in the St. Kevin Mining Company have formed a corporation for the purpose of erecting a concentrating mill, adapted to the treatment of the low-grade ore product of the St. Kevin. Since the incorporation of the Hassell Milling Company, no time has been lost in carrying out its objects. During the past few days a complete mill was purchased, embracing a 50-horse power boiler and engine, pulverizing machinery and approved concentrating tables. The entire outfit is now on its way to Leadville. The site selected for the new mill is in St. Kevin gulch—a short distance above the place formerly occupied by the Pacific mill, recently destroyed by fire. Grading for the new mill is to be commenced to-morrow, and its completion is to be hastened along as rapidly as possible. The materials for the new mill, to be erected by Mathews & Webb, of Denver, and others in Tennessee Park, near the mouth of St. Kevin's gulch, are already on the ground. The mill, which is said to be a first-class one and exactly adapted to the mineral it is designed to treat, was formerly in operation at Silver Cliff. The owners expect to have the mill erected and machinery in place ready for operation in 30 days. Major A. V. Bohn, who took a lease a short time ago on the Last Chip lode, on the west slope of Fairview Hill, is drifting in a strong body of vein material. The developments up to date disclose a well-defined mineralized seam, but whether it is situated in a fault crevice or the regular lime porphyry contact we do not know. The work in either event is favorable, and likely at any time to disclose good ore. It is only a short distance west of the great mines of Fryer Hill, and the chances for an extension of the ore to this point are quite good. Major Bohn feels sanguine of ultimate success, and will continue until the ground is thoroughly proven up. The principal product of the Only Chance mine, on Rock Hill, is obtained from a winze, sunk below the main workings. This source of ore supply yields about \$3000 a month.

Preparations are in progress for the starting of a deep, new shaft on the southeast slope of Carbonate Hill, near the point where the North Star drill-hole was put down some years ago. Deeper work in the O'Sullivan mine is proving productive. Developments below the acknowledged plane of contact have disclosed ore from which assays have been obtained of 126 ounces in silver to the ton, and 70 per cent in lead. The Iron Mask mine, at Red Cliff, resumed active shipments again last Tuesday, when it sent 15 cars over the Eagle River branch of the Denver & Rio Grande Railway, consigned to Leadville smelters. The managers of the property expect hereafter to maintain a regular shipment of 14 carloads a day.

## IDAHO.

**QUARTZ.**—*Coeur d'Alene Record*, July 20: The *Record* has several times referred to the Margaret mine, which was one of the first, if not the very first, quartz location made in the Coeur d'Alene, and which shows such evidences as seem to warrant the conclusion that it will also rank among the first in value. It will be remembered that the Margaret is on Bald mountain on West Eagle creek. Seven months ago a company was incorporated under the laws of the State of Oregon, with the following named officers: D. C. McKurcher, president; Dr. E. O. Smith, vice-president and general manager; W. L. Newbury, secretary; L. G. Clark, treasurer. The capital stock is \$100,000, divided into 100,000 shares of \$1 each. Twenty-five thousand shares are set aside as working capital, and in addition to this provision five of the stockholders have entered into an agreement, which is duly recorded with all the legal papers, both in Oregon and Idaho, to contribute 25,000 shares more in case it is found necessary in order to get the mine to working upon a paying basis. But careful estimates show that the first provision is likely to be ample. At a depth of 82 feet the vein is eight feet wide and shows chloride, black sulphurets and brittle silver, and assays across the vein run from 50 to 1300 ounces in silver. The stock is made non-assessable.

**FOUR HUNDRED TONS OF ORE SOLD.**—The Montana Co., of Yankee Fork district, have sold to the Custer Co., the contract being closed a week ago yesterday, the entire old dump of the Montana mine, consisting of 400 tons of low-grade or third-class ore, and the ore will be removed at once to the Gen. Custer mill for reduction. The price paid was \$10 per ton on the dump. The Montana Co. have six tons of 200-ounce, or second-class ore, which was mined last year, that they will ship at the same time for reduction. Duncan Cameron went over to the mine Thursday to let the purchasers have the Montana's ore sacks so shipping could be commenced, and returned Saturday.

**OLD LOCATIONS.**—*Idaho World*, July 20: Prospects of late have been taking up and working old locations, well knowing that many quartz veins that would not pay expenses of working 15 or 20 years ago can now be made to give fair returns above all expenses. The old locations, abandoned many years ago, that now give promise of soon being classed as permanent mines, are those now being worked in Lewis gulch; the Cleveland, in Gambrian district, ore from which was recently crushed by the Forest King mill. The location near Grimes' creek, owned by J. W. Pharris and Charley Cooper, and which they are now developing, will no doubt pay. This is the first work that has been done on it for 20 years. The present owners will soon tap the vein in a new place, at the depth of 40 feet.

**RABBIT CREEK.**—Walt Galbreath came in a few days ago from Rabbit creek. He will return to-day. Walt and Conrad Haag own a recently-discovered vein of quartz over there, and are developing it. They are now running a cut and are down about 12 feet. The vein is narrow, but carries rich ore. Walt uncovered the vein the other day 20 or 30 yards from the discovery hole, and there it is even better than where first discovered. The ore carries both gold and silver, the former predominating. Walt brought in a number of specimens that were pretty freely speckled with gold, and liberally sprinkled with silver. He says the vein is no thicker than a knife-blade in places, and at the widest is six inches. It is an encouraging prospect, but the owners are not excited, and say they really have nothing yet to blow about, or on which to build big expectations. With the limited amount of development that has been done, it is entitled to the distinction of being called a very promising prospect.

## MONTANA.

**THE PILGRIM INCORPORATED.**—*Helena Independent*, July 22: Articles of incorporation were filed to-day with the secretary of the territory of the Bozeman Gold and Silver Mining Company with the following well-known incorporators: Hon. Samuel Word of Butte, Walter Cooper, Lester S. Wilson, John S. Mendenhall and Henry Fielding of Bozeman. The property to be worked by this company is known as the Pilgrim mine, owned by Walter Cooper, Esq., of Bozeman, and has been in course of development since August 1st, 1885, and has been a large producer of very rich gold and silver ores, a carload of which has been sampled in Helena, the result being most satisfactory. A number of carloads were also shipped to Omaha last winter. We have never seen any mention of his property in the territorial papers, but from experts and persons who have been on his premises and examined his property we learn that it is a large ore producer, and one of the finest properties in this Territory for the amount of development, which consists of a two-compartment shaft 103 feet deep and about 550 feet of levels and crosscuts. A first-class hoisting and pumping plant has, we learn, been ordered, and will be placed in position at an early day. The mine is located in Madison county, some 20 miles from Bozeman, and is surrounded by rich prospects entered years ago, but many of these old ones have been re-entered, and new locations made in the camp.

**NOTES.**—A contract has been let by the Hot Springs Mining Company to sink a perpendicular shaft 100 feet on the lead in order to prepare the property for effective working. The contract will be completed in about 40 days, and a large amount of ore will be taken out during the progress of the work. Hope Mining Company shipped 7051 ounces

of silver on July 2d, a half-month's run. The stockholders say that if the Hope proves a true fissure, as they have every reason to believe, the mine will rival the Granite. Mr. John Longmaid has been visiting the Cooke mining district, and is said to have been there in the interest of Helena capitalists. Cooke correspondent of the *Bozeman Courier*: The Republic company are doing finely, and turning out some very rich bullion for themselves, and helping the camp by buying ore from several of our mines, thus furnishing funds for the development of mines, which would otherwise only be represented.

**THE HAPPARANDA PLANT.**—*New Northwest*, July 17: Mr. W. A. Koneman, with W. A. Rodgers as general manager, has just completed the erection of a quartz mill near the old town of Reynolds City, on the northeast side of the range that divides Elk creek from Deep and Bear gulch, and just below the mine called the Happaranda, lately purchased by Mr. Koneman for \$25,000—\$3000 being paid down and the balance in installments. The mine was discovered 13 months ago and two tunnels run in on the lead 140 and 100 feet, with shaft connections to the surface, and about six feet width of lead and free-milling gold ore, but may be of low grade. The mill consists of a rock-breaker and a small pulverizer, made almost like a blower used in a blast furnace, inside of which four iron shoes revolve 1700 times in a minute, and so great is their pulverizing properties that they soon wear out, but can be replaced in 15 minutes. Their capacity is said to be 25 tons per day. There are four amalgamating pans and two concentrators, capable of working 100 tons per day. Mr. Koneman is the inventor, and claims a superiority over all others, the principal advantage being an easily adjusted motion, and the concentrates being carried up-hill on four-foot rubber rollers with a scraper underneath, while the tailings are washed down the incline into a settler. About a ton of concentrates that assayed \$114 per ton were saved in a 30 hours' run, a result he claimed not attainable by another process. No cleanup had yet been made. The placer mines at the head of the gulches will soon close down for want of water. There are more Chinamen working in the gulches than there has been for the past two years, and it is thought to be on account of their being driven from other places. Messrs. David Allen, Nat. Preston and Mr. Smith, of Butte, are prospecting with reported success upon the divide between the top of Deep and Bilk gulches.

## OREGON.

**QUARTZ AND PLACER.**—*Jacksonville Times*, July 23: L. D. Brown's mill has resumed crushing ore from Swinden's ledge. The past season has been a better one for placer miners than several past. There is considerable stir in mining circles, notwithstanding the hot weather. Gin Lin is still piping at his mines near Uniontown, but will make a cleanup before long. Piping has been suspended at McCall & Anderson's mines, two miles this side of Ashland. Patterson & Co., who are mining on Grouse creek, in the Siskiyou, are doing well this season. Lance, Duffield & Co., of Foot's creek, are finishing up and have done very well this season in their placer claims. Wimer & Sons, of Waldo, are cleaning up their season's work, and no doubt their big mine has paid them as well as ever. Two different parties have offered to put up a mill on the site of the Hope ledge, in Wagner Creek district, which prospects well. A party consisting of Messrs. Dollabride, Smith, Hawkins and Barnes, are opening a new placer mine on Beaver creek with good prospects. A number of mining operations on an extensive scale will soon be inaugurated in Josephine county, which offers superior inducements to placer miners. Blalock, Owings & Co. are still engaged in pulverizing cement at their claim on Jackson creek with sledges and washing the pulp in a rocker with good results. The Eureka Mining Co. is testing quartz from its ledge in Willow Springs precinct by means of an anastra, which crushes 600 pounds of quartz daily, with favorable results. The shaft now being sunk on the Wagner Creek Mining Co.'s ledge, known as the Pilgrim, has reached a considerable depth, and the ore shows considerable of an improvement. Baunle, Klippel & Co. have broken ground for their new quartz mill on Shively gulch, and mean business. Mr. Klippel will leave for Portland and San Francisco soon to obtain more machinery. J. N. Casteel is finishing up his contract with the Jacksonville Milling and Mining Co., but finds the rock quite hard and progress slow. He has commenced running a tunnel to tap C. C. Beekman's ledges. G. B. Caldwell & Son are cleaning up at their mines on Steamboat, and are doing quite well. Finney & Prickett are also taking out considerable gold, although they were compelled to abandon their hydraulic pipe and use picks and shovels, owing to the deepness of their diggings. Messrs. Cornelius, Church and Hastings, of Portland, who purchased H. Wines' placer mines on Jump-off-Joe, are now in this section making preparations for next season's run. They will put in a hydraulic pipe and a giant and operate on an extensive scale. These gentlemen are also interested in one or more quartz mines in Josephine county. Thirty tons of ore from B. A. Knott's ledge in Willow Springs precinct was crushed in L. D. Brown's mill near the Swinden mine recently, and turned out well. It is said that the quartz averaged \$10 a ton.

## UTAH.

**REVIEW.**—*Salt Lake Tribune*, July 24: The receipts of ore and bullion in this city for the week ending July 21st inclusive, were \$206,214.59 in the aggregate, of which \$57,739.10 was ore and \$138,475.49 was bullion. For the previous week the receipts of bullion were \$117,172.92; of ore, \$73,572.98; of both, \$190,745.90. The Ontario product for the week was 22,147.93 ounces of fine bullion, and \$14,302.72 in ore sales. The Daily shipped 18,171.19 fine ounces during the week, 13 bars. No ore sales. Fine bar receipts for the week amounted to \$40,347; base bullion, \$21,350. The product of the smelters for the week was as follows: Hanauer, \$27,585; Germania, \$15,501.87; Pascoe, \$2915. The Stormont sent up silver bars to the value of \$3350. The Alice sent down 30 bars of bullion during the week, \$25,127.62. Ore receipts during the week were: By Wells, Fargo & Co., \$21,579; by McCornick & Co. (including \$8265 Queen of the Hills), \$25,265; by T. R. Jones & Co., \$20,894.10.



GET THE BEST.

## The BARAGWANATH

### STEAM JACKET FEED WATER HEATER AND PURIFIER.

Adapted to High &amp; Low Pressure Engines.

OVER 5000 IN USE.

The advantages of this Heater, briefly stated, are as follows: It loses no heat by radiation. That portion of the water chamber which in all other heaters is subject to the cooling action of the atmosphere is converted into a heating surface by the Steam Jacket.

It has twice the heating surface of any other of equal size.

It delivers its water always above the boiling point, averaging from 215 degrees to 220 degrees. By boiling the water under pressure all impurities are thrown off.

It keeps the Boiler clean and free from scale, by which means a large saving in fuel is effected, as also a great saving in repairs, as well as the capacity of the Boiler largely increased.

It never causes any back pressure on the Engine, but acting as a surface condenser relieves any back pressure that may exist. Send for Circular.

A. P. BRAYTON, Jr.,  
Agent for the Pacific Coast.

PACIFIC IRON WORKS,  
127 First St., San Francisco, Cal.

GET THE BEST.

## THE BARAGWANATH HEATER.

WHAT IS SAID OF THEM BY PARTIES USING THEM.

"Heats water to 220 degs."

St. Louis, Mo., August 24, 1885.

Messrs. Wm. Baragwanath & Son, Chicago, Ill.—GENTLEMEN: We take pleasure in informing you that your Steam Jacket Feed-Water Heaters have given perfect satisfaction. We work the same in connection with three batteries of boilers, representing 650-horse power. They heat the water to 220° Fah., and we warmly recommend them to all establishments using steam machinery. Yours truly,

ANHEUSER, BUSCH BREWING ASS'N.  
GEO. KRUMSICK.

WOODMAN LINSERD OIL WORKS,  
OMAHA, NEB., Dec. 21, 1885.

Messrs. Wm. Baragwanath & Son, Chicago, Ill.—GENTLEMEN: Your heater is working to our perfect satisfaction. Temperature of feed-water is 218° and purification is perfect. From all appearances the heater is in perfect condition. It has been in constant use for three years. Yours truly,

CLARK WOODMAN, Pres.

Chicago, Dec. 15, 1885.

Wm. Baragwanath & Son—DEAR SIR: In answer to your favor of the 11th inst., we beg to state that we have purchased a large number of your Heaters for use of mining companies in the West and foreign parts. We have always received the highest possible testimonials regarding the operation of the Heater, and personally, we consider it equal to any Heater in the market, and give its use preference at all times. Yours truly,

FRASER &amp; CHALMERS.

GET THE BEST.

## THE BARAGWANATH HEATER.

WHAT IS SAID OF THEM BY PARTIES USING THEM.

Saves a ton and a half of Coal per day.

F. MAYER &amp; Co.,

Manuf'rs Furniture, 300 to 341 S. Clinton St.,  
CHICAGO, August 28, 1880.

Mr. Baragwanath—DEAR SIR: We have been using your Steam Jacket Heater for several months, and find it fully up to your representations. It saves us about a ton and a half of coal per diem, and gives us a regular steam pressure. It works to our entire satisfaction in every respect. Yours respectfully,

F. MAYER &amp; CO.

## PULLMAN PALACE CAR CO.

PULLMAN PALACE CAR WORKS,  
DETROIT, Mich., Feb. 25, 1882.

I beg to report the Steam Jacket Feed-Water Heater and Purifier, made by Baragwanath, of Chicago, has been in operation in our works for some time, and from careful test I find the heat of feed-water delivered from Heater 215 degs. Fah. I do not find any visible back pressure on the engine. The engine had eight pounds of back pressure when working in connection with our old Heater. We save 30 per cent in fuel, and one fireman. We have dryer and hotter exhaust for warming shops than before. I also find the Heater the best apparatus for removing scales I have ever seen.

CHARLES MERRY, Chief Engineer.

GET THE BEST.

## THE BARAGWANATH HEATER.

WHAT IS SAID OF THEM BY PARTIES USING THEM.

"Boiler Clean as Possible."

OFFICE OF CHAS. FIGLER,  
Manuf' of Flour, Feed and Meal,  
NEW AUBURN, MINN., March 11, 1882.

DEAR SIR: In response to your inquiry about the working of the Baragwanath Heater I bought of you last summer, would say it is the best Heater and Water Purifier to my knowledge. I would not be without it for twice its cost. My boiler is as clean and free from scales as it is possible to be, and I invite steam users contemplating to buy a Heater to come to my mills and examine mine before they buy elsewhere.

Respectfully yours, CHAS. FIGLER.

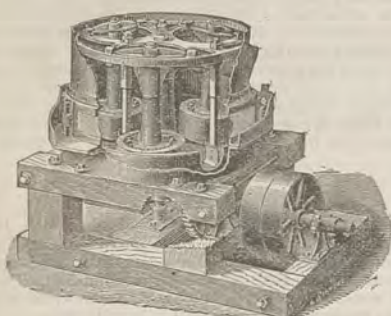
STANTON, MICH., March 17, 1881.

Wm. Baragwanath—DEAR SIR: After two years' use of the Heater, we can say your guarantee has been fully met. It delivers its water into the boiler at 217 Fahr., purifying it to a very great degree, and saving fully 20 per cent of fuel. No new scale has formed on the boiler since its use. It is a success, and the best Heater we have any knowledge of. Yours truly,

TURNER & REYNOLDS.  
October 30, 1885. Does all it ever did; never had a cent's repairs; know of nothing which equals it.—T. & R.

DETROIT LINSERD OIL COMPANY,  
DETROIT, Nov. 24, 1885.

Wm. Baragwanath & Son, Chicago—GENTLEMEN: We are using your Steam Jacket Heater and Purifier with great satisfaction, obtaining at all times the best results. Yours truly,  
SAM'L E. PITTMAN, Manager.



Centrifugal Roller Quartz Mill.

## F. A. HUNTINGTON,

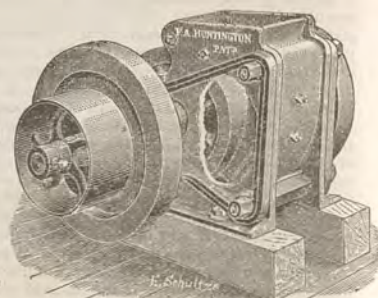
MANUFACTURER OF

### Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS.

Mining Machinery of Every Description,  
Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.



SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS!

### SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.  
BEST SOFT LAKE SUPERIOR COPPER USED.

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.  
E. G. DENNISTON, Proprietor.

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent

L. R. MEAD, Secretary.

## THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. NOTE.—Have just completed order for 35 miles of 44-inch pipe of 1-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

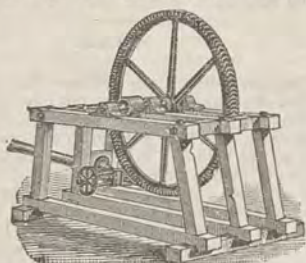
SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.

Send for Circular and Price Lists.

## KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.

SEND FOR CIRCULAR.

EDWARD A. RIX &amp; CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco.

## THOMAS PRICE'S ASSAY OFFICE,

524 SACRAMENTO STREET, SAN FRANCISCO.

Working Tests of Ores by all Processes.

SPECIAL ATTENTION PAID TO THE CONCENTRATION OF ORES.

ORES SAMPLED and ASSAYED.

## CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

STEIGER &amp; KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

DEWEY & CO., { No. 252 MARKET ST. } PATENT AGENTS.  
Elevator 12 Front St.

THE Sign of the Arkansas Cough Syrup is looking you all square in the face.

Do you want a sure, safe and reliable Cough Syrup? Are you troubled with a Cough, Cold, Bronchitis or Lung Complaint? Do your Babies keep you awake all night with Hacking Coughs, Colds in the Head, etc. Do you want something reliable in the house to meet these emergencies? We answer to all: "Go to your Druggist and get a Bottle of the Arkansas Cough Syrup, and be troubled no more." Price, 50 cents per Bottle!

For Sale by all Druggists.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival. Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

UTAH OFFICE—SALT LAKE CITY, UTAH.

Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,  
JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

Metallurgy and Ores.

**SELBY  
SMELTING and LEAD CO.,**

416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY  
And Assay Office.**

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

**BLUESTONE,  
LEAD PIPE,  
SHEET LEAD,  
SHOT, Etc., Etc.**

ALSO MANUFACTURERS OF

**Standard Shot-Gun Cartridges,  
Under Chamberlin Patent.**

**WM. D. JOHNSTON,**

**ASSAYER AND ANALYTICAL CHEMIST,  
515 California Street,  
Bet. Montgomery and Kearny, SAN FRANCISCO.  
ASSAYING TAUGHT.**

Personal attention insures Correct Returns.

**JOHN TAYLOR & CO.,**

IMPORTERS AND DEALERS IN

**ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,**

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco.

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

**Nevada Metallurgical Works.**

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869.

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

**THOMAS PRICE'S**

ASSAY OFFICE,

CHEMICAL

LABORATORY

**Bullion Rooms and Ore Floors**

No. 524 Sacramento Street,  
San Francisco.

J. KUSTEL. H. KUSTEL.

**METALLURGICAL WORKS,**

318 Pine St. (Basement),

Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process. Assaying and Analysis of Ores, Minerals and Waters. Mines Examined and Reported on. Practical Instruction given Treating Ores by improved processes.

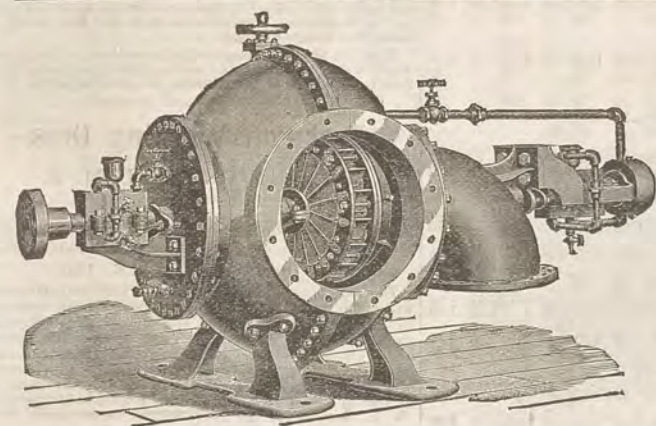
G. KUSTEL & CO.,  
Mining Engineers and Metallurgists.

C. H. AARON,

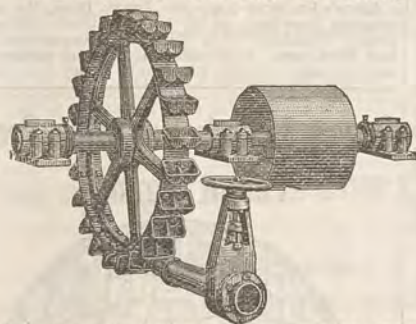
**ASSAYER AND METALLURGIST,**

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.



**PELTON'S WATER WHEEL.**



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

**N. W. SPAULDING  
SAW COMPANY**

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

**Saws.**

SAW MILLS AND MACHINERY  
Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

**NATIONAL ASSURANCE CO.,  
OF IRELAND.**

**ATLAS ASSURANCE COMP'Y,  
OF LONDON.**

**BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.**

H. M. NEWHALL & CO.,

GENERAL AGENTS,

309 & 311 Sansome St., San Francisco, Cal.

**THE SCIENTIFIC PORTABLE FORGE**

AND

**BLACKSMITH HAND BLOWERS.**

GUARANTEED

**The Lightest Running! The Strongest Blast!  
The Most Durable!**

ADAPTED TO ALL KINDS OF WORK,

Send for Catalogue: AND MADE IN STYLES AND SIZES TO SUIT.

**THE FOOS MANUFACTURING CO., - Springfield, Ohio**

PATENT

**LIFE-SAVING RESPIRATOR**

Entirely Prevents Lead Poisoning  
and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, Threshing and Stock-driving, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,  
380 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.



PAT. OCT. 25, 1881.

**PERFECT PULLEYS**

First Premium Awarded at Mechanics' Fair, 1884.

**CLOT & MEISE,**

Sole Licensed Manufacturers of the

**Medart Patent Wrought Rim Pulley**

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

**SHAFTING, HANGERS AND APPURTENANCES.**

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 & 131 Fremont Street,

San Francisco, Cal.



## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey &amp; Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey &amp; Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING JULY 20, 1886.

345,944.—PORTABLE HOUSE—W. J. Anderson, S. F.  
 345,686.—EXTENSION FIRE LADDER—D. D. Hayes, S. F.  
 345,701.—FRUIT-DRYER—C. W. Kitts, Grass Valley, Cal.  
 345,852.—CANE-STOOL—E. O. Leermo, Gold Hill, Nevada.  
 345,797.—REVERSIBLE PLOW—Neil McLean, Watsonville, Cal.  
 345,804.—SEWER-CLEANING APPARATUS—Geo. W. Pringle, Benicia, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

## Mining Share Market.

Work is going on actively at most of the Comstock mines, though two of them shut down this week for repairs. Stocks, however, have shown no special activity. The lateral drift north from the Combination shaft, 3200 level, to connect with the drift coming south from the bottom of the Hale and Norcross deep winze, has been driven ahead at a very lively rate. It is skirting along the east side of the fine ore vein developed at the west face of the station, and the last 20 feet has grazed into the vein itself on the west side of the drift, showing some very good ore—better than was found in the west face of the station itself. Connection with the deep-winze drift will probably be made to-morrow, if not sooner. After the drift is properly straightened up, crosscutting west will be in order, and the true value of the ore vein be made practically manifest. The water is well reduced in the Osbiston shaft, ready for deeper sinking, and the Combination shaft still deeper is all right in that respect. In fact the middle and northern section of the Comstock is under good drainage subjection and amply prepared for deeper explorations, but no assistance is given from the south end—the Gold Hill mines. The *Enterprise* says: The Combination shaft being down to below the 3200 level, drains a very considerable of the country south belonging to the Gold Hill sections, and it is but just that the Gold Hill mines should now join in and assist in the good work. The Yellow Jacket new shaft could be utilized to most excellent advantage in this respect, being 3000 feet in direct vertical depth with the pumps, which were taken out when the mines were flooded four or five years ago, ready to put in again, and ample surface machinery for pumping or sinking a thousand or two feet deeper.

## New Incorporations.

GEM CONSOLIDATED CO., July 23. Location Trinity Co. Capital stock \$1,000,000. Directors, Geo. F. Geise, W. H. Sharp, A. D. Allen, D. Puck and J. A. Steinberger.

MORGAN OYSTER CO., July 23. Object to cultivate and deal in oysters. John S. Morgan, John Crellin, Thomas Crellin, J. Arthur Crellin and Fred. C. Morgan are the directors. Capital stock \$500,000.

MERRIMAC PLACER M. CO., July 24. Location Marble creek, Butte and Plumas counties. Capital stock \$20,000. Directors, F. J. McWorthy, Hank Small, J. Billington, L. T. Farr and O. V. Harvey.

BARDETT M. CO., July 25. Capital stock \$25,000. Directors, Jay Deming, Leon Maison, M. T. Frietas, John J. Wall and A. Bardett.

AMERICAN CRACKER CO., July 27. Capital stock \$200,000. Directors, Leon Sloss, James H. Jennings, John Proctor, James Dunn and George H. Garthorne.

FIREMAN'S FUND INS. CO. The directors of the Fireman's Fund Insurance Co. have notified the Superior Court of an increase of the company's capital stock from \$750,000 to \$1,000,000.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Margat Ann, July 21, \$1648; Oro Grande Mill, 25, \$1521; Alice, 16, \$10,596; Hanauer, 17, \$3270; Germania, 17, \$1858; Hanauer, 21, \$3095; Queen of the Hills, 21, \$2095; Germania, 21, \$3907; Hanauer, 23, \$3100; Pascoe, 23, \$1550; Germania, 28, \$1074; Hanauer, 23, \$10,720; Crescent, 23, \$5920; Hanauer, 24, \$31,601; Queen of the Hills, 24, \$3105; Germania, 24, \$2022; Alice, 16, \$10,596; Queen of the Hills, 23, \$2695; Alice, 19, \$14,533. Last week Wells, Fargo & Co., at Salt Lake, received in bullion \$85,576; McCornick & Co., \$59,115; T. R. Jones & Co., \$35,395; Union Bank, \$25,127. The banks of Salt Lake City report the receipt for the week ending July 21st, inclusive, of \$138,475.49 in bullion and \$67,739.10 in ore, a total of \$206,214.59.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

**ASSESSMENTS.**

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.		
Belmont M Co.....	Nevada.....	40.	10.	Apr 30.	July 8.	Aug 3.	J. W. Pew.....	310 Pine St
Bodie Con M Co.....	California.....	5.	50.	June 21.	July 26.	Aug 16.	G. W. Sessions.....	309 Montgomery St
Best & Belcher M Co.....	Nevada.....	34.	50.	June 14.	July 23.	Aug 9.	W. Willis.....	309 Montgomery St
Con Amador M Co.....	California.....	13.	15.	July 15.	Aug 18.	Sept 8.	J. F. Latham.....	327 Pine St
Dudley M Co.....	California.....	12.	25.	June 21.	July 27.	Aug 16.	J. Stafield Jr.....	419 California St
Ehrtrachs Gravel M Co.....	California.....	22.	05.	June 5.	July 28.	Aug 21.	H. Kunz.....	208 Sansome St
Eureka Con M Co.....	Nevada.....	10.	1.00.	July 28.	Sept 6.	Sept 25.	E. H. Willson.....	328 Montgomery St
Forty-Nine M Co.....	California.....	3.	05.	July 8.	Aug 9.	Aug 30.	A. L. Perkins.....	310 Pine St
Golden Floor G M Co.....	California.....	5.	20.	May 23.	July 31.	Aug 21.	J. L. Gleason.....	Phelan Block
Gould & Curry S M Co.....	Nevada.....	53.	50.	June 21.	July 26.	Aug 17.	A. K. Durbrow.....	309 Montgomery St
Hale & Norcross M Co.....	Nevada.....	91.	50.	July 15.	Aug 18.	Sept 8.	J. F. Latham.....	309 Montgomery St
Indian Spring Drift M Co.....	California.....	6.	03.	July 15.	Aug 18.	Sept 30.	L. B. Sharp.....	213 Sansome St
Mount Como M Co.....	Nevada.....	1.	10.	July 7.	Aug 14.	Sept 8.	M. Horwinski.....	331 Montgomery St
Mexican M Co.....	Nevada.....	32.	25.	June 17.	July 22.	Aug 12.	C. E. Elliott.....	309 Montgomery St
Mayflower Gravel M Co.....	California.....	31.	25.	July 1.	Aug 9.	Aug 31.	J. Morizo.....	328 Montgomery St
New Como M Co.....	California.....	19.	25.	July 13.	Aug 27.	Sept 13.	J. L. Hunt.....	5 Pioneer Place
Ophir S M Co.....	Nevada.....	51.	25.	June 7.	July 13.	Aug 2.	E. B. Holmes.....	338 Montgomery St
Potosi M Co.....	Nevada.....	24.	30.	June 25.	July 28.	Aug 12.	C. E. Elliott.....	309 Montgomery St
Savage M Co.....	Nevada.....	65.	50.	June 17.	July 20.	Aug 9.	E. B. Holmes.....	309 Montgomery St

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Liberty Hill Con M Co.	California.	F. E. Luty.	330 Pine St.	Annual.	July 30
Loreto M & M Co.	Mexico.	C. T. Bridge.	224 California St.	Annual.	Aug 5
McMillen M Co.	Arizona.	J. Morizo.	328 Montgomery St.	Annual.	Aug 4
Navajo M Co.	Nevada.	J. W. Pew.	310 Pine St.	Annual.	Aug 10
Occidental M Co.	Nevada.	A. K. Durbrow.	309 Montgomery St.	Annual.	Aug 9

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Holmes M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	25.	Mar 20
Mono M Co.	California.	G. W. Sessions.	339 Montgomery St.	25.	Mar 10
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	25.	July 26
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	July 15
Young America M Co.	California.			40.	May 20

## San Francisco Metal Market.

[WHOLESALE.] THURSDAY, July 29, 1886.

ANTIMONY—French Star.	91 @	—
BORAX—San Bernardino.	— @	8
Amagosa.	— @	64
IRON—Glenbrook ton.	— @	22 50
Eglinton, ton.	— @	21 50
American Soft, ton.	23 00	24 00
Oregon Pig, ton.	21 00	23 00
Clippier Gap, Nos. 1 & 4.	22 00	23 50
Clay Lane White.	22 50	—
Shots, No. 1.	23 50	—
STEELE—English, lb.	16 @	25
Black Diamond, ordinary sizes.	10 @	—
Flow.	4 @	5
Machinery.	5 @	6
Sanderson Bros.	10 @	—
COPPER—		
Braziers' sizes.	20 @	—
Fire-box sheets.	20 @	—
Bolt.	19 @	—
Sheathing.	18 @	—
Ingot.	12 @	13
LEAD—Pig.	4 65 @	4 75
Bar.	5 @	5 1
Pipe.	7 @	—
Sheet.	8 @	—
Shot, discount 10% on 500 bag.	1 65 @	—
Buck, 3/4 bag.	1 85 @	—
Chilled, do.	2 05 @	—
ZINC—German.	9 @	10
Sheet, 7x3 ft, 7 to 10 lb. less the cask.	7 @	—
QUICKSILVER—By the flask.	35 75 @	36 00
Flasks, new.	1 05 @	—
Flasks, old.	85 @	—
TINPLATE—Oke.	5 85 @	—
Charcoal.	6 75 @	—

## New York Metal Market.

Telegraphic advices dated July 29th give the following New York prices:

BORAX—63 1/2 @ 7 1/2 c.  
 BAR SILVER—94 per oz.  
 COPPER—LAKE—\$10.00.  
 IRON—No. 1, \$17 @ \$18.00; No. 2, \$15 @ \$16.00.  
 LEAD—\$4.85 @ 4.95.  
 QUICKSILVER—43 @ 43 1/2 c. per lb.

The following is the latest by mail from the "New York Metal Exchange Market Report":  
 COPPER—Neglected; Lake offered at 9.90c @ 10.00c. Transferable Notices (Lake) offered at 10.00; Transferable Notices (Chili Bars) offered at 10.39.

LEAD—Nominal at 5.00 @ 5.10c. Transferable Notices (Domestic) issued at 4.95.

TIN—Firm, closing at \$21.85 @ \$21.90. Transferable Notices issued at \$22.10c.

SILVER—New York, 95% per oz. London, 43 1/2 d. MAKER'S PRICES—At tidewater. too ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18 @ \$18.50; No. 2, \$17.00 @ \$17.50; Grey Forge, \$15.00 @ \$16.00. Hudson River, Grade No. 1, \$18 @ \$18.50; No. 2, \$17.00 @ \$17.50; Grey Forge \$15.00 @ \$16.00. Southern, Grade No. 1, \$18.00 @ \$18.50; No. 2, \$17 @ \$17.50; Grey Forge \$15 @ \$16.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$21.80 @ \$22.00; Billiton Tin, \$22.40 @ \$22.75; Banca Tin, \$22.60 @ \$22.90; Baltimore Copper, \$9.25 @ \$9.75; Orford Copper, \$9.25 @ \$9.75; P. S. C. Copper, \$9.25 @ \$9.75; Foreign Lead, \$4.90 @ \$4.95; Foreign Spelter, \$4.80 @ \$4.85.

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
 G. W. INGALLS—Arizona.  
 E. L. RICHARDS—San Diego Co.  
 R. G. HUSTON—Idaho and Montana.  
 GEO. McDOWELL—San Luis Obispo and Santa Clara Co's  
 FRANK W. SMITH—Idaho and Montana.

JULIUS REIMER has been admitted to practice as an attorney and counselor-at-law. He has had much experience in San Francisco as an expert accountant, and many years ago he was the editor of *The Engineer of the Pacific*.

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING July 8.	WEEK ENDING July 15.	WEEK ENDING July 22.	WEEK ENDING July 29.
Alpha.	.85	1.00	.95	1.00
Alta.	.45	.55	.50	.70
Andes.			.35	.40
Argenta.				
Belcher.			1.30	1.25
Belding.				
Best & Belcher.	1.20	1.30	1.00	1.25
Bonanza King.		.40		.40
Bodie Con.	1.40	1.55	1.40	1.55
Benton.		.65	.05	.10
Bodie Tunnel.				
Bulwer.	.70	1.05	.70	.75
California.	1.40	1.55	1.30	1.60
Champion.		.40		.40
Chollar.	1.45	2.25	1.50	1.90
Confidence.		3.00	2.75	3.00
Con. Imperial.				.15
Con. Virginia.	1.40	1.55	1.30	1.60
Con. Pacific.				
Crown Point.	1.10	1.25	1.10	1.25
Day.				
Eureka Con.		3.00	2.50	3.30
Eureka Tunnel.				3.25
Exchequer.	.25	.30	.25	.40
Grand Prize.				
Gould & Curry.	1.30	1.65	1.05	1.40
Goodshaw.				1.30
Hale & Norcross.		2.80	2.45	2.55
Holmes.	3.20	3.90		3.05
Independence.				2.50
Julia.				
Justice.	.25	.30	.25	.35
Martin White.				.45
Mono.	1.90	2.00	1.80	2.00
Mexican.	.45	.60	.60	.70
Mt. Diablo.				.95
Northern Belle.				.85
Navajo.	.70	.75	.70	1.15
North Belle Isle.				.85
Occidental.		1.00		1.00
Ophir.	.85	1.00	1.10	1.75
Overman.	.30	.35		.30
Potosi.	.75	.90	.60	.85
Pinal Con.	3.00	4.00	2.50	3.90
Savage.				4.20
Seg. Belcher.				4.35
Sierra Nevada.	.70	.90	.80	.95
Silver Hill.		.15		.20
Silver King.		7.50	7.88	7.75
Scorpion.	.05	.10		.10
Syndicate.				.20
Toga.				
Union Con.	.55	.60	.60	.75
Utah.	.60	.90	1.00	1.25
Yellow Jacket.	1.30	1.85	1.35	1.65

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., July 29.	350	Holmes.	2.50
600 Alta.	.65c	500 Justice.	.35c
50 Alpha.	.35c	200 Mexican.	.85c
700 B. & Belcher.	1.40	10 Mt. Diablo.	2.00
315 Bodie Con.	2.80	100 Navajo.	.85c
200 Bulwer.	.95c	600 N. Belle Is.	.60c
180 Bullion.	1.85 @ 1.70	500 Ophir.	1.40
900 Chollar.	1.85 @ 1.70	500 Potosi.	.90c
450 Con Va. & Cal.	1.50 @ 1.60	310 Savage.	3.65 @ 3.70
20 Crown Point.	1.15	100 Sierra Nevada.	.80c
50 Confidence.	2.75	100 Syndicate.	.20c
50 Eureka Con.	2.25	50 Utah.	1.10
250 Gould & Curry.	1.50 @ 1.55	900 Union Con.	.70c
350 Hale & Norcross.	2.45 @ 2.50	170 Yellow Jacket.	1.25 @ 1.30

## Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. F.) from week to week and year to year.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

MINERS and prospectors are going to Meadow Lake district. But as the process that is to work out the salvation of the place has not yet been practically proven a success, it seems rather early for an excitement.

MISFIT institutions bring grist to the mill. Muller's optical depot, 135 Montgomery St. x

## Books on Assaying.

By C. H. AARON.

## PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist or the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

## Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorchification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables. The volume embraces 106 12mo. pages, with illustrations, well bound in cloth; 1884. Price, \$1, postpaid. Sold by DEWEY & CO., Publishers, No. 252 Market street, San Francisco.

## PARTS II AND III.

## Lead, Copper, Tin, Mercury, etc.

Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

## Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Manipulation, etc.; Lead Ores; Copper Ores; Volumetric Assays; Parkes' Process; Amalgamation; New Process; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of Zinc Ores, New Method; New Assay of Nickel and Cobalt; Assay of Chromium; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Salt; Appendix to Part I; Notes on Crucible Assays; Weighing by Oscillations; Appendix to Part III; The Assay of Lead; The Assay of Copper.

There are 160 12mo. pages with illustrations in the volume, which is bound strongly in cloth. Price postpaid, \$1.75. Sold by DEWEY & CO., Publishers, No. 252 Market St., S. F.

## Books on Working Ores.

By GUIDO KUSTEL, M. E.

ROASTING OF GOLD AND SILVER ORES (Second Edition and the Extraction of their Respective Metals without Quicksilver. By GUIDO KUSTEL, M. E. 1880.

This rare book on the treatment of gold and silver ore without quicksilver, is liberally illustrated and crammed full of facts. It gives short and concise



**Practical Hydraulics.**

By P. M. RANDALL.

A Book for Civil Engineers, Miners, Millmen, Hydraulicians, Mining Engineers, and Irrigators.

This new work is by one of the most experienced hydraulicians of the country. It abounds with useful tables for ready reference, in which the results of abstruse calculations are all placed in a form so that one can find what he wants in a moment. For the engineer the principles, formulae, coefficients, etc., are given; and for those not familiar with higher mathematics, examples, rules, and tables are prepared. Thus the needs of the scientist and the practical miner or millman are each met. It is the most complete work on the subject yet published, and is specially applicable to the Pacific Coast.

**Table of Contents.**

The following brief abstract of the contents will give an idea of the branches of the subject treated:

General Plan; Discussion of the Principles of Hydraulics; Rules Deduced from Formulas Obtained; Examples and Calculations; Extensive Tables for Ready Reference; Fundamental Laws of Hydraulics Demonstrated, and Expressed in Formulae and Rules; Flow of Water through Openings; Weir Coefficients; Triangular Weirs; Flow of Water Over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow Through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water Through Short Tubes and Compound Tubes; Flow of Water Through Pipes; Tables of Velocities and Cubic Feet Flows for Given Fall per Mile and Diameter of Pipe; Coefficient for Bend—Circular and Angular; Flow Through Nozzles; Inverted Siphons; Flow of Water in Open Channels; Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

Price, \$2.00, post-paid. Sold by Dewey & Co., Publishers, 252 Market St., San Francisco.

**Practical Treatise on Hydraulic Mining**

By AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by Dewey & Co., Publishers, 252 Market St., San Francisco.

**DIVIDEND NOTICE.**

OFFICE OF THE

**Paradise Valley Mining Company**  
San Francisco, California.

At a meeting of the Board of Directors of the above named Company, held July 26, 1886, Dividend No. 7, of twenty-five (25) cents per share, was declared, payable immediately at the office of the Company.

W. LETTIS OLIVER, Secretary.

OFFICE—No. 328 Montgomery Street, San Francisco, California.

**FOR SALE.**

Half Interest in Patent Right and Manufacture of the finest Quartz Breaker and Pulverizer of the age.

Machines in operation and subject to any test.

Call on C. G. Y., at office of DEWEY & CO., 252 Market Street, San Francisco.

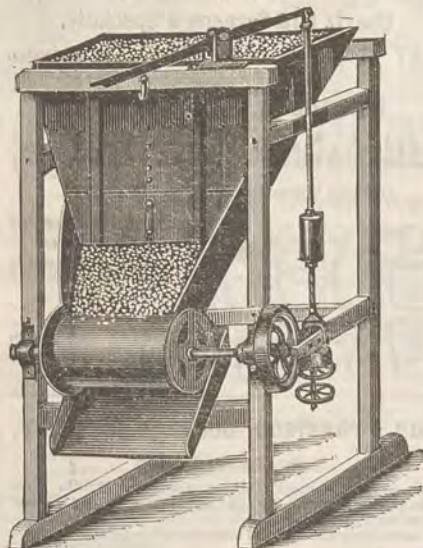
**THE RUSSELL PROCESS COMP'Y.**

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

**THE ROLLER ORE FEEDER**

(Patented May 28, 1882.)



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

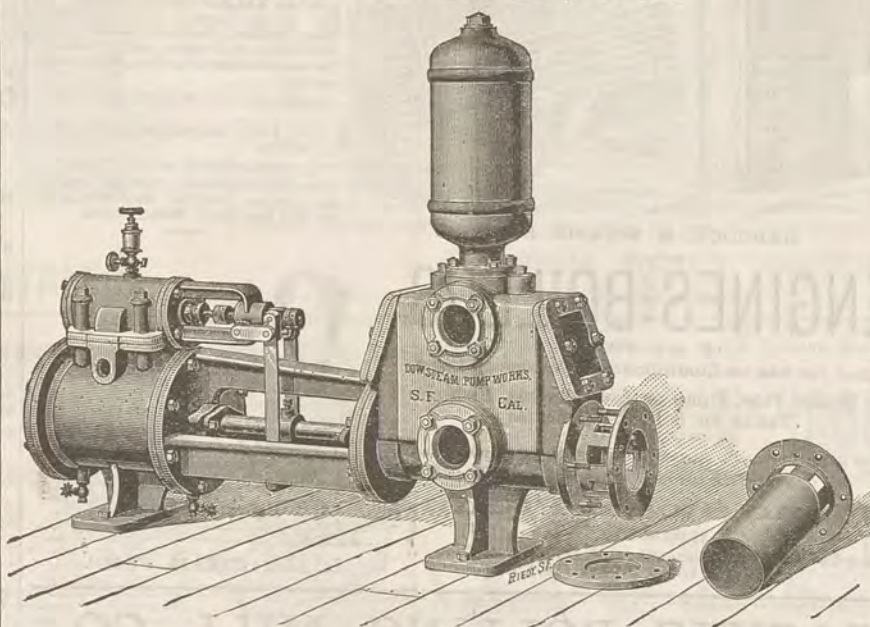
In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

**Golden State and Miners' Iron Works.**  
Sole Manufacturers,  
237 First Street, San Francisco, Cal.



## DOW STEAM PUMP WORKS,

San Francisco, Cal.



## DOW'S IMPROVED STEAM PUMPS And Pumping Machinery

FOR EVERY POSSIBLE DUTY.

## COMPOUND PUMPING ENGINES,

Condensing and Non-Condensing,

.....FOR.....

**Water-works,  
Mining Purposes,  
Irrigation, Etc.**

GRAND SILVER MEDAL Awarded at Mechanics' Institute Industrial Exhibition for Best Direct and Double-acting Pump.

Works: 114 & 116 Beale St. Correspondence solicited. Call or send for Catalogue

**CALIFORNIA**

## ARTIFICIAL STONE PAVING CO.

(SCHILLINGER'S PATENT.)

—FOR—

**SIDEWALKS, GARDEN WALKS, CORRIDORS, OFFICES, CARRIAGE  
DRIVES, STABLES and CELLAR FLOORS, KITCHENS, Etc.**

The Courts here and in the East have decided that Artificial Stone Pavements with plastic concrete and in detached blocks, are infringements on the Schillinger Patent; and also, that when the plastic material is blocked off with a trowel and cut through far enough to control the cracking caused by shrinkage, that such pavement is in law the same as if laid in detached blocks, and is an infringement of the patent. All property-owners having such pavements laid without the license of the above Company, will be prosecuted.

OFFICE, 404 MONTGOMERY STREET, SAN FRANCISCO.

GBERT JUDSON, President.

ALBERT H. REICHLING, Secretary.

G. GOODMAN, Manager

**DEWEY & CO.,** { No. 252 MARKET ST. } PATENT AGENTS.  
{ Elevator 12 Front St. }

**Educational.**

W. E. CHAMBERLAIN, JR.

T. A. ROBINSON.



Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Evening Sessions during the entire year.

Call, or send for CIRCULAR to

CHAMBERLAIN &amp; ROBINSON, Prop's.

**MISS BISBEE'S SCHOOL**

FOR YOUNG LADIES,

1020 OAK STREET, - - OAKLAND,

WILL RE-OPEN

WEDNESDAY, JULY 28th, 1886.

**Field Seminary for Young Ladies,**

1825 Telegraph Avenue,

Oakland, - - - - - California.

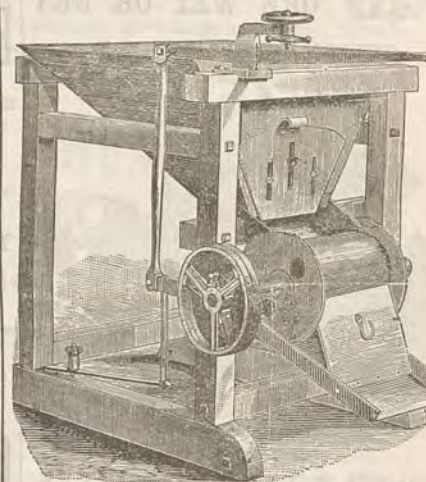
Address MRS. R. G. KNOX, Proprietor, or MISS FRANCES A. DEAN, Principal.

THE FIFTEENTH YEAR WILL BEGIN

Wednesday.....July 28, 1886

## THE ORIGINAL Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Challenge" Ore Feeders for any character of ores; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ores.

Prices furnished upon application to

**JOSHUA HENDY MACHINE WORKS,**  
39 to 51 Fremont St., San Francisco.

**American Exchange Hotel,**

SANSOME STREET,

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50  
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

**W. S. Smith**

ENGINEER AND DRAUGHTSMAN.

Drawings, Specifications and estimates furnished. Machinery of all kinds constructed. Engines tested. INVENTIONS perfected. Blue Prints. 258 Market St., S. F.

**INVENTORS, TAKE NOTICE**

L. PETERSON, MODEL MAKER,

258 Market St., N. E. cor. Front (up stairs), San Francisco  
Experimental machinery and all kinds of metal, tin and Brasswork.

**HEALD'S BUSINESS COLLEGE,**  
24 Post St. S. F.  
Send for Circular.



**NOTICE TO  
MINING MEN,  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.**

**Engineers' Tables of Progress**

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

**NEW YORK  
AQUEDUCT TUNNEL**

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, etc., address:

**INGERSOLL ROCK DRILL CO.,**

REPRESENTED BY

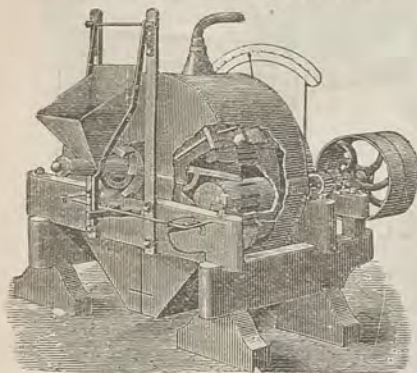
**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

**Tustin's Pulverizer  
WORKS ORE WET OR DRY**

FULTON IRON WORKS, S. F.



MANUFACTURED BY

**HINCKLEY, SPIERS & HAYES,**

**MACHINE TOOLS,  
PRESSES AND DIES,  
PUNCHING and SHEARING  
MACHINERY.**

**F. A. ROBBINS,**

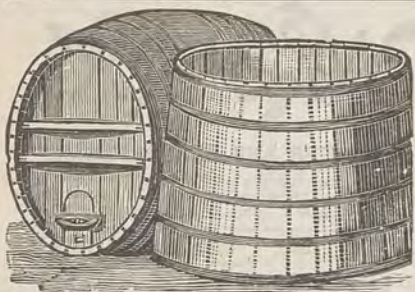
...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and  
Dies, 20-inch Engine Lathes,  
12-inch Shapers.

Punching and Shearing Machinery for  
Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.  
Gear Cutting a Specialty.

221 and 223 First St., San Francisco.



**WATER TANKS! WINE TANKS!  
CALIFORNIA WINE COOPERAGE CO.**

FULDA BROS., Proprietors,

30 to 40 Spear St., San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

**HOOD'S FOUNDRY COKE.**

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**  
316 California St., San Francisco.

**FULTON IRON WORKS,**

**HINCKLEY, SPIERS & HAYES, Proprietors.**

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure  
or Compound, Stern or Side-wheel En-  
gines.

MINING MACHINERY—Hoisting En-  
gines and Works, Cages, Ore Buckets,  
Ore Cars, Pumping Engines and Pumps,  
Water Buckets, Pump Columns, Air Com-  
pressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for  
Dry or Wet Crushing, Amalgamating  
Pans, Settlers, Furnaces, Retorts, Con-  
centrators, Ore Feeders, Rock Breakers,  
Furnaces for Reducing Ores, Water Jack-  
ets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MA-  
CHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines  
and Boilers, Dredging Machinery, Pow-  
der Mill Machinery, Water Wheels.

**ENGINES AND BOILERS**

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

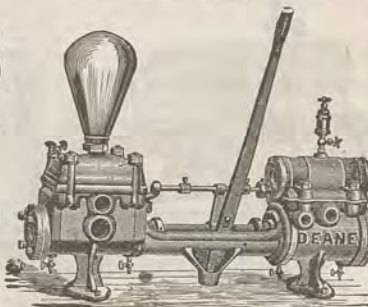
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

**PACIFIC ROLLING MILL CO.,**

.....MANUFACTURERS OF.....

**Cast Steel Castings and Steel Forgings**

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.

—ALSO—

**HOMOGENEOUS STEEL, SOFT and DUCTILE,  
SUPERIOR TO IRON FOR  
LOCOMOTIVE AND MARINE FORGINGS.**

ALSO Steel Rods, from 1/2 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**

**FRASER & CHALMERS.**

CHICAGO, ILL.  
U. S. A.

General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.

PERFORATED METALS FOR  
REVOLVING and SHAKING-SCREENS,  
JIGS & STAMP BATTERIES.

Denver Office:  
No. 248  
18th Street,  
Denver,  
Colo.

Mexico Office:  
No. 11  
Calle  
de Suarez  
Chihuahua,  
Mex.

UTAH OFFICE—SALT LAKE CITY, UTAH.

**Iron and Machine Works.**

**Golden State & Miners Iron Works.**

Manufacture Iron Castings and Machinery  
of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

**Mold-Board AMALGAMATORS,**

**Golden State Pressure Blowers.**

First St., between Howard & Folsom, Sts.

**California Brass Foundry,**

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt  
Metal Castings, Brass Ship Work of all kinds, Spikes,  
Sheathing Nails, Rubber Braces, Hinges, Ship and Steam-  
boat Bells and Gongs of superior tone. All kinds of Cocks  
and Valves, Hydraulic Pipes and Nozzles, and Hose Cou-  
plings and Connections of all sizes and patterns, furnished  
with dispatch. PRICES MODERATE.

J. H. WEED.

V. KINGWELL.

THOMAS THOMPSON

THORNTON THOMPSON

**THOMPSON BROTHERS,**

**EUREKA FOUNDRY,**

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

**CALIFORNIA MACHINE WORKS,**

**WM. H. BIRCH & CO.,**

ENGINEERS AND MACHINISTS,

No. 119 Beale St., San Francisco.

BUILDER OF

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines  
Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. ORDERS SOLICITED.

**UNION IRON WORKS,**

SACRAMENTO, CAL.

**ROOT, NEILSON & CO.,**

MANUFACTURERS OF

**STEAM ENGINES, BOILERS AND ALL**

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front Street, Between N and O Streets,  
SACRAMENTO, CAL.



The California  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

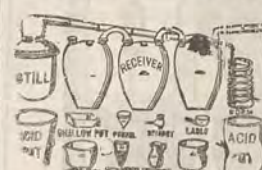
**FLOUR AND OTHER MILLS.**

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco

**RICHARD C. REMMEY, Agent,  
Philadelphia Chemical Stoneware Manufactory,**

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of  
all kinds of  
Chemical Stoneware

—FOR—  
Manufacturing  
Chemists.  
Also Chemical Brick  
for Glover Tower.

**San Francisco Cordage Factory.**

Established 1856.

Constantly on hand a full assortment of Manila Rope  
Sisa Rope, Tarred Manila Rope, Hay Rope, Whal  
Line, etc., etc.

Extra sizes and lengths made to order on short notice.

**TUBBS & CO.**

611 and 613 Front St., San Francisco.

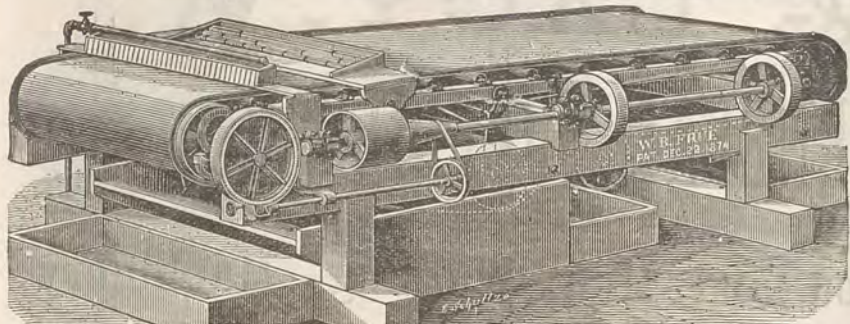
**A Good Opportunity for a Ma-  
chinist.**

A variety of good Tools, Patterns, etc., with business  
for sale cheap by a party retiring from business. A  
splendid opportunity for an enterprising mechanic.

Address A. B. C. care of this paper.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS.**  
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

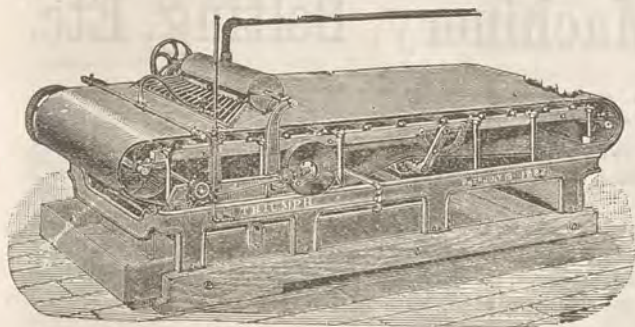
N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street.

SAN FRANCISCO, CAL.

# \$1,000 CHALLENGE ACCEPTED, PRICE, FIVE HUNDRED AND FIFTY DOLLARS (\$550.00).



**THE  
"TRIUMPH" ORE CONCENTRATOR.**

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE, placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.




**Chicago Prices Beaten!**  
ESTABLISHED 1860.  
**S. F. PIONEER SCREEN WORKS,**  
221 & 223 First St., cor. Tehama, S. F.  
**J. W. QUICK, Prop'r.**

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chests, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).  
Orders Promptly Executed

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.  
J. C. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

## STEAM, AIR, AND HYDRAULIC MACHINERY.

### Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

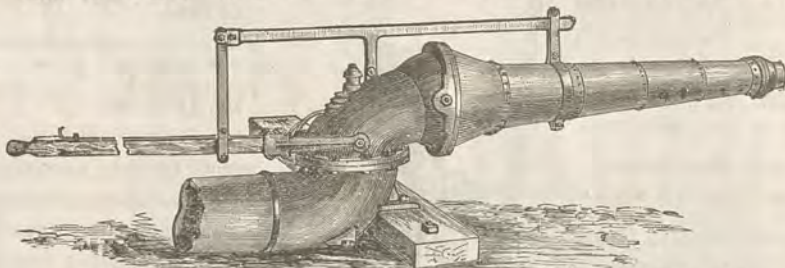
## UNION IRON WORKS.

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

## IMPROVED FORM OF HYDRAULIC GIANTS.

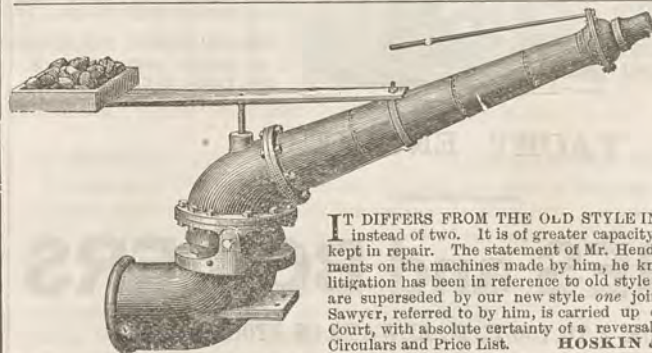


The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco, Cal.



This cut represents our

**IMPROVED  
HYDRAULIC  
MACHINE.**

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List. HOSKIN & CO., Marysville, Cal.

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.



THE CONSUMERS' COMPANY.

## VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

**Vulcan Nos. 1, 2 and 3,**

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**

218 California Street, San Francisco, Cal.

## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

## GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

## JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

## BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

## THE JENKINS STANDARD PACKING



IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the Jenkins Standard Packing can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing," and is for sale by the Trade generally.

Manufactured only by

For Sale by  
DUNHAM, CARRIGAN & CO., San Francisco, Cal.

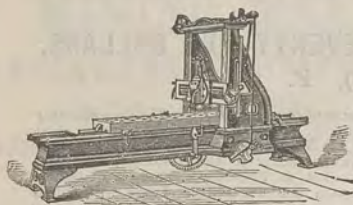
JENKINS BROS. 71 John St., New York.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



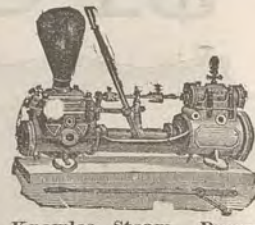
Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Knowles Steam Pump  
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.

## DAMAGED BY FIRE!

Engines, Boilers, Wood and Iron Working Machinery, Belting, Etc.

### FOR SALE CHEAP!

The fire which destroyed our building, Nos. 25 to 31 Main Street, on the 20th of June, will have no effect on our business.

We have already secured one of the stores in the magnificent Donahue Block, Nos. 34 and 36 Fremont Street, near Market, the finest in the city.

We have removed our Machine Shop to Nos. 225 and 227 Beale Street, and are now in full blast.

Our Oil Warehouse is located at 519 Front Street.

Our Oregon Branch is still at 91 and 93 Front Street, Portland.

Constant arrivals of new stock will enable us to supply our customers with everything of the latest and best description.

In addition, we shall have all of our old stock of Machinery, much of which had just come in, removed from the burnt building to our new store, where we shall be able to offer it at **EXTREMELY LOW PRICES.**

When the fire occurred, we had, fortunately, finished shipping the mammoth mills for La Trinidad and Silver Queen Mines, of Mexico, and the 20-Stamp Mill for the Buchanan Mine, of Tuolumne.

Notwithstanding our fire, the Pacific Lumber Company, of Humboldt, awarded us the contract for their new mill over all competitors, preferring to wait till our New Shop was ready rather than get their Machinery elsewhere, though they are in a great hurry. We consider their action conclusive evidence of the superiority of our Machinery, as they are determined to have the finest mill on the Coast.

Our New Concentric Set Works and Headblocks, and the Sinker, Davis & Co. Band Log Mill, which we recently furnished the Humboldt Lumber Company, of Humboldt, are pronounced by them superior to any ever seen in Humboldt.

We are now at work on nine Headblocks for Pope & Talbot Mills on the Sound.

From the above facts, it would appear that we stand fire pretty well, and if our patrons will kindly continue to favor us with their valuable business, we will do our best to excel our former efforts.

**TATUM & BOWEN, San Francisco and Portland.**

## H. P. GREGORY & CO.

Nos. 2 and 4 California St., - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

# MACHINERY

SOLE AGENTS FOR

J. A. FAY &amp; CO.'S WOODWORKING MACHINERY.

FRANK &amp; CO.'S WOODWORKING MACHINERY.

NEW HAVEN MANUF'G CO.'S MACHINISTS' TOOLS.

BEMENT &amp; SON'S MACHINISTS TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND EXHAUSTS.

SHIMER MATCHER HEADS.

BRINARD MILLING MACHINES.

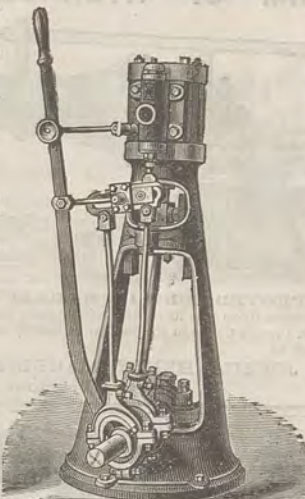
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS.

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISHERS.



YACHT ENGINES.

WILLIAMSON BROS' HOISTING ENGINES.

ATLAS ENGINE WORKS ENGINES AND BOILERS.

PAYNE'S VERTICAL AND HORIZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS.

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECTORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

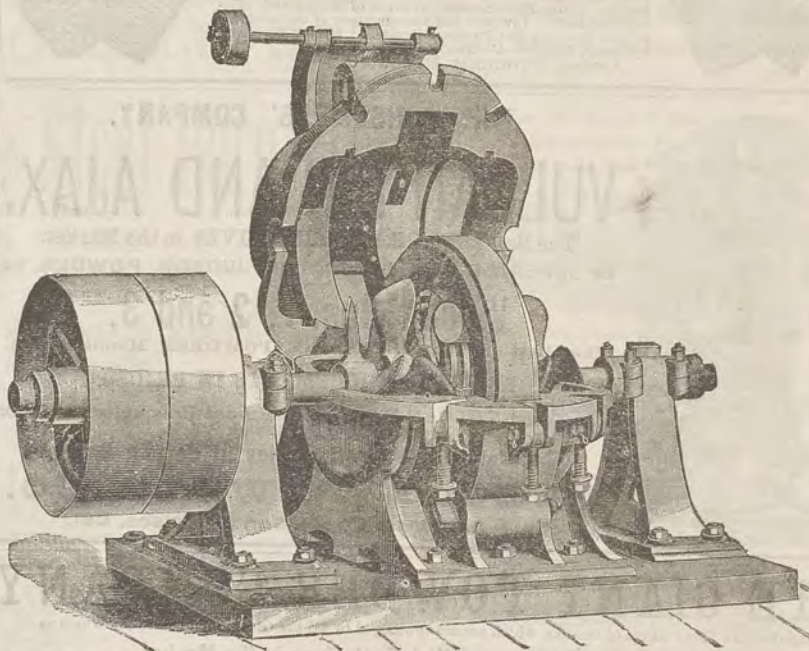
H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.

Certificates as to performance of the Mills, and any information required, furnished on application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 &amp; 106 Washington St., NEW YORK.

OR PACIFIC IRON WORKS, SAN FRANCISCO.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, AUGUST 7, 1886.

VOLUME LIII  
Number 6.

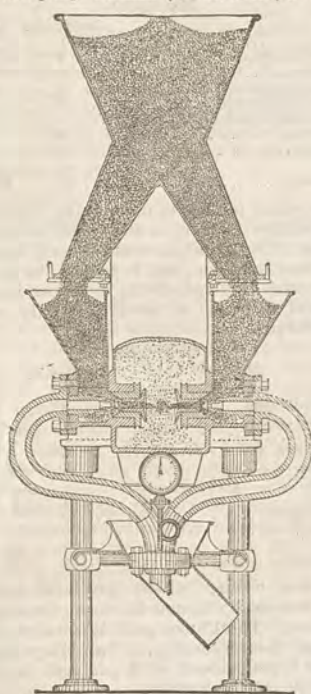
## The Pneumatic Pulverizer.

A new principle of pulverization of quartz consists in the employment of two powerful opposing currents of dry, superheated steam or air, so arranged and adjusted that they continuously charge themselves with crushed or granulated material, and by the great force and velocity of the steam currents the minerals are dashed against each other with such power of concussion as to cause the hardest ores to be pulverized to an impalpable dust. This principle has been established by pulverizing one of the most difficult ores (chrome iron) continuously for many months. The high temperature of the superheated steam currents employed, through which every minute particle of ore must pass, causes them to become very hot and dry, which produces, it is claimed, a beneficial effect on sulphurets and ores containing rusty gold.

We give on this page engravings showing a complete plant of four pulverizers with elevator, and jet exhaust connections, the superheater, and the boiler; also a sectional view showing opposing currents. The wearing parts in this device are two very small tubes of hard cast iron, weighing one pound each, which can be removed and replaced in a few minutes. The plant is complete within itself, only requiring a level floor to stand upon, and when in full working operation is almost noiseless, and free from escaping dust. Damp ores that can be crushed

sired, ranging from a coarse sand to an impalpable powder. It can be arranged to discharge into a tank hot and wet, if desirable.

The company furnish (in all cases) a boiler,



Section Showing Air Currents.

verizer Co., Nos. 2 and 4 Stone street, New York, are prepared to furnish complete plants of 10, 25, 50, 75, 100 or 200 tons per day, including a sectional steam boiler, supplying all the power required to work the pulverizers to their full capacity. The pulverizers are all made the same size. For large plants larger boilers are provided, and pulverizers sufficient to do the work are added. In addressing the company, requesting price for plants, persons should forward an average sample of the ore, state the degree of fineness they desire, and the quantity they wish to pulverize per day of 24 hours. They will then be able to give a price, either in New York or complete at the mine or works, that will do the required work. Several persons who have used this pulverizer testify to its efficiency.

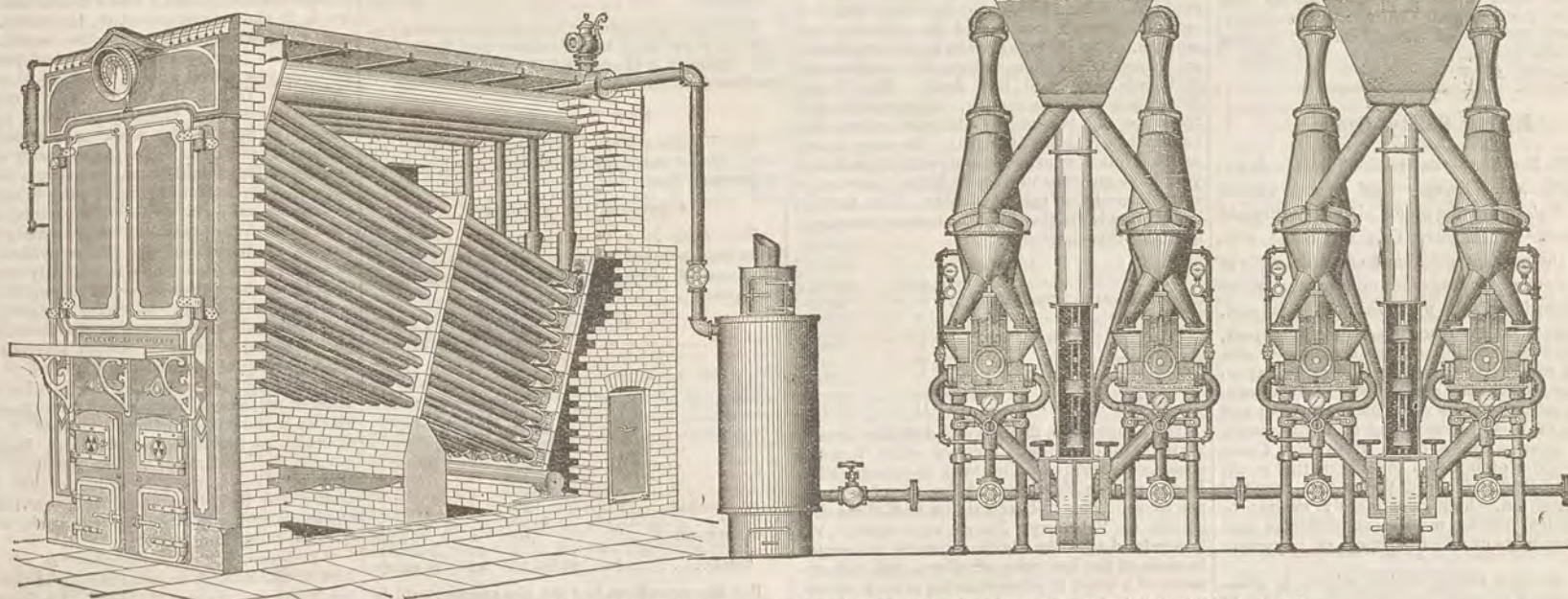
## Tuesday's Pageant.

A more sublime spectacle than the grand parade and review on Tuesday has never been witnessed in San Francisco. The Knights Templar parade of 1883 was more gorgeous in symbolism and showy regalia, more brilliant in military evolutions, but never were the streets crowded with such a vast mass of eager humanity, made more sonorous with bursts of martial airs, and the sight of the old grizzled veterans of the war, with their bullet-riddled flags, awoke sentiments of gratitude and admiration akin to those of religion in sacredness. All the prin-

## Foundry Notes.

The men who went out of the boiler shop of the Risdon Iron Works a few weeks ago, at the order of the Federated Trades, because they were put at work on the boilers of a steamer managed by a firm that had been "boycotted," have sensibly made up their minds to go back to work. They had no complaint about wages, hours, or anything of that kind, and the strike was a foolish one. At a meeting of the Iron Trades Council on Saturday night, resolutions were adopted recommending that the boiler-makers who left the Risdon Iron Works three weeks since disregard the action of the Trades Federation and return to work. The boiler-makers then held a meeting and decided to go back to work, which they have done. Next morning 110 of the strikers appeared at the shop and were told by the foreman to resume work if they desired. This they did, and everything is running as smoothly as though nothing had happened. It is stated that at the last meeting of the Trades Federation it was understood that if the steamer *Alameda* sailed with non-union men a special meeting would be called and the Spreckels boycott declared off. The *Alameda* sailed on Saturday with a non-union crew, so on Monday evening, at a meeting of the boiler-makers, they concluded to act for themselves, with the result as stated.

The molders have withdrawn from the Federated Trades, and it is now said that the boiler-



COMPLETE PLANT OF PNEUMATIC ORE PULVERIZERS, WITH BOILER, SUPERHEATER, ETC.

so as to feed freely into the pulverizers, need no previous drying. The ores require crushing and should pass through a quarter-inch mesh screen before entering into the pulverizer, after which the operation is automatic and continuous, requiring but little attention.

Two men, including fireman, can attend a plant of 50 tons pulverizing capacity per day. A dry steam jet is employed to exhaust or draw the pulverized material from the machines and deposit it in a dust chamber. This jet can be adjusted to throw the pulverized material into the dust chamber at any degree of fineness de-

superheater attached, to supply the pulverizers with steam, of ample capacity and pressure.

The boiler is constructed of tubes of small diameter, with metallic joints and fittings, insuring the greatest possible strength and durability with absolute safety. When erected for use it is tested and proved to sustain a pressure of 500 pounds to the square inch, although the pulverizer only requires a working steam pressure of about 200 pounds.

The pulverizer will crush gold and silver ore, iron ore, cement, phosphates, etc., to any required degree of fineness. The Pneumatic Pul-

verizer Co., Nos. 2 and 4 Stone street, New York, are prepared to furnish complete plants of 10, 25, 50, 75, 100 or 200 tons per day, including a sectional steam boiler, supplying all the power required to work the pulverizers to their full capacity.

The figures of Washington, Lincoln, Garfield and other noted soldiers were seen everywhere, together with battle-pieces, camp scenes, soldiers on picket duty with such inscriptions as "Welcome," "Welcome to the Brave," "Welcome to California." To one looking up Market and Kearny streets the flags, streamers and pennants seemed to cover the streets. The superb triumphal arch on Market street added greatly to the imposing occasion; for elaborateness and beauty of historic designs it has probably never been surpassed on the continent.

makers and other iron-workers' unions will do the same at the next meeting.

The Iron Trades Council has appointed a committee of four to wait on Governor Stoneman and request that the work to be done on the fireboat *Governor Irwin* be not given to the Union Works. The strike at these shops still continues.

THE Eartlick Bros., of Oro Fino, Siskiyou county, shipped \$25,000 (in gold dust) to San Francisco, which is the result of their season's run.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

## Marysville Mines, Montana.

EDITORS PRESS:—The mineral belt of which this embryo city is the natural depot is about three miles wide by six miles in length. There are other paying districts lying outside of these boundaries which contribute to this place.

Marysville is 20 miles northwest of Helena, the capital, and is reached by a good wagon road, over which three daily lines of stages run.

The Montana Central Railroad is grading its road-bed thither, but it is not known when the rails will be laid on account of the high price demanded by the U. P. railroad for hauling the same from Duluth to Helena.

The Drum Lummon mine is located here, and as this letter is only intended as introductory, I shall not attempt to describe this magnificent property until some subsequent time.

One-half mile west is the Belmont—a good gold-bearing mine with a mill of 30 stamps, but idle from some cause or other.

Two miles west is a group of gold-bearing lodes, principal among which are the Bluebird and Hickey. A 10-stamp mill on this property has produced fortunes for the owners.

Two miles southwest from this point lies the Bald Butte group, owned by Helena men. A 10-stamp mill keeps busy, and pays well during the summer months. A five-stamp mill is also located here, which has paid its owners handsomely.

Three miles northwest from Marysville lies the Empire mine, recently purchased by English capitalists for \$80,000, which is considered a very great bargain. Development is progressing rapidly, and a 10-stamp mill is kept busy.

Near here is the Gloster, which has produced wonderfully in the past five years; it has 60 stamps in operation. The Penobscot, near Bald Butte, should not be forgotten, as it is the lead Nate Oestel sold in 1878 for \$400,000. It was worked for two years by an Eastern company, and just paid expenses. John Longmaid purchased the property last August with the 10-stamp mill thereon, and it is estimated has cleared \$50,000 out of what the imported Eastern superintendent left in sight.

The number of stamps in the district is as follows:

Belmont.....	30
Mount Pleasant.....	10
Bald Buttes.....	10
Edge & Wormer.....	5
Penobscot.....	10
Empire.....	10
Gloster.....	60
Drum Lummon.....	60
<b>Total.....</b>	<b>195</b>

The Drum Lummon Co. are now erecting 60 additional stamps, and a one-stamp pony mill is at Marysville, which by October 1st will make a total of 256 stamps. The Empire Co. will greatly increase their milling plant, but probably not before next spring.

The Union Iron Works of San Francisco have placed several hundred tons of excellent machinery in the district at the Drum Lummon and Gloster.

There are any number of good mines here that need the energetic Californian to examine, so we will get some of those thorough mining men in this district.

Marysville, M. T.

## Mining Safety Cages.

H. W. Bracken writes to the *Virginia Enterprise* as follows: Having read in some of last week's *Enterprises* the practical views expressed by gentlemen from Silver City and Bodie, relative to the most practical and effective style of safety devices for cages in mining shafts, for the prevention of the many sad and fatal accidents such as have occurred in times past, through the breaking or non-breaking of the cable, I would like to make a few pertinent remarks as a mechanic and miner. I have considered carefully their views on the subject and approve of them to the extent of their merits. I take occasion, however, to state that I also have a device of my own invention, the result of careful study of every phase and result of the proposition, which I confidently submit to the practical mining mechanics, engineers and superintendents of the Comstock or anywhere else.

It is simply a safety clutch, which is absolutely obliged to work automatically in case of cable breakage, unlatching of the reel or any other of the fatal circumstances or conditions heretofore encountered in that line, and to prove my knowledge, earnestness and perfect confidence in the matter, wherein so many human lives have been and still are at stake, I will unflinchingly offer the following test:

Place a single or double deck cage on the chairs at the surface or top of the shaft, unlatch the reel to spin around its axles freely and as lively as possible, slacking down all the cable you please between the reel and the sheave, or between the sheave and the cage, or take off the cable altogether, or keep on the cable at any sort or degree of tension, and, regardless of the present style of very eccentric safeties, with my own invention as a safeguard,

I will step upon the cage, with my hands in my pockets, and allow the chairs to be pulled back, betting anybody \$1000 that the cage will not drop 12 inches.

This may seem like a foolhardy proposition, but I know what I am talking about, and any true mechanic or practical mining engineer who examines critically my device must simply understand and see that I am right, and that the same demonstrative experiment may be performed with perfect safety at any point in the shaft as well as at the surface.

Bear in mind that all the fatal mishaps referred to have occurred through the failure of the safeties to work with a tension on the king-bolt. My device is totally regardless of either tension or king-bolt, and any interested parties, who may feel skeptical in the matter, are freely and confidently invited to inspect my invention and accept my offered test.

[With reference to the foregoing communication, we will state that we have by invitation examined a working model of Mr. Bracken's device. Square wings, compactly situated and very sensitive in action, cause the eccentric clutches or safeties to promptly act upon the guides in case of any undue speed of the cage downward from the breakage, unlatching or unreeling of the cable. These wings can be placed beneath or above the cage, but their action is certain, causing not only the safeties connected with them to act, but obliging the old style of safeties which may be attached to the cage also to act. Thus a two-fold safety is secured not only to human life but for costly mining cages, cables and other accompanying property. The device needs but to be seen to be appreciated. It certainly would cost but little for any of our mining companies to try it.—*Rep. Enterprise.*]

## Mining Dividends for the Half Year.

The New York "Financial and Mining Record" apportions the dividends of American mines for June and for the first six months of the year as follows:

	For June.	Jan. 1 to June 30.
New York.....	\$142,250	\$1,069,250
Boston.....	780,000	780,000
San Francisco.....	180,000	847,300
Elsewhere.....	316,500	1,054,647
<b>Totals.....</b>	<b>\$688,750</b>	<b>\$4,351,197</b>

These dividends have been disbursed by 43 mines, located in 11 States and Territories, as follows:

California.		
	Dividends.	Amount.
Derbec Blue Gravel.....	4	\$40,000
Mono.....	1	12,500
Plymouth Consolidated.....	5	125,000
Plumas Eureka.....	1	33,156
Sierra Buttes.....	1	30,625
Young America.....	5	80,000
<b>Totals.....</b>	<b>17</b>	<b>\$323,281</b>

The Derbec Blue Gravel is in Nevada county. This mine did not pay in January or May. The Idaho quartz mine, in the same county, is understood to have paid a dividend every month this year, but the "Record" has omitted it, probably owing to the refusal of the owners to report their dividends to the press. The Mono mine is in Mono county, and this is the first dividend. It was paid in March. The Plymouth Consolidated is in Amador county, and is credited with dividends for the first five months, though our record is only for four months. The Plumas Eureka and Sierra Buttes are owned in London, where the semi-annual dividends were paid last April. The Young America is in Sierra county. It is possible that these are not the only California mines that have paid dividends this year. Owners in any omitted mines who have received dividends this year have only themselves to blame for want of suitable credit in this particular. The *Bulletin* has always been glad to publish news announcements of this character.

Nevada.		
	Dividends.	Amount.
Con. California and Virginia.....	1	\$64,800
Holmes.....	3	75,000
Jackson.....	3	15,000
Manhattan.....	2	25,000
Paradise Valley.....	1	10,000
Richmond, Con.....	1	67,500
<b>Totals.....</b>	<b>11</b>	<b>\$257,300</b>

The above is the first dividend of the Consolidated California and Virginia since the two mines were merged under that corporate title. It was paid in February, at the rate of 30 cents per share. The Holmes paid its first three dividends in February, March and April. We understand that the dividends were suspended because of the low price of silver, and not because of a want of silver-bearing ore, of which, we are told there is an abundance. In addition to the dividends paid by the Jackson mine in January, March and June, there was a stock dividend of 10 per cent in March. The two dividends by the Manhattan mine were paid in January and February, and the one by the Paradise Valley in February. Both have paid dividends before, and both are well supplied with silver-bearing ore.

Utah.  
The Ontario Mining Company paid six dividends of \$75,000 each, or \$450,000 in the half year, despite the fact that the mill was closed down for nearly a month.

Idaho.  
The Idahoan mine is not incorporated. The owners claim to have divided up \$60,000 among

them, in four installments, in the half year, or 31 per cent of the net proceeds.

Dakota.		
	Dividends.	Amount.
Caledonia.....	2	\$20,000
Homestake.....	6	300,000
Iron Hill.....	6	75,000
<b>Totals.....</b>	<b>14</b>	<b>\$395,000</b>

The dividends of the Caledonia were paid in January and February. A cave in the mine followed. The debris has since been removed, and there is a prospect of an early resumption of dividends.

Arizona.  
The Silver King Mining Company has paid six dividends in the half year, amounting to \$150,000. There is not another mine in the whole Territory that has paid a dividend this year, so far as we can learn.

New Mexico.  
The Peacock Mining Company is reported to have paid its first dividend of 5 cents per share, or \$10,000, in June. The office of the company is at St. Louis, where the dividend was paid.

Mexico.  
We know no mines in Mexico that have paid dividends this year. Even the Jucustita has ceased to remember stockholders. The low price of silver is hard on the Mexican mines, whose product is almost exclusively silver.

Montana.		
	Dividends.	Amount.
Alice.....	1	\$25,000
Boston and Montana.....	6	180,000
Elkhorn.....	6	30,000
Granite Mountain.....	6	520,000
Hecla Consolidated.....	6	90,000
Helena Mining and Reduction.....	1	18,000
Moulton.....	1	30,000
Montana.....	1	128,750
<b>Totals.....</b>	<b>28</b>	<b>\$1,016,750</b>

The mines of Montana are being worked on close business principles and with encouraging success. The Montana was formerly known as the Drum Lummon, and is owned in London. An interim dividend of 62½ cents per share, or \$207,600, was paid on the 15th of July, making \$620,000 to date.

Colorado.		
	Dividends.	Amount.
Adams.....	6	\$105,000
Colorado Central.....	3	42,500
Freeland.....	2	40,000
Hubert.....	2	16,116
Iron Silver.....	1	100,000
Plutus.....	1	20,000
Robinson Con.....	1	24,000
Silverton.....	6	437,500
Small Hopes.....	6	212,500
Yankee Girl.....	6	212,500
<b>Totals.....</b>	<b>34</b>	<b>\$1,007,616</b>

The last dividend of the Freeland and Iron Silver was in April, and Robinson Consolidated in March. The Plutus paid its first and only dividend last February. The Mary Murphy paid its first dividend of 5 per cent last May; gross amount not known.

Michigan.		
	Dividends.	Amount.
Atlantic.....	1	\$40,000
Calumet & Hecla.....	1	500,000
Central.....	1	40,000
Franklin.....	1	40,000
Quincy.....	1	160,000
<b>Totals.....</b>	<b>5</b>	<b>\$780,000</b>

These are all copper mines, and the above dividends were paid last January and February. The Calumet & Hecla and Franklin have paid further dividends this month.

New Hampshire.  
The Valencia Mica Company paid a dividend of \$2.50 per share, or \$3750, last April, making \$37,300 to date.

Comparative Summary.  
Following is a summary of the dividends from incorporated mines for the six months ending June 30, 1886, compared with the same time last year:

1885.		1886.	
Mines.	Amount.	Mines.	Amount.
California.....	9	6	\$923,281
Nevada.....	4	6	257,300
Utah.....	3	1	450,000
Idaho.....	1	1	60,000
Dakota.....	3	3	395,000
Arizona.....	1	1	150,000
New Mexico.....	1	1	10,000
Mexico.....	2	8	1,016,750
Montana.....	5	6	1,007,616
Colorado.....	6	5	780,000
Michigan.....	2	5	780,000
North Carolina.....	1	1	40,000
Vermont.....	1	1	30,000
New Hampshire.....	1	1	3,750
<b>Totals.....</b>	<b>40</b>	<b>43</b>	<b>\$4,453,607</b>

For the same time in 1884, the amount paid in dividends was \$4,581,108 by 47 mines, against \$5,627,187 by 52 mines in the first half of 1883. Nearly one-half of the amount this year has been paid by the silver mines of Colorado and Montana.

Rowie's Mill in Six-mile canyon, below the Park mansion, is crushing ore extracted from the Ophir mine nearly a quarter of a century ago. This ore has been lying on the site of an old mill at Ophir, just north of Washoe City. Bullion valued at \$2400 resulted from a cleanup after crushing 26 tons recently brought to the mill by rail.—*Virginia Chronicle.*

The Nickel Company expect to commence operations on the nickel and cobalt mines at Lovelock, Nev., very shortly.

## Modern Inventions.

Their Multiplicity and Influence on the World's Material and Moral Progress.

How little the average man or woman stops to think how much of the ordinary comforts and conveniences of life are due to modern inventions. What would the housewife of to-day do without the thousand and one little "Yankee notions" which are now found in every kitchen? Even the cooking-stove and range are of quite modern invention. It is within the lifetime of all whom we now call aged that the old-fashioned fire-place with its crane, trammel and hooks, with a "Dutch oven" or baking kettle and a few iron pots were the only cooking utensils in use. The first stoves were merely cast iron boxes for heating purposes and not for cooking. Who to-day that has a family to sew for could think of doing without a sewing machine? Yet that almost indispensable household requisite is less than 40 years old.

What would our modern farmer do without the various descriptions of machinery with which the inventor of the present century has supplied him, in the way of harvesters, headers, thrashers, mowers, cultivators, harrows, etc.? By the use of these inventions the drudgery of farming has been transferred from the muscle of the farmer himself to that of his horses, and he has been enabled to reduce the price of his products to one-half and even one-quarter of that which he was formerly obliged to charge, to the great advantage of himself and the entire community which he supplies with so many of the necessities of life.

Again, go into the factory or the machine shop and witness the innumerable number of inventions, all calculated to lessen the toil of the human hand, reduce the cost of supplies of every kind, and add to the convenience and comfort of mankind. What a contrast between the machine shop 50 or 60 years ago and now! One hundred years ago the total number of steam engines in the United States could have been numbered on the fingers. In 1776—the year from which we date our independence—there were but three steam engines on the entire American continent! There is no need that we should speak of the power printing press, the railroad, the telegraph, the telephone, illuminating gas or coal oil. How could we do without either at the present time? Going back six or eight decades would seem to put us back 2000 years in the march of progress. It really would do so. For all the progress of the 2000 years in the mechanic and useful arts previous to the present century might be balanced by a single year of modern invention. The important influence which these inventions have exerted on the comfort, health and material progress of civilized nations needs no elaborate statement. But there is another direction of this influence of which little has been said or thought, but which is nevertheless real and of great importance. We refer to

## The Influence of Invention on Social and Moral Progress.

It is not in the mere physical or material directions alone in which the human family has been benefited by modern invention. Invention has accomplished a much higher and nobler work, in the advancement of the social, moral and religious condition of the world. This matter has been most pleasantly and profitably presented by a well-known mechanical engineer—Charles Talbot Porter, of New York—in a thoughtful volume recently published by G. P. Putnam's Sons. The work is entitled "Mechanics and Faith." To the majority of readers this title would seem to express the most opposite extremes of thought—the bringing together of subjects quite incongruous, and between which no relations could exist; yet the author, in discussing the power which he believes mechanical science is actually exerting, in guiding the development of thought and belief in moral truth, is really preparing the way for a still higher work in the direction of a philosophical system in which spiritual faith shall be fully recognized and honored.

According to our author, the peculiar adaptation of mechanical science and pursuits for this service is indicated in the claim that it exerts a healthful influence on thought, belief and morals, and, generally, on the spiritual nature of men. Concerning this influence, the author makes the following statement, that indicates the scope and object of the argument, which is both plausible and logical:

"It"—mechanical science—"is of a nature to aid directly in establishing in the mind the solid foundation of faith. Its immediate tendency is to dispel the idea of antagonism between reason and faith, to show that antagonism exists only between reason and credulity, and to vindicate the authority of faith over its own vast region. It shows that faith is consistent with the highest intelligence; that all true philosophy leads up to faith, and that the larger and more complete the comprehension of truth becomes the more absolute faith must become."

While we have neither time nor space to follow the author in his argument, we would briefly refer to the position taken in the outset, as stated by a reviewer in the following words: "This branch of science dealing as it does, not with matter, but with force, the unseen and eternal, is peculiarly fitted to carry the thought beyond things physical and visible. Force is



insisted on as a spiritual reality, and this fact is the key to the author's reasoning and the starting point of his argument. This leads to the conception of natural law, which, instead of being a substantive reality, can express nothing except the uniform mode of action of a Being, which is subsequently shown to be the uniformly beneficent action of a Being. In this view of force, bearing as it does against materialism, the author is probably in sympathy with Dr. Carpenter when he remarks, with reference to nature, that we should not speak of government by laws, but government according to laws, although Mr. Porter's conception more directly recognizes force as the divine energy. The materialistic views of nature are further combated in an argument against the atomic theory which is regarded as the bulwark of materialism. This discussion is interesting and able."

### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

**STEAM COOKING APPARATUS.**—Daniel D. Mounts, San Francisco. No. 345,391. Dated July 13, 1886. This is an apparatus for cooking fruit by means of steam. The machine is complete in itself, embodying the source of heat, the steam generating water, the super-heating device and distributor by which the steam is discharged equally, and the receptacle containing the fruit jars.

**SEWER-CLEANING APPARATUS.**—George W. Pringle, Benicia, assignor of one-half to L. B. Mizner. No. 345,804. Dated July 20, 1886. An apparatus for speedily cleaning sewers is a very useful thing. This one consists of an endless chain extending down through the sewer, passing over guides and driving pulleys, and adapted to carry plows or scrapers, which travel through the material collected within the sewer, so as to loosen and remove it.

**CANDLESTICK.**—Samuel Tyrell, Grass Valley. No. 345,461. Dated July 13, 1886. This is one of that class of candlesticks in which a vertically adjusted rest is arranged within the main tube, whereby the candle may be raised and the grease discharged; and the invention consists in a rest having a fixed nut in its base, and in a screw passing through the base of the candlestick and threaded in the nut, said screw having a thumb-piece on its lower end by which it is operated. The object of the invention is to provide a candlestick in which the means for raising and lowering the rest are simple and effective and not liable to get out of order.

**ANIMAL EXTERMINATOR.**—Homer Esborn, Petaluma. No. 345,373. Dated July 13, 1886. This invention is one of that class of animal exterminators in which some combustible material within a cylinder is subjected to a blast of air, whereby the noxious fumes or products of combustion are driven out through suitable pipes into the hole or burrow of the animal; and the invention consists in the novel arrangement of the operating parts, and particularly in the independent nozzle which is inserted in the burrow and the exterior pipes connecting the nozzle with the combustion chamber, one of said pipes being shorter than the others, whereby sufficient ventilation is obtained.

**REVERSIBLE PLOW.**—Neil McLean, Watsonville. No. 345,797. Dated July 20, 1886. This improvement in reversible plows consists of a double landside and shares having a single double-faced mold-board hinged thereto and movable about the hinge, so as to serve as a mold-board for either share. The standard extends upward from the center of the landside, and is pivoted or journaled within the plow-beam, and has a circular disk turning against the lower surface of the plow-beam. In combination with this disk is a peculiarly-constructed holding and adjusting lever, and a means for swinging the double-faced mold-board from one side to the other when the plow is reversed.

**EXPANDING DRILL-BIT FOR ARTESIAN-WELL BORING.**—Chas. O. Lane, S. F. No. 345,385. Dated July 13, 1886. In artesian-well boring the drill-bit is passed down on the inside of the pipe until the cutting points project below, when it is rotated by suitable mechanism from above. In order to make a hole below the pipe larger than the pipe itself, the drill-bit is adapted to expand upon emerging from the pipe, but while passing down or up through the pipe it is in a contracted position. This is made possible by reason of the yielding or springy capacity of the legs; but it is obvious that after they have expanded some means must be used to hold them rigidly separated while at work, and to relieve them when about to be drawn up or lowered through the pipe. The main object of this invention is to provide simple and effective means to this end, and also to perfect the other portions of the tool. It is an improvement on a former bit made by the same inventor. It consists in two or more spring-legs, firmly secured at their tops to the head of the tool, their lower ends being formed into or provided with cutters, above which, on their outer surfaces, are formed peculiar or frictional bearing-knees; in a novel fixed or stationary fulcrum-block between the legs, over which they are adapted to bend when their lower ends are forced together, whereby the distance be-

tween the cutters is made shorter than the distance between the knees; in a novel adjustable automatic brace adapted to operate between the legs, to hold them rigidly separated when at work, and to release them when the tool has to be raised; in a beveled surface for the lower portion of the legs to guide and hold the brace and relieve its upper portion from undue friction; in a protecting and strengthening disk or flange on the head of the tool, a protecting rib on the upper portion of the legs, and certain details of construction which perfect the tool.

**PORTABLE HOUSE.**—Wm. J. Anderfuren, S. F., assignor of one-half to James Eva. No. 345,944. Dated July 20, 1886. The invention relates to that class of houses in which the parts are previously prepared in such a manner as to adapt them to be readily put together, and hence are generally known as portable houses. The invention consists in peculiarly grooved corner and intermediate posts having removable clamping plates or strips fitted to them; in siding having its ends prepared to fit the grooves of the posts and to be clamped therein by their plates, and its meeting edges tongued and grooved to form a novel overlapping dovetail joint with each other and the sills; in the window and door frames having dovetail tongues for fitting the dovetail grooves of the posts; in an outer top plate adapted to overlap the siding above; in an inner top plate or cornice adapted to overlap the siding on the inner side, and in various details of construction. The object of the invention is to prepare the various parts of the house so as to adapt them to be readily fitted together, at the same time fully providing for the subsequent adjustment of the house by taking up the shrinkage easily and effectually and concealing it, and also to provide for the change of a door or a window from one point to another, or the insertion of a new one.

**CHECK-REIN ATTACHMENT.**—C. L. Bard, San Buenaventura. No. 345,404. Dated July 13, 1886. This invention relates to that class of check-reins and hooks which enable the driver, unaided by any extra line or string in his hands, to check or uncheck his horse or horses at will by the action of the driving reins or lines alone, and without rising from his seat or leaving the vehicle. Mr. Bard has obtained several patents on this class of devices, in all of which the check-rein is attached to the driving lines or reins behind the plane of the pad, and is disengaged from the hook and re-engaged therewith by the action of said lines. The present invention consists in a check-rein in addition to the regular checking-slot of the first reins, a limiting-slot located back of the checking-slot, and acting as a limiting-check after the disengagement of the one in front, and in a check hook, the pivoted lever arm of which has in its rear end several openings or slots in different vertical planes, so that the check-rein may be adjusted to suit different sizes of horses and heights of vehicles, whereby, no matter what may be the relative position of the horse and driver, the perfect operation of the device may be had. The invention further consists in an improvement in the checking-slot of the check-rein by making in it several independent shut slots, whereby the horse may be checked at different heights.

**THE Nevada Manuscript** says: A portion of the material for the elevator to be tested at the North Bloomfield hydraulic mine has arrived here from San Francisco. The elevator will be constructed and put in operation as soon as possible.

**THE Carson Tribune** says: The amount of bullion that comes in from the southern part of the State is very large, and the bricks shipped by the local roads reminds one of olden times, when the Mint was in full blast.

**AN** injunction has been served to restrain the South Yuba Water and Mining Company from selling water to the hydraulic miners dumping into the South Yuba river or its tributaries in the county of Yuba.

**NEARLY** all the silver mills at Butte City, Montana, have shut down, owing to the shortage of milling salt. This in turn is due to the disagreements with the railroads about shipping rates.

**THE** United States geological surveyors now in the field have recorded the altitude at Mt. Pitt, or McLaughlin, Or., as it is generally called, as being 14,000 feet above the level of the sea.

**THE** new leaching works of Mr. Wenban at Cortez district are operating very successfully. During the last month 59 bars were shipped, weighing about 100 pounds each and over 500 fine.

**THE** relocators of the Lightning Liz claim, near Dayton, are said to have uncovered a four-foot vein of gold-bearing quartz assaying \$100 per ton.

**THE** Marysville foundry has suspended operations temporarily. It is stated that the help have not been paid for two months.

**THE** closing down of the Copper Queen mine has occasioned much depression at Bisbee, A. T.

**THE** first bullion from the Nogales (A. T.) smelter was shipped to Pittsburg, Pa.

### Standard Sizes for Iron Axles.

Our readers who use wagon gear—and they will comprise nearly all of our subscribers—will be interested in the following letter by R. G. Sneath, of Jersey Farm, which we copy from the *Carriage Journal*:

The subject of iron or steel axles for wagons and carriages would appear anything but a live subject to write about, and yet they are the innocent cause of sad losses, tedious and expensive delays, untold blasphemy and infinite disgust, to the human family. The manufacture of these highly useful articles, under present methods, is, no doubt, criminal, as their use sadly interferes with the progress of mankind. Webster defines crime as "a public wrong," "that which is condemned," etc., and I will try to show wherein the wrong lies, that it may be condemned.

As near as I can learn, there are, perhaps, 40 different sizes of axles in their greatest diameter—say from  $\frac{1}{2}$  inch up to 5 inches; then there is a variation in length of spindle in each size, of from  $\frac{1}{2}$  to 3 inches, giving, say, 11 sizes in length to each size in diameter, or multiply 11 by 40 and you have 440 sizes simply by one maker. Now, estimating the number of makers in the United States and elsewhere, who make our axles, at 100, we should multiply that number by 440, which makes 44,000 different sizes. I do this because I do not know of any two makers that make alike, in fact hardly two axles by the same maker are alike.

Axle boxes not only vary in fitting axles but differ in thickness and taper; some  $\frac{2}{3}$  inch boxes are  $\frac{5}{8}$  inch thick, while others are  $\frac{3}{4}$  inch. Some nuts are  $\frac{1}{2}$  to  $\frac{3}{4}$  larger on the square end than others of the same sized axle, making from three to four different sized wrenches necessary, at times, for a patched-up wagon. In  $\frac{2}{3}$  inch axles I have noticed a difference of  $\frac{1}{8}$  inch in the taper, between the different makers, and also that it was very difficult replacing lost nuts on account of the various sizes.

In new axles, before the boxes are removed, it is quite essential to mark each arm and box in order to return them to their respective places; otherwise you may have trouble, as they are pretty sure not to be alike, and you may get your hind wheel in front.

Extra boxes to fit closely, in case of repairs, are an accidental thing, and in order to be sure that they are not too small, you are pretty sure to order them a size or two too large. The wobbling, however, of wheels thus fixed is neither pleasant nor profitable. Axles are not marked distinctly enough to prevent the wear and tear, dust and grease, from obliterating the maker's name and marks, and the correct measurement of such axles, when well worn by the farmer or teamster, is a matter of great uncertainty and notorious inaccuracy.

Orders for either axles, boxes or nuts, from such a source, will ordinarily have to be duplicated before a fit is obtained, and should such orders come from the mountains, several hundred miles off, the damage by delay—even of a nut being lost—may run up into hundreds and thousands of dollars, especially when a large body of men and horses are waiting the arrival of some special thing in connection with machinery.

The principal reason of serious delays and loss in this respect is that nearly all orders on this coast must come to this city, as there is no stock to speak of carried elsewhere. The next is the difficulty of filling the order after its arrival here. Most of the wagons and carriages in use here are of all conceivable sizes and patterns and come from the Eastern States, and, notwithstanding the great wealth of the wholesale dealers in these articles in this city they are not equal to the task of furnishing 44,000 different kinds of axles and make the business pay. Consequently, the old axles and boxes must be thrown away and new ones take their place, or the orders sent East to be filled, perhaps, by the maker, while the stock of axles here is dwindling down under this process to a point that is not even respectable, and in smaller towns hardly any stock is kept.

Iron boxes that vary in thickness cause a short life to wheels, for, in replacing in one case, the hub must be cut to admit the larger box, and in the other the hub must be filled with something to enable the smaller box to stay in place, and in neither case can the farmer or teamster place the box centrally and securely.

If the boxes were made uniform in inside and outside diameter, and of a standard pattern, upon the principle of a gun and its cartridge, exactly alike of a given size, then any person could replace a broken box without loss of time or money.

If axles, boxes, nuts and wheels were interchangeable like our government's arms, or the mowers, reapers and farming implements of the present day, then a few extras would accommodate a whole neighborhood of farmers. The village blacksmith and the country store could then be persuaded to keep extras, for there would be a profit in it.

In a business I have myself, I employ about 30 wagons. They were picked up from various sources and no two are alike. I soon found myself in trouble in the matter of repairs, and I then adopted one make of axles and one size for each department. Also one size of wheel and one width of tread (five feet to outside of tires), and one width for shafts and poles where attached to the wagons with springs, as well as one size and make of springs. I keep a few springs and axles and extra boxes and wheels,

perhaps a dozen of the latter, so that in painting and tire-setting the wheels can be shifted. And now I have no delay from breaks, as about all my wagons are now up to standard sizes, through repairing.

It may be of general interest to say that I receive about 12,000 pounds of milk daily from Jersey Farm Dairy, San Bruno, Cal., on thoroughbred wagons carrying 6000 pounds at a load, going five miles an hour, on axles  $2\frac{1}{2} \times 2\frac{1}{2} \times 12$ , making 60 miles daily or 22,000 miles annually, or 150,000 made in the last seven years by two wagons that are alternated for repairs. One of the wagons had axles  $2\frac{1}{2} \times 2\frac{1}{2} \times 11\frac{1}{2}$  which were always grinding and heating, and needed oil continuously, notwithstanding any set or gather we gave it, and it was only used while repairing the other. But upon changing the axles to the size and taper of the other, it gave entire satisfaction. I estimate the life or duty of such an axle, loaded and cared for properly, at 50,000 miles; and of the tires, 1x3, at 5400 miles. My experience favors a  $\frac{3}{8}$ -inch taper to 12 inches in length, and in axles  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches diameter; the length should be about five times the larger diameter, as giving the greatest strength and durability.

I think it would be safe to say that on this coast, with two millions of people, there are at least 1000 stores and places where at least 10 sets of axles with boxes and nuts would be kept, if the business was simplified by the adoption of a few standard sizes, that were uniform and interchangeable. These axles being worth say \$10 per set, would make the stock of 10,000 axles, at \$10, \$100,000. The wholesale stores in this city, and other large towns in the interior, would perhaps carry 5000 axles more, which would figure \$50,000, or \$150,000 worth, in all would be carried by the trade over and above what is now carried.

Now, the whole United States having 30 times the population we have, would, if the same ratio is preserved, carry four million five hundred thousand dollars worth in excess of present stock, or with extra boxes and nuts from five to six millions.

I can remember the time when, to get a one-half inch or three-eighth inch nut for a carriage bolt, it was necessary to visit the blacksmith, as no two nuts or bolts were alike, and he would perhaps have to recut the bolt or make a new one, as his screw cutter was unlike anybody's else. But now I venture to say that there is not a farm, store or shop on the coast where a three-eighth or one-half inch bolt and nut could not be obtained, either new or second-hand, and so it should be with nuts for ordinary iron axles for farmers; they should be obtainable anywhere.

The enormous growth in the trade of those articles that are manufactured cheaply, on a grand scale, because of their uniformity, interchangeability and general use, can be noted in carriage and machine bolts, guns, pistols and cartridges, clocks and watches, mowers, reapers, sewing machines and many other things.

It is only a few years since every planing mill in this city had a different gauge for flooring, and if a builder obtained flooring from two yards his floors would be spoiled, as the tongue and grooves would not match. Now all are alike.

It seems remarkable to me that in this modern age so large a number of respectable people should be engaged in a calling wherein the public are damaged to the extent of millions of dollars annually through unnecessary delays, while they themselves are ruining their own market for their goods to the extent of millions also, and without having an apparent knowledge of the fact.

There should be a combined effort on the part of all manufacturers, dealers and users to concentrate this business to a few standard sizes that can be agreed upon by the dealers and makers; and hardwood dealers are particularly interested in the matter, as the enormous variety of wooden hubs they are now constrained to keep makes their business unprofitable.

Wagon and carriage makers by adopting standard sizes for wheels, especially for those most largely in use, and keeping extra wheels on hand for sale, would, no doubt, find a large demand for wheels that are finished in iron and paint, for emergencies, as thousands are broken every month and people have not time to wait for weeks for the paint to dry on a repaired wheel.

And why not agree at the same time for width of tread and tires and between standards of bolsters, size of king-bolts, distance from doubletree to axles, length of tongues, etc., so that the bodies, racks, breaks, bolsters, tongues, etc., can be interchangeable.

These reflections come from 40 years of actual and active experience, and the figures I have given, as the probable result of a change, I candidly believe to be not far out of the way. I have mentioned this matter to several gentlemen, who have dealt largely in wagon materials for many years, who have universally coincided with me in the belief that this whole business has become intolerable and should be remedied immediately; and that if half a dozen axle manufacturers, or less, should take hold of the matter promptly and advertise thoroughly that their work was interchangeable there would be no difficulty in selling all they could make, rapidly, at better prices even than now.

**THE** Lynx Creek mill, Arizona, is making a very successful run, and the Del Pasco is grinding out plenty of gold.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 13 Front St.

W. B. EWER, SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$8. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square).....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Aug. 7, 1886.

## TABLE OF CONTENTS.

EDITORIALS.—The Pneumatic Pulverizer; Foundry Notes. 81. Passing Events; Lead Mining in Nevada; The State Mining Bureau; Victorian Gold Mining; At Rest. 84. Refining Copper Bullion Produced by Amalgamated Tailings; Idaho Mines. 85.

ILLUSTRATIONS.—Complete Plant of Pneumatic Ore Pulverizer, with Boiler, Superheater, etc.; Section Showing Air Currents. 81. Fig. 7—Bluestone Crystallizers, L. M. &amp; Co. 85.

CORRESPONDENCE.—Marysville Mines, Mont. 82.

MECHANICAL PROGRESS.—Inventions Wanted; Thin Rolled Iron; The Master Mechanic; Iron and Steel Wire Rope; Thorough Workmen; So it is Said. 86.

SCIENTIFIC PROGRESS.—The Mechanical Equivalent of Light; Value of the Lens to Man; Obscure Heat; Germanium, the New Metal; A Merited Recognition of a Valuable Invention; Water Jets and Flames as Conductors of Sounds. 86.

ENGINEERING NOTES.—Hoisting from Great Depths; The Projected Siberian Railway; Four and a Half Days to New York; City Railway Owned by the City. 87.

USEFUL INFORMATION.—Pile Driving; The Health-giving Properties of Rain; Varnish—Five Different Sorts; Souring of Milk in a Thunder Storm; For Staining Bricks; Liquid Carbonic Acid; Sunken Timber; The Care of Emery Wheels; How to Tame the Wildest Horse; Stains for Wood; Orange Stain for Wood; Railway Gauges; A Great Pumping Engine; Green vs. Seasoned Oak. 87.

GOOD HEALTH.—Recovery from Illness; Cause of Premature Old Age; What is Catarrh; Hay Fever in California; A Remedy for Hiccough; Changing the Voice; Smoking and Drinking. 87.

MISCELLANEOUS.—Mining Safety Cages; Mining Dividends for the Half Year; Modern Inventions. 82. Notices of Recent Patents; Standard Sizes for Iron Axles. 83.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico. 83-89. MINING STOCK MARKET.—Sales at the San Francisco Stock Board. Notices of Meetings, Assessments, Dividends, and Bullion Shipments. 92.

## Business Announcements.

Quartz Breakers—E. I. Nichols.  
Mechanics' Institute Fair.

See Advertising Columns

## Passing Events.

In San Francisco we have had a sort of holiday week incident to the Annual Encampment of the Grand Army of the Republic. The city is filled with strangers from all parts of the country.

The closing down of the famous Copper Queen mine, in Arizona, is the result of the long-prevailing low price of copper. This mine is the most important in Arizona, and its production has been so large as to exert a decided influence on the copper market.

The low price of silver is causing a number of low-grade ore silver mines to close down, there being no margin of profit with the present heavy discount.

The success of the pneumatic-tube mining experiment on the Feather river, referred to elsewhere, will doubtless lead to the system being adopted in other places for river mining.

New Mexico is having an excitement over the gold discoveries in the Territory. Numbers of men are flocking to the new district.

The shut-down of the Crown Point shaft threw nearly 250 miners out of employment in that and the Belcher mines. The time required to line up the settled hoist-engine at the head of the incline cannot be accurately estimated. It will not occupy over 30 days at the furthest.

## Lead Mining in Nevada.

For two or three years the Richmond Consolidated Mining Co. (an English corporation), Eureka, Nevada, have held a large quantity of lead on hand, refusing to sell on account of low prices; but in June of last year the price began to go up, and the company finally sold 7538 tons at prices ranging from £14 12s to £19 per ton of 2000 pounds. They have still some 6000 tons of lead on hand. The expenses at the mine have been considerably reduced. For instance, the mining, which was \$11.75 last year, is only \$9.03 this year. That is a reduction on every ton of ore of \$2½. Those items include the cost of the dead work, which has been considerably larger than in previous years. The smelting expenses are very much the same as last year, viz.: \$10.07, as against \$10.39—practically the same amount. The directors paid dividends this year of £35,667. They smelted in the general furnace 7117 tons of Richmond ore, and 5552 tons of purchased ore; and 342 tons of low-grade Richmond, and 1940 tons of purchased ore by the No. 4 furnace, working in connection with the refinery. Thirteen thousand one hundred and sixty-three ounces of gold, 444,368 ounces of silver and 2045 tons of lead have been produced in the year. Lead having gradually improved in price since June, 1885, 7538 tons have been sold during the financial year at prices varying from 3.65 to 4.75 cents per pound; the stock on hand, consisting of 6151 tons, has been valued in the accounts at 4.70 cents per pound; and in consequence of this increase in the price of lead, the directors are enabled to restore the reserve fund to the amount at which it stood in 1884, namely, £75,000.

The cash received during the year for gold, silver and lead, according to the directors' report, is £221,367, and the estimated value of bullion in transit (after allowing for all unpaid refining and marketing expenses) is £153,472—together £374,839—from which, deducting the value of the bullion on hand Feb. 28, 1885 (£154,107), and £71,478 paid for expenses, leaves £149,253 as the net value of the bullion produced in the year. The cost of mining, dead work, smelting, purchasing ore, renewals and repairs, and all other working and general expenses at Eureka, was £101,928. The profit for the year on mining, smelting and refining is £47,380.

The ore has been of better grade than last year, the average assay being \$66.83, as against \$57.32, and the yield per ton of ore has been this year \$59.35, as against \$51.77, an increase of \$7.58 per ton. The expenses of mining have been reduced from \$11.75 to \$9.03 per ton of ore, notwithstanding that a larger amount has been expended in dead work. The smelting expenses have also been slightly reduced, namely from \$10.39 to \$10.07 per ton. The amount paid for purchased ore has been £40,838 for 7493 tons, as compared with £48,181 for 8940 tons last year. The furnaces were shut down in March and April, 1885, in consequence of the great difficulty in getting sufficient supplies of ore and fuel on account of the snow and bad roads. Smelting commenced on May 1, with the usual two furnaces, the general furnace smelting ore and the refinery furnace smelting drosses, accretions from the slag dump and low-grade ore.

The exploratory work done in the mine during the year consists of 584 feet of drifts as against 279 feet last year. The cost of this dead work is included in the mining expenses. No large bodies of ore have been discovered, but the small bodies found on the 300 and 400 levels have further developed, and ore of good quality has been extracted from them. Prospecting is now being carried on in several places. Explorations have been carried on in the Williamsburg and Hoosac mines on a small scale. In consideration of the payment of \$85,000, all suits against the Richmond Company have been dismissed, and the liens on the Albion mines, buildings and works transferred to the Richmond Company, to enable the company to resume possession of the mines and other property. While the rise in the price of lead has enabled the directors to restore the reserve fund to the amount it stood at in 1884, namely, £75,000, they are enabled to state that the profit on the year's working is due principally to the intelligent manner in which the mines have been worked, and the thanks of the shareholders are due to Mr. Probert not only for this but for the successful way in which he

has, by his own inventions, been able to treat the speiss, whereby the profits of the company have been considerably increased; and the directors hope, now that the company is free from litigation, that he will be able to devote himself to the carrying out of still further improvements.

## The State Mining Bureau.

William Irelan, State Mineralogist, having in great part recovered from the severe injuries received a few weeks since near Sonora, has again left on a tour through the central mining counties of the State. While absent on this trip he will visit the more important mines and mining localities in Nevada and Sierra counties, including also, perhaps, some portions of Placer and Plumas counties. Meantime, Dr. Degroot has been deputized to look after the group of counties occupying the northwestern angle of the State, where he is now engaged in the discharge of his duties.

Our newly appointed State Mineralogist seems to be going about his work in a sensible and practical way, visiting and inspecting the mines himself in the more central and accessible districts, and procuring such inspection to be made by competent parties in regions more remote. It is his purpose, as we learn, that the data to be embodied in his forthcoming report shall be obtained, as far as possible, from original sources of information. With such purpose carried out, it may be expected this report will contain more new facts and fresh matter than usually find place in documents of this kind. That this report will not be voluminous may be inferred from the comparatively little time left for its preparation.

The effecting of further economies in mining, more especially in the metallurgy of the business, will be with Mr. Irelan a dominating idea. Much attention, will, therefore, be paid by him and his assistants to the processes employed in the treatment of sulphurets and the reduction of base ores, these having become matters vital to the success of many mining enterprises in California. The plan of procuring from mines being worked or in course of development samples of ore and of the inclosing wall-rock will be largely adopted, these samples, properly labeled, being preserved in the Bureau as well for general reference as for the guidance of the prospector and miner. Under the new management the mineral collection has been subjected to a careful revision, whereby some redistribution of its contents became necessary. It was found that the prior classification of the specimens had, in several instances, been based on the localities of their occurrence or other artificial conditions, rather than on their common properties and characteristics. In all these cases a more natural arrangement has been adopted, and one more in conformity with the requirements of science.

In his endeavors to systematize and otherwise improve the Mining Bureau the State Mineralogist finds his efforts ably seconded by the board of trustees, all of whom manifest a lively interest in the welfare of the institution, several of them devoting much of their time to the consideration of ways and means calculated to increase its popularity and add to its usefulness. Mr. J. Z. Davis brings to the aid of the State Mineralogist the fruits of a long and valuable experience in mining and kindred matters, while in Counselor Heydenfeldt that official enjoys the benefits attendant on a trained and cultured mind and sound legal guidance. Messrs. Durden and Snyder, filling respectively the positions of secretary and assistant mineralogist, have wisely been retained by Mr. Irelan, who could have found no men better fitted to fill these places.

So well officered and conducted, if now the Legislature will make suitable provision for the sustenance of the Mining Bureau, there is abundant reason to believe that it will in a very short time more than repay all it may have cost, and ultimately prove one of the most useful and creditable institutions ever founded by the people of this State.

FURTHER discoveries of gold are being reported in the northern part of Western Australia. Several men are said to have made their way into Sydney from the supposed gold fields. They report the new field as likely to be the largest in Australia. A rush of diggers has already arrived at Sydney en route to the new fields.

## Victorian Gold Mines.

In some parts of Victoria, N. S. W., they are having somewhat the experience we are here; that is, they are now beginning to rework quartz mines, which, under former conditions prevailing there, could not be operated at a profit. In Castlemaine district, 28 years ago, there was a population of 15,000, but there are now barely a third of that number. The drifts were mostly hard, being simply banks of decomposed granite 6 feet to 12 feet in depth. The gold in this "cement" was heavy and much water-worn. In those prosperous alluvial days excellent results were also obtained from vein mining, but the claims were generally abandoned at the average water-line, and the resources of the field are evidently far greater than patient, practical working has yet shown them to be. A local registrar of long standing recently produced an interesting synopsis of 12 distinct reefs, once in good repute, which had been heedlessly discarded at an average depth of 183 feet, after a total yield of 85,566 ounces of gold was obtained from 143,641 tons, crushed by primitive mills and crudest methods of treatment. The figures denote the latent power of the "Great Central Gold Field," and in their light alone it is really difficult to conjecture why a region once so productive and full of promise should have lain so long idle, a veritable scene of apathy and desolation. The area now worked is under 40 square miles, and there are 3500 miners.

The placers in that part of Victoria have been very rich, and the veins which produced the gold in such quantities ought to be found somewhere near by, though we have not always been able to in this country. A correspondent of the London Mining Journal gives some interesting facts of the yield of that region: From Forest creek, alone in the zenith of its fame, 14,000 ounces of gold was won monthly from alluvial drifts, and a few details will indicate the value of the veins from which those deposits were originally derived. On one hillside the drift overlying the bedrock, in claims only 64 square feet, yield 3600 ounces on an average. From Hundredweight hill—so named from its heavy yields—Edwards & Co. frequently washed 360 ounces of gold from a tub of soil. At Sailor's flat and the adjacent gully, 4068 ounces were got from claims only 18 feet by 12 feet. On Dinah flat the returns by the simplest means were even more remarkable, one bucketful of earth giving 252 ounces of gold. In Sheephead gully 456 ounces were taken out of one small hole; 1800 grains were found close to reef crossing the line of drift, and elsewhere finds of 50 cents to the tub were not uncommon. The gold yet remaining in the soils of these unsightly abandoned workings is reckoned considerable, if some facile process could be hit upon for its recovery.

## At Rest.

It is with feelings of deep regret that we chronicle the death of Martha D. Ewer, wife of Warren B. Ewer, of the firm of Dewey & Co., who died July 31st, at her residence, 1516 Folsom street, San Francisco, at the age of 51 years. Her death is a sad surprise, for though she had been ailing for some time she was believed to be hopefully convalescent. Mrs. Ewer was a native of Massachusetts, having spent her girlhood days in the neighborhood of Martha's Vineyard. Her companion, an aged mother, son, sister and brother mourn her loss. She was a member of Temescal Grange, Patrons of Husbandry, Ivy Chapter No. 27, Eastern Star, and the Knights and Ladies of Honor. Mrs. Ewer possessed in a remarkable degree the happy faculty of making a sunny home and winning and retaining the confidence of many friends. Her sweet and amiable disposition, cheerful manners, kind and generous impulses, will cause her loss to be deeply felt in the circle in which she moved.

Mrs. Ewer's funeral was held from her late residence on Monday afternoon, August 2d. The services, which were conducted by Rev. N. L. Rowell and Rev. Dr. Pendleton, were very impressive. A fitting tribute was paid to the character and worth of the deceased. The course of mourning friends, the beautiful floral offerings, the earnestness of the sympathy which was tendered to the bereaved ones, were all significant of the fact that home and society had lost one whose life has been precious to all who came within its influence.



## Refining Copper Bullion Produced by Amalgamating Tailings.\*

NUMBER 4.

The tubs were partially filled with the acid needed for a charge, diluted with water to about 20° Beaume and boiled by live steam. The charge was then fed slowly with a small scoop by one man while his partner vigorously stirred the bath with a wooden paddle, both men paddling from time to time. The chief requisite for good work was to keep the material suspended in the solution until it was substantially free from copper. When the bath reached a strength of over 42° Beaume, it was weakened with water so long as any more bullion was to be charged. Sufficient steam was used to keep the solution hot.

The bullion remaining in the dissolving-tub was leached once or twice with dilute acid, and then several times with water, being stirred and boiled each time. The leachings, so long as they contained silver, were drawn into the precipitating tanks. The bullion was put into small lead-lined filtering-tubs, two feet in diameter and three feet high, and washed with hot water until completely free from acid. It was then dried in iron pans and melted in black lead crucibles. The bars produced averaged, in round numbers, about 950 fine in silver and 17 fine in gold, including all cleanup material, which reduced the fineness several points.

### Precipitating Fine Silver.

The precipitating tanks were old settlers from the mill, about 10 feet in diameter and four feet high. They were lined with lead and furnished with a steam-pipe, arranged as for the dissolving-tubs, and were provided with bars of copper laid on the bottom.

The solutions were boiled with steam in these tanks to an extent sufficient to prevent crystallization, and were stirred with wooden paddles occasionally. The silver was precipitated usually in four or five hours; but occasionally trouble was experienced in throwing down the metal completely, and once in a great while the operation was prolonged for 20 or 24 hours before the tests with salt solution showed no chloride precipitate.

The fine silver precipitate was leached with acid and water, and filtered and washed until free from acid in the same manner as the dissolving-tub residues. All wash waters were tested for silver. The washed precipitate was pressed into cakes, dried and melted.

### Crystallizing.

The crystallizers were wooden vats with flaring sides, and were 7 feet long, 3 feet wide at the top and 2½ feet wide at the bottom, and 2 feet high, clear dimensions. They were constructed of 2-inch plank, braced and strongly nailed. The ends were dapped into the sides, which were bolted together with 4 rods. They were lined with 6-pound lead, one piece 7'x7', forming the sides and bottom, while one-half of another sheet, 3½'x5', formed each end. Considerable economy in lead can be effected by cutting the sheets properly. (See Fig.)

The crystallizers, after being filled, were covered with boards and sacking for three or four days, in order that the solution might cool off slowly and gradually, and thus the formation of larger crystals be promoted. Farther than this there was no financial advantage in attempting to obtain fine crystals, for which reason no lead strips were used.

The bluestone, which crystallized on the bottom, sides and ends of the vats, was taken out, washed and dried on shelves for several days, and then broken up and packed in barrels for the market. A crystallizer yielded about 1000 pounds of bluestone of excellent quality—often as much as 1200 pounds. Specimens sent to the Nevada State Agricultural Fair, in 1875, received a silver medal—the first prize. The same specimens were forwarded by the managers of the fair (without the knowledge of the company) the next year to the Centennial Exhibition at Philadelphia, and, as part of an exhibit, received favorable mention.

Too great an excess of acid in the solutions retarded the process of crystallization, increased the proportion of bluestone of too inferior appearance to put on the market, and gave a greater strength of mother liquor remaining after crystallization.

\*Read before the American Institute of Mining Engineers by A. D. Hodges, Jr.

## Idaho Mines.

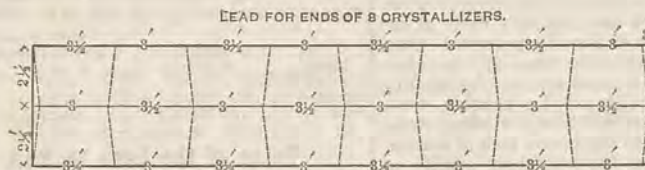
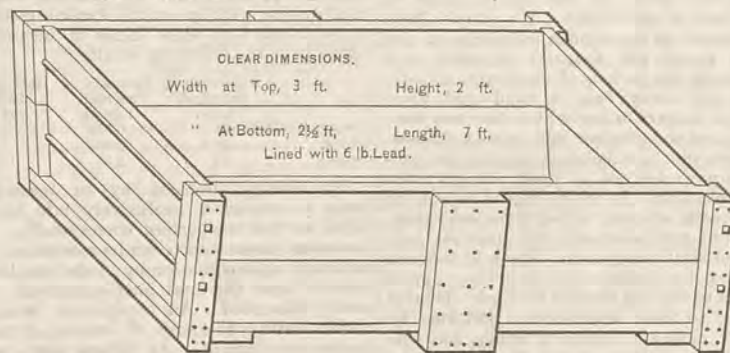
The "Short Line Mineral Belt"—Placers of Boise Basin—Banner Bonanzas, "Float," Etc.

[For the PRESS by our traveling representative, FRANK W. SMITH.]

The country traversed by the new and popular railway known far and wide as the "Oregon Short Line," from Granger, Wyoming, northwesterly to Huntington, Oregon, has developed during the past few years a mineral belt that bids fair to lay all past discoveries in the shade. The mineral-bearing formations are rich and varied, and the resources of the districts are extensive and easily worked. The "Short Line mineral belt," since the completion of that road and its branches, has come to the front with a showing and at a pace that will soon place Idaho alongside of Colorado and Montana as a producer of precious metals. A review of the vast mineral field in one or a dozen issues of a paper would be impossible, hence we will confine ourselves to a district or two for each letter.

### "Washington County."

This county boasts of vast acres of rich agricultural and stock-grazing lands as well as a large and undeveloped mineral district. The north end of the county has a number of good



### BLUESTONE CRYSTALLIZERS OF THE LYON MINING & MILLING COMPANY.

properties that only lack practical and economical handling to gain for the county a splendid reputation. Weiser is the county seat. Gold, silver and copper mines have been discovered in the upper end of the county. The Seven Devils and a number of other properties sold for big prices, and so far as worked have turned out very satisfactorily. Owing to the county having such a big reputation as a stock and agricultural district, miners have given it the "go-by" to a great extent. The opportunities to invest and those to get property in mines without buying are good, and the prospects for the future are flattering.

### County "Float."

The general formations are: porphyry and lime. There is a small cannon-ball mill on the Daniel Boone in Mineral district.

Concentrated ores can be shipped to Butte, Salt Lake or Denver over the "Short Line" at a profit.

An offer of \$60,000 for the Black Maria, adjoining the Black Hawk, was declined a few weeks ago.

Washington district is 22 miles north of Weiser. The ores are copper and silver, the latter predominating.

Denver and Omaha smelters are bidding for and securing a greater portion of the ore shipments on the Short Line mineral belt.

Miners are wanted to prospect this county and capital to back them. The latter without the former is a detriment rather than a help.

The Black Hawk mine in Washington district is patented; over 400 feet of development has been made. The ores run from \$30 to \$300 per ton.

Farmers are doing most of the prospecting in this county, hence the little said of new finds. In many instances some prospectors have to be told when they do get a good thing.

### Boise City.

"Boise," as the capital of Idaho is familiarly termed by residents of the Territory, is as lovely a little city as one can find in the West. Since its decay as a great stage and freighting center it has become a clean, beautiful and dignified city, and to-day can boast of more broad, shaded streets, handsome and costly residences,

magnificent and stately public buildings (county, Territorial and Government) and fair-dealing, hospitable citizens than any late-day metropolis of a Territory can sum up. The United States has an \$81,000 assay office here that compares well with the capitol building of some States. Gold is bought here for the United States mints, and assays made of ores for miners. H. F. Wild, the assayer now in charge, is a popular and efficient officer, and is spoken of as the "right man in the right place." Idaho's output last year was \$6,000,000. The new high school building, the courthouse, and the new capitol, standing on adjoining blocks, the capitol in the center, all facing the same street, are marvels of modern architectural beauty, while the interior arrangements of the buildings are as near perfect as skill and experience, backed by a liberal expenditure of money, could make them. Boise's shaded avenues, garden orchards, cosy homes midst beds of flowers, with suburban districts of river farms on either side, while the foothills on the east, with mountains in the background and the plains of Kuna on the west, give the surroundings a variety that is not often enjoyed by otherwise more favored localities. The 15 miles stage ride, from Kuna station on the "Oregon Short Line," made in easy riding and comfortably equipped four-horse Concord coaches, is an experience more delightful than tiring, and the accommodations to be had in the way of hotels cannot be excelled in any city of its size on the coast. "Boise" is the "Denver of Idaho," and each year adds to her growing importance as a commercial center, and ere many 12 months pass away the shriek of the

range of mountains on the east and the Payette range on the west. The country lying between these ranges and extending a distance of 20x30 miles abounds in the richest (has been) placer mines on the Pacific Coast—California excepted. Quartz mines of no mean merit have been opened up, and to-day this basin has the best quartz country in the Territory—the best undeveloped and unprotected. During the palmy days of placer mining, and in fact even yet, the miners of the basin have not been weaned from their first love, in but few cases, and in these instances rich finds in quartz have been the rule rather than the exception. During the present season quartz mining has received more attention in this county than ever before. Comparatively speaking, the country is undeveloped except in places. The few quartz mines that have been developed have paid from grass-roots, and some of them have been dividend-producing for years, yet, strange as it may seem, new finds are few and far between until the present season. On second thought, it is not strange that Boise county's quartz mining has been neglected, when one is familiar with the peculiar prejudices of the average placer miner against any method of mining save with the sluice-box and the hydraulic pipe. This class of miners have been located in the basin since '62, and, owing to the national reputation Boise county has enjoyed as a placer-mining district, and the continual excitement and booms of new quartz fields, very few miners experienced in quartz have visited this basin. Now that the water right of the entire basin has been bought up by a few individuals, and they are using nearly if not all of the water to work their own placers, the miner of little or no means must either seek new fields or pastures green, or rustle on the sidehill for quartz. A year hence I dare say a head of water cannot be bought for either prospecting or working outside placers, and at that time the writer will venture to say that the mining news contained in the local papers of the basin will assay high in quartz and show but few colors in places outside of ditch-owners' mines. The field open here to capital interested in and seeking investment in quartz is wide enough to suit the most fastidious, and, in the language of the gospel, "Now is the accepted time." Of course this, like it is used in the pulpit, will be dealt out to the capitalist who is desirous of knowing when is a good time to come, until time shall be no more; but the early bird in this locality is more liable to get the worm cheaper and more of them than he who carries till gold bars and bullion shipments are the order of things daily from the basin, which is very likely soon to be the case.

### Idaho "Undercurrents."

Wages paid in placers are \$4 per day.

The basin gold is worth about \$15 per ounce.

The cleanups of the placers about Idaho City take place about twice during the season and run up into thousands.

Since Wells, Fargo & Co. hauled off their express lines in Idaho the greater bulk of gold shipments are sent by mail.

Noble & Co. own and control some 60 miles of ditches in the basin. Water sells at five cents per inch—when there is any for sale.

The Forest King, nine miles northeast of Idaho City, has a large showing in the way of development, and is equipped with a five-stamp mill (Fraser & Chalmers). The ore runs \$15 to \$40 per ton, and has produced thousands each season for some time past. It is run the year round and is owned by James Moriarty and James Curley.

The "Sub-rosa" group near the Forest King, owned by Hon. M. G. Luney, the popular host of "The Luney House" at Idaho City, has a ten-stamp, wet process mill on the group. The ore runs \$30 to \$40 per ton. This would be a nice property for some company to handle.

The theory that Boise basin has a "false bedrock" and that the richest gravel still lies below this bedrock is a reasonable one, and geologists and scientific mining men are inclined to indorse the theory. Should such prove to be the case the gravel elevator will be just the thing to work every inch of low ground, where otherwise it would be impossible to even prospect.

### Quartzberg Bonanzas.

Quartzberg is a small but live and prosperous camp at the upper or northwest end of the Boise basin, distant about 20 miles from Idaho City. The camp is an old one but by no means worked out. The place boasts of two working properties at present, the Iowa, which has recently started up after a long rest, and the Gold Hill, which has a dividend-paying record regular since September, 1869. The latter is owned by D. E. and Wm. Coughanour of Quartzberg, and Thomas Mootry, of San Francisco. The mine is an old standby and as regular a dividend-dispenser as a tax collector is in his visits.

### Placerville.

This once live and booming camp is now a quiet one, though not a non-producer by any means. A few good placers are worked during the winter season, and good "cleanups" are generally the result. Wages are made by a number of men with rockers.

### Banner District.

This district lies 36 miles nearly due east of Idaho City. It is a silver camp and has a past record as a steady producer. A New York and an Illinois company have the leading mines of

(Continued on page 92.)



## MECHANICAL PROGRESS.

## Inventions Wanted.

People frequently say, says the Cincinnati *Artisan*, that much further progress in the direction of mechanical appliances is unnecessary and impossible; that inventors have almost exhausted the combinations of mechanical movements, and that we have enough helps to make the race perfectly contented, provided every man receives his share of the profits from work done. Before we close the Patent Office, and make it a capital offense for any one to materialize their revelations, we desire to make a few suggestions in regard to improvements which are really needed.

## The Thrashing Machine Dust Nuisance.

We have all noticed the great amount of dust raised by the thrashing machine. The dust is of a very injurious nature, but some appliance is needed to attach to the existing machines to prevent it. The appliance must not be costly, nor complicated, but simple and perfectly efficient. If this problem is solved, the patent can be sold for a good price to almost any manufacturer of thrashers, as it would be a good selling point and prevent an almost unbearable nuisance.

## Connections for Road Steamer Wheels.

A practical apparatus is needed to connect all the wheels of a road steamer, thereby giving higher tractive effects. It must not interfere with the steering gear, but be independent. The parts must be very strong to withstand the shocks incident to rough roads and hard usage in general.

## Improved System of Fire-arms.

An improvement in the present system of small arms, to keep pace with the rapid strides that have been made in the art of war in other departments, is almost a necessity. An improved cartridge, with some very simple, reliable means of firing, would be a great improvement, and the inventor who can discard the common lock mechanism, with its heavy spring, hammer, etc., and produce a perfectly safe and reliable result, will be the possessor of an invention of great value.

## Draft in Locomotives.

Those who are familiar with the principles of the modern locomotive know that the present method of producing a draft of air through the furnace is very imperfect. Back pressure in the cylinders, by contracted exhaust nozzles, has been the cause of a fearful waste of fuel, ever since Stephenson's "Rocket" started on her trial trip. Railroad men are generally too busy to stop and experiment, so the problem will have to be taken up by some one outside their circle. Most experienced railroad men concluded, years ago, that locomotive-builders were contracting the nozzles of the engines too much, and lately inventors have been experimenting with the extensive smoke-box, baffle-plates, screws, etc., and have discovered that by giving the principles of induced currents a more thorough research the parts in the smoke-box and stack could be given a form better suited to a larger area in the nozzle openings, and produce a better draft with much less back pressure in the cylinders, and at the same time relieve to a great degree the emission of sparks. These are real improvements, but cannot be considered perfect.

It has been suggested that a steam chamber, of say greater capacity than both cylinders, be connected to the exhaust passage-ways, the nozzle being attached at the top. This chamber will equalize the pressure of the succession of rapid exhausts, and make a more regular current of steam through the petticoat pipe and stack, thereby producing a regular current of air through the furnace, rather than the "jerky" draft now obtained by the present system. We could supplement the above by the following suggestions from *Mechanics*: Among other inventions wanted, there are calls for macaroni-machinery, separators for mica and graphite, good red lead pencils, comb-grailing machinery, portable power transmitting dynamometer (preferably for belts), type-writers which will work on account books and record books, indelible stamp-canceling ink, a practical car starter, a good railway car ventilator, better horseshoes, radial car axles, independent car-wheels, locomotive head-light, anemometer or instrument for measuring velocity of wind currents, apparatus for measuring the depth of the sea without sounding by line; piano-lid hinge which shall be "flush" on the outside, good fluid India ink for draughtsmen, reciprocation counter for locomotives, solder for aluminium, another good method of working iridium, substitute for coal-tar pitch in making artificial fuel from anthracite coal dust and culm, good metallic railway tie, good independent cut-off for locomotives, flexible book back, method of alloying copper and iron, better facing compositions for iron-founding, good molding material for iron and brass casting, capable of giving mold which can be used over and over again.

**THIN ROLLED IRON.**—As an experiment a piece of iron was recently rolled in the new Falcon mills at Niles, Mich., to ascertain the extreme thinness it was possible to obtain. The result was a sheet about the substance of writing paper—in fact, 150 sheets would be required to constitute one inch of substance.

## The Master Mechanic.

The man who would attain to the position of a master mechanic in any line of mechanical business must acquire something more than mere technical skill, or that knowledge which pertains to the useful or mechanical arts. He should ever cultivate the consciousness that there is always something to be learned in his business, and also very much to be learned outside of it. He should be ever ready to appreciate valuable knowledge from whatever source it can be obtained; carefully study and consider every new development pertaining to his business; and, most important of all, swear unflinching allegiance to duty, to honesty of purpose and faithfulness to principles in the discharge of the important trust devolved upon him. He is most successful for himself who serves his employers best and first. A good foreman or master mechanic is not made of poor material, neither is he the work of a day. His growth in progress is slow, often, perhaps, discouraging, always more or less laborious. He must ever be learning, ever on the alert for some unknown or unforeseen danger, and always awake to those that are known. There is hardly a trade, industry, art or invention with which he should not be more or less familiar, at least so far as to be able to estimate correctly the inherent elements of danger, and its relation, if any at all, to his daily work. The changes made in manufacture are to be noted, and the new dangers involved, if any, studied, counteracted or avoided. A thousand inventions, more or less pregnant with danger, are to be understood, and their hazards or advantages pointed out. In manufactures, every year develops new peril in the efforts made to cheapen cost of production. He should keep himself posted on the various industries of the country; study the financial situation, and watch closely the periods of prosperity and depression, and always bear in mind that there are always dangers to face which the most careful study and the greatest skill cannot fathom, and against which, oftentimes, caution and prudence are powerless, or at least can give but partial protection. In art he should be able to judge correctly of every detail of the workshop, as well as to truly estimate the priceless productions of skill and genius. The best foremen and master mechanics we have in our great workshops to-day are those who have elevated themselves to their trustworthy positions by hard work, close application to study, and who feel themselves fully prepared to assume any responsibilities as they may increase and be placed upon them.—*The Wagon-maker.*

**IRON AND STEEL WIRE ROPE.**—In an article on the manufacture of wire rope at the present time, a recent writer states that although a few years ago such rope was generally made of the best iron—Norway or Sweden preferred—steel has now largely taken the place of iron, especially wherever wire ropes are used for winding over a drum or pulley, or for hoisting, while the best of iron wire will bear a breaking strain of 100,000 pounds to the square inch of section. In this manufacture the very best quality of metal is employed, and the bars are rolled down at a welding heat to wire about one-fourth inch thick; this is then cleaned in warm water acidulated with a little oil of vitriol, and, being coated with a paste of rye flour, is drawn through a succession of holes in a wire plate until it is reduced to the thickness of No. 9 wire, when it is annealed by heating from five to eight hours, and then cleaned and drawn down again until it is of the required degree of fineness. Ropes with 19 wires to the strand are more pliable, and are generally used for hoisting ropes; those with 12 or 7 wires are stiffer, and are preferable for guys, ferries and rigging. Wire ropes are made with six strands, with a center of hemp or wire, the former being more pliable and will wear better over small pulleys and draws.

**THOROUGH WORKMEN.**—There is not a more honorable position in life than that of a good craftsman in a useful occupation. A man with the wisdom of Solomon could not constitute himself a perfect artisan without the practical experience which makes a man such. Journey-men are turned out in multitudes, day by day, who have hardly an idea of the first principles of their trade; and many young men, hardly yet of age, are found bold enough to profess a thorough knowledge of two or more handicrafts, any and all of which they know little or nothing about. Ask employers whence they have their most skilled laborers, and they will tell you they come from those workshops where long apprenticeships served to turn out thorough workmen; where engineering is not learned in a year, shoemaking in a month, or printing in a few days. There are many reasons why this whole subject of mechanical training should be pressed upon our young men who expect to live by mechanical labor. The great enemy of the workingman is the crowd of bad workers who are admitted to his status without the proper experience for which he has paid years of effort.

**SO IT IS SAID.**—Central New York has produced some remarkable men, and has been, and is still, wonderfully prolific in men of inventive genius. The latest is a Utica chap, who has produced out of his fertile brain a farm harness that weighs less than 15 pounds, and does away with whiffletrees, traces and many of the cumbersome straps and buckles. Moreover, it is cheap. What next?

## SCIENTIFIC PROGRESS.

## The Mechanical Equivalent of Light.

The relations existing between mechanical energy and luminosity are for the present unknown; in fact, we know really very little about luminosity and the factors on which it depends, further than that one and the same body becomes the more luminous the higher its temperature. Nevertheless, we can in some cases determine the mechanical work which produces a certain intensity of light by deducting the sensible heat lost by radiation or otherwise from the total amount developed. Generally it is impossible to do so, but the incandescent electric light offers an opportunity for this investigation. Experiments have recently been made at the Technical High School at Hanover, Germany, by Mr. Peukert, in this direction. The radiated heat was determined by a calorimeter filled each time by an exactly weighed quantity of water. The lamp was plunged into it and the water kept agitated. A thermometer divided into tenths of degrees C. indicated the slightest changes. The losses were annulled by placing the calorimeter in an isolating chamber and keeping the surrounding air at about the same temperature as the water. The absorption of light by the liquid was ascertained by photometric measurements in both mediums while making use of Hefner-Alteneck's standard. The current was supplied by a gramme dynamo of Schuckert's make, driven by an Otto gas engine; the difference of potential measured by a Siemens and Halske galvanometer. The current was determined by this instrument in combination with an exactly known resistance. Experiments with three kinds of incandescent lamps gave the following results:

	Difference of potential. Volts.	Intensity of current. Lamps.	Heat absorbed. Calories per hour
Siemens-Halske . . . . .	.98	0.554	36.7
Edison . . . . .	.93.6	0.963	55.26
Swan . . . . .	.76	2.55	124.19

The energy absorbed by an incandescent lamp is converted exclusively into heat and light, so that the portion corresponding to the luminous phenomenon can be ascertained with sufficient approximation by deducting the heat radiated from the total heat equivalent of the energy absorbed. An experiment was made which justifies this way of looking at the subject to some extent. An Edison lamp with a thin copper globe instead of glass was immersed in the calorimeter, when the heat found in the latter differed only by 2 per cent from the calculated total. This would seem to show that rays of light intercepted are converted into heat. If the total energy is converted into calories the results with the three lamps will be as follows:

Lamp.	Total work in calories.	Calories absorbed by radiation of heat.	of light.
Siemens-Halske . . . . .	46.98	35.70	11.28
Edison . . . . .	78.01	55.26	22.75
Swan . . . . .	167.86	124.19	43.67

## Value of the Lens to Man.

Ever since man was capable of observing things around him, he must often have seen that a straight stick thrust obliquely into the water appeared to be bent at its surface. It was a long time before man learned the value of this fact; but at length the lens was discovered. The invention consisted simply in the form given to a piece of glass—in giving to one or both of the surfaces of a disk of glass a curved form. This we know forms a lens, and a lens has become one of the most valuable devices known to man, but it was a long time after its invention before it became of much value.

I alluded to spectacles as a valuable invention. I have never seen any attempt to estimate its value. I do not know that I have ever heard the inquiry made. And yet when we remember that nearly every person above the age of 45, and very many below that age, use glasses, we see that they must enter largely into the sum of our comforts. How many persons would be deprived of the pleasures and benefits of reading and writing during a large portion of their lives but for this simple invention! How many kinds of labor would be performed badly, and with great discomfort, but for these devices! At what disadvantage literary labor would be carried on without them! For how many delicate handicrafts would men and women become unfitted in their later years but for them! At what discomfort and inconvenience would domestic needle-work be performed in their absence! How much trial of the patience is saved by their use! I doubt not our tempers are much better in old age for these helps.

But the value of the invention of the lens is not limited to its use for spectacles. From it has grown up those wonderful modern instruments, the telescope and microscope. Through the former has come a large part of our astronomical knowledge, which has a great commercial value from the security it gives to man in navigating the oceans. It has also a high moral and mental value from the field it opens to the exercise and training of the powers of observation and imagination; from the new conceptions it has given us of the immensity of creation, and of the power which gave it birth. I wonder if any man can rise from a contemplation of the facts, the mysteries and magnitudes of the universe revealed to us by the telescope and spectroscopy, without repeating to himself, with a new sense of its significance, the

question: "What is man that Thou art mindful of him, or the son of man that Thou visitest him?"—Chauncey Smith, in *Popular Science Monthly*.

**OBSCURE HEAT.**—At the late Albany meeting of the National Academy of Sciences, Professor Langley reported on the progress of remarkable researches with the bolometer, by which he has so greatly extended our notions of the invisible spectrum. This time he dealt with the lunar spectrum, and estimated the heat derived from the unilluminated moon. Rosse had estimated the temperature of the moon's surface as from 200° to 500° Fah. By studying the moon at its full, with a rock-salt prism obtained only after repeated failures, and which from its nature had already required repolishing seven times, each time necessitating a new determination of its constants, he had succeeded, on repeated occasions, in securing a spectrum which showed two curves—one according with that previously obtained in the infra-red region beyond the visible portion of the solar spectrum, clearly due to reflection, and another, lying entirely beyond that, as clearly due to the moon itself, and revealing its real temperature. This, as shown by studying the spectrum of frigid masses, is colder than the temperature of melting ice. By comparing the mean of the spectra obtained in summer with that of those obtained in winter, it is evident that a much greater amount of heat is obtained from the moon in winter than in summer. This may simply be due to the greater amount of aqueous vapor in our own atmosphere in the summer as contrasted with the winter clarity. By directing the bolometer to the zenith and the horizon, the temperature of space has also been measured by direct experiment for the first time, and the amazing transparency of our earth's atmosphere to radiation of the earth's heat revealed, for his experiments show that our atmosphere transmits the earth's heat more readily than the sun's.

**GERMANIUM, THE NEW METAL.**—A German technical journal gives an account of a new metallic element discovered by Clemens Winkler. It occurs in argyrodite, a silver ore from the Himmelsfurt mine, near Freyberg. Germanium, symbol Ge, has a great resemblance to antimony, though it is distinguished by certain well-marked reactions. If the sulphide is heated in the absence of air, *e. g.*, in a current of hydrogen, it forms a blackish crystalline sublimate, which at a higher temperature melts to brownish red drops. This sulphide dissolves in ammonium hydrosulphide, and is reprecipitated with a white color by hydrochloric acid, and is again redissolved by ammonia. If arsenic or antimony is present, the color is yellow. If heated in air, or treated with hot nitric acid, the white germanium oxide is formed, which is not volatile at a red heat. The oxide dissolves in potassium hydroxide. If this solution is slightly acidified, it gives a white precipitate on treatment with hydrogen sulphide. The oxide is easily reduced by hydrogen; the sulphide less easily. The metal is gray, volatile at a full red heat, though less readily than antimony. The vapor deposits small crystals resembling those of iodine, which do not melt. In a current of chlorine the metal yields a white chloride, which is more volatile than antimony chloride. The acid solution gives a white precipitate with hydrogen sulphide. Herr Winkler is determining its atomic weight, with a view to determine its place in the periodic arrangement.

**A MERITED RECOGNITION OF A VALUABLE INVENTION.**—The Phelps system of telegraphing to and from a moving train by the utilization of the well-known principle of induction has justly been considered one of the most important inventions of the day. It presents a decided and radical departure in telegraphy, since it was the first practically successful attempt to turn to useful account an electrical phenomenon which had hitherto been not only quite useless but positively a hindrance and an obstacle in the practice of telegraphy and telephony. It is a just tribute to the inventor—the fact that the city of Philadelphia has just awarded to him the John Scott Legacy Premium and Medal for his system of induction telegraphy, on the recommendation of the Franklin Institute, a society which, with increasing years, exhibits increasing zeal in good works.

THERE has been of late so much alarmist talk, says London *Truth*, about the exhaustion of our coal fields that it is good news to learn that an inventor, Mr. R. M. Marchmont, has at last perfected an engine in which the steam is returned to the boiler, and, so to say, used over and over again. The saving in coal thus to be effected is calculated at 80 per cent. Besides saving coal, however, this invention will upset a pet theory of the engineering fraternity, who have always considered this problem as impossible as perpetual motion. It is to be feared that our cotemporary has gone a little in advance of his patronymic.

**WATER JETS AND FLAMES AS CONDUCTORS OF SOUNDS.**—Dr. Chichester A. Bell claims to have discovered that a falling jet of water, or a flame of gas burning in a room, mimics, echoes, and carefully reproduces every word spoken and every sound uttered in a room. Dr. Bell has found that when a couple of friends join in a conversation in the drawing-room of an evening, the gas which burns above their heads repeats every word they say.



## ENGINEERING NOTES.

## Hoisting from Great Depths.

Prof. J. Hrabak, of Austria, in discussing the means that will have to be adopted to raise ore or coal from depths exceeding 1000 meters, points out that that depth was reached in 1883, by the Przibram mines, and that several collieries are rapidly approaching it. He shows, says the *Colliery Guardian*, that the ordinary method with ropes of any form whatever will be practically impossible when the ore has to be raised 1200 meters, without the use of supplementary engines placed lower down the shaft, and that even these would not enable the ore to be raised from depths greatly exceeding 1200 meters. The method that, in principle at least, would enable the ore to be raised from almost any depths is the pneumatic system, which has been in use since 1876 at the Epinac colliery, in the south of France. The results obtained have been very satisfactory; but as the cost of a pneumatic plant would be greatly in excess of a rope one, it is very improbable that it will come into general use as long as it is found practicable to employ ropes. Having this in view, the author proposes a method by which he considers it will be possible to overcome the difficulties attaching to the ordinary rope arrangements. He proposes to increase the width of the shaft for half its depth to such an extent that, besides the two principal winding divisions, two secondary ones could also be arranged. Through the principal divisions, the winding would be effected by ropes that reach to the bottom of the shaft, and they would be worked in such a manner that while half the length of each was wound upon the drum, the other halves would hang down the shaft and counterbalance one another. The ore would be raised by these ropes half the height of the shaft, and would be lifted the remainder of the distance by the secondary ropes. This method of winding would be expensive on account of the enlargement of the shaft, and the necessity for two winding-engines. The expense would, however, be compensated for by the winding power being increased by 50 per cent.

**THE PROJECTED SIBERIAN RAILWAY.**—The completion of the Canadian Pacific Railway has given a fresh incentive to the discussion among Russians of their own long-talked-of line to the Pacific across Siberia to Vladivostok. If Russia has stolen a march over England in railway progress toward Herat, it will be a long time ere the Russian locomotives compete with those of England and America in reaching the shores of the Pacific. The *London Times* says: "The almost chimerical idea of a Russian Pacific Railroad is talked of and written about as an undertaking of early and easy accomplishment. All difficulties are very satisfactorily disposed of except one, which is quite left out of calculation, and that is the source of the 150,000,000 roubles and more that would be required for the enterprise. The addition of the Canadian Pacific Railway to that of the United States naturally makes the Russians feel more keenly than ever the disadvantages of their isolated position on the Amoor and the Pacific Coast." And we may add that in England the feeling is so strong against the enterprise that the judgment is constrained to decide that the same is an impossibility. But Russia will eventually go through Siberia to the Pacific Coast by rail, and find a way for her people and their commerce to either the Indian ocean or the Mediterranean sea—probably both. The interests of commerce and industrial progress demand it.

**THE DISAFFECTED PROVINCES** of the Dominion are moving earnestly in the direction of effecting more intimate commercial relations with the northeastern portion of the United States. Arrangements are said to have been completed for building an International railway across the State of Maine to connect the Canadian Pacific with St. Johns and Halifax. This important line has been proposed for many years, and its completion will greatly shorten the distance between Montreal and western Canada and the maritime provinces.

**FOUR AND A HALF DAYS TO NEW YORK.**—There seems to be a determined effort being made to run an overland train from San Francisco to New York in four and a half days. Those interested in the scheme are exceedingly sanguine of success. Referring to this matter, J. M. Davis of the Iowa line says that the question of doubt is not a factor, as his line has already practically demonstrated the fact that there is increased profit in running a fast train.

**THE USE OF IRON RAILROAD TIES** in this country is not favored by Chief Engineer Brown, of the Pennsylvania Central road, who has been experimenting with them for several years. He says they give perfect satisfaction and are no more difficult to keep in line and surface than wooden ties; but they cost from three to four dollars each, while good white oak ties can be procured for one dollar less.

**CITY RAILWAY OWNED BY THE CITY.**—The 14 miles of street railway in Glasgow are owned by the city, and bring to the treasury a rental of \$76,000 annually. There is no uniform rate of fare, but a penny a mile is charged, with reduced rates morning and evening, when the working people travel.

## USEFUL INFORMATION.

**PILE DRIVING.**—In an article on pile driving, published in the *Railway Review*, Mr. W. L. Clements remarks: Some pilework recently driven shows that piles driven with the steam hammer have greater capacity for sustaining loads than those driven with the drop hammer. The Michigan Central Railroad Company had driven some time ago several hundred piles to protect their bridges from ice. Part was driven by a steam hammer and part by a drop hammer. Some are in clusters and others are standing alone. Those withstanding the lift of the ice are invariably the ones driven by the steam hammer. It would appear that the earth is more violently disturbed by the quivering blow of a long drop and heavy hammer, and the frictional resistance of the pile thereby decreased. The steam hammer, on the other hand, gives a short, rapid tapping to the pile and rather presses it into the ground without intervals of rest, thereby keeping the earth in its natural state. This theory, however, has not been sufficiently substantiated by further experiments, and cannot be stated as a positive fact.

**THE HEALTH-GIVING PROPERTIES OF RAIN** are not appreciated by the general public. Rain is an essential to physical vigor in localities that have any extensive population. Man and his occupations laden the air with countless and unclassified impurities. The generous, kindly rain absorbs them, even as a washer-woman extracts the dirt from soiled clothes. The ammoniacal exhalations, the gases resultant from combustion and decay, are all quietly absorbed by a brisk shower. People talk about a "dry climate," but it is a snare and a delusion. There is nothing in it. A very dry climate will never support a large population, for it would soon become so poisoned that it would be fatal to the human race. A scattering few might inhabit it, but not the multitude.

**VARNISH—FIVE DIFFERENT SORTS.**—Common oil varnish: Resin, 4 lbs.; beeswax,  $\frac{1}{2}$  lb.; boiled oil, 1 gal.; mix with heat, then add spirits turpentine 2 qts. Mastic varnish: Mastic, 1 lb.; white wax, 1 oz.; oil turpentine, 1 gal.; reduce the gums small, then digest it with heat in a close vessel till dissolved. Cabinet-makers' varnish: Pale shellac, 700 lbs.; mastic, 65 lbs.; strongest alcohol, 1000 lbs.; dissolve. Dilute with alcohol. Small quantity, same proportions. Turpentine varnish: Resin, 1 lb.; boiled oil, 1 lb.; melt, then add turpentine 2 lbs.; mix well. Copal varnish (pale): Pale African copal, 1 part; fuse, then add hot pale oil 2 parts. Boil till the mixture is stringy, then cool a little and add spirits turpentine 3 parts.

**SOURING OF MILK IN A THUNDER STORM.**—Some one sent a query to the *Manufacturer and Builder* asking the cause of the souring of milk during or immediately after a thunderstorm. After recognizing the existence of the fact, that journal says that "the most satisfactory explanation that has been offered to account for the phenomenon is that the electricity developed when a thunder-storm is passing causes the formation of ozone in considerable quantity. This is a powerful oxidizing agent, and being absorbed by the milk, converts a portion of the milk-sugar contained as one of its constituents into lactic acid, which in turn acts on the nitrogenous matter (the casein), causing this to coagulate or curdle."

**FOR STAINING BRICKS.**—For staining bricks red, melt one ounce of glue in one gallon of water; add a piece of alum the size of an egg, then one-half pound of Venetian red and one pound of Spanish brown. Try the color on the bricks before using, and change light or dark with the red or brown, using a yellow mineral for buff. For coloring black, heat asphaltum to a fluid state, and moderately heat the surface of the bricks and dip them; or make a hot mixture of linseed oil and asphalt; heat the bricks and dip them. Tar and asphalt are also used for the same purpose. It is important that the bricks be sufficiently hot, and be held in the mixture to absorb the color to the depth of one-sixteenth of an inch.

**LIQUID CARBONIC ACID.**—The recent simplifying of the process for producing carbonic acid is proving of much practical use for industrial purposes, and to meet the demand for the same an enterprising German firm is now building up a large business in its manufacture. It is used for charging beer in the cask, in the manufacture of seltzer waters, and for fire extinguishers. By its expansion the Krupps, of Essen, subject their great castings to the enormous pressure of 1200 atmospheres. Its gas is also expected to prove valuable for inflating balloons to raise sunken ships, heavy weights having been very quickly raised from the sea-bottom by its aid.

**SUNKEN TIMBER.**—When vessels or timber sink to great depths in the ocean the pressure is so great that the water is forced into the pores, and the wood becomes too heavy to rise again. It is this pressure that makes it possible for divers to descend to any great depth.

**THE CARE OF EMERY WHEELS.**—In an interesting paper on "Emery Wheels and Their Uses," by L. Best, in the *American Machinist*, a point is stated which every person who uses

such wheels should remember. It is this: "Have the wheel slip easily on the mandrel; do not force it on in any case, as the expansion of the spindle in case of heating in many cases causes the wheel to break." Mr. Best also says that wheels on automatic planer knife-grinders should run only about 300 revolutions per minute, and that corundum for "sharpening wood-working tools and machine-shop tools is better than emery."

**HOW TO TAME THE WILDEST HORSE.**—Take finely-grated horse castor, oils rhodium and cummin, keep these in separate bottles well corked; put some of the oil of cummin on your hand and approach the horse on the windy side. He will then move toward you; then rub some of the cummin on his nose, give him a little of the castor on anything he likes, and get 8 or 10 drops of the oil rhodium on his tongue; you can then get him to do anything you like. Be kind and attentive to the animal and your control is certain.

**STAINS FOR WOOD—SIX COLORS.**—Red: Brazil wood, 11 parts; alum, 4 parts; water, 85 parts; boil. Blue: Logwood, 7 parts; blue vitriol, 1 part; water, 22 parts; boil. Black: Logwood, 9 parts; sulphate of iron, 1 part; water, 25 parts; boil. Green: Verdigris, 1 part; vinegar, 3 parts; dissolve. Yellow: French berries, 7 parts; water, 10 parts; alum, 1 part; boil. Purple: Logwood, 11 parts; alum, 3 parts; water 29 parts; boil.

**ORANGE STAIN FOR WOOD.**—Yellow or orange stains generally result from the use of nitric acid or turmeric. Thus, 2.1 ounces finely-powdered turmeric are digested for several days in 17.5 ounces 80 per cent alcohol, and then strained through a cloth. This solution is applied to the articles to be stained. Nitric acid diluted with three parts of water is likewise used. A hot concentrated solution of picric acid can likewise be used.

**RAILWAY GAUGES.**—The six-foot gauge is rapidly disappearing from American railways. The five-foot gauge in the South is also being replaced, and the probability is that the standard gauge will soon be a rule to which the narrow gauge will be the only exception.

**A GREAT PUMPING ENGINE.**—The largest pumping engine in the world is used to pump water in Pennsylvania. In one minute it forces 20,000 gallons of water out of a mine to a height of 130 feet.

**GREEN VS. SEASONED OAK.**—It is said that experiments have proved that green oak posts will last longer in the ground than those from the same variety of seasoned timber.

## GOOD HEALTH.

## Recovery From Illness.

I think that only those who have been on long beds of sickness, experiencing weeks of pain and weariness, coming slowly up through convalescence once more, can fully appreciate all that good health means.

In sickness your world is limited to the world of your chamber; your interests to obtaining ease and rest from pain. You are like a babe in your despondency, and a child in your temper and caprice. Strange thoughts come and go through the brain; all the future is dull and lurid, as seen through the morbidness of disease, and between it and you lies the valley of the shadow of death, perhaps. If you escape that valley, and feel life thrilling once more within your veins, how slow the creeping back to the old landmarks once more, and the awakening of the old interests. But one by one they come to you once again, the pulse beats ever stronger until you can cry *jubilante*, I am well.

And there is a compensation of one sort for sickness. The wheels of your machinery have been oiled and jointed afresh, and move with greater ease; the new fibers of flesh and muscle have something of the elasticity of youth about them, and your brain is cleared of many cobwebs. In the hand-to-hand conflict you have had with disease, all minor troubles have lessened or vanished entirely, and the blessings of life so nearly lost are appreciated at their worth.

Hope is in the ascendancy again, and you are thankful, loving, willing, glad to do your part once more in the work of life. All this comes with real healing from disease.—*Herald of Health*.

**CAUSE OF PREMATURE OLD AGE.**—The cause of much of the premature old age and decrepitude and nerve degeneracy and break-down is in the many inventions man has devised whereby he robs himself of timely rest. The morning newspaper, often read through before breakfast; the telephone in his house, to call him at any and all times aside from his repose; the electric light to keep his brain unduly stimulated through the retina; the railroad and the sleeping-coach, which may keep him continuously on the rail (if he chooses so to travel) for many weeks, without rest from the noisome and exhaustive cerebro-spinal concussions of this mode of travel, hasty meals and telegrams and business, and nightmare sleep, all commingled, wither and wreck lives innumerable, which,

under wiser management, might end differently; and the needless noises of the city—the bells and whistles, howling hucksters, noisy street cars, yelling hoodlums, that make night hideous with their howls—hasten the premature ending of useful lives; and when, superadded to all this unphysiological strain, we have the assault of a pestilence that poisons, like cholera, how much exemption can such overwrought organisms expect? How much of resisting immunity can such overstrained and exhausted nerve-force oppose to the invading foe?—*Sanitarian*.

**WHAT IS CATARRH?**—Catarrh is a mucopurulent discharge, caused by the presence and development of the vegetable parasite *amœba* in the internal lining membrane of the nose. This parasite is only developed under favorable circumstances, and these are: Morbid state of the blood as the blighted corpuscle of tubercle, the germ poison of syphilis, mercury, toxæmia, from the retention of the effete matter of the skin, suppressed perspiration, badly-ventilated sleeping apartments, and other poisons that are germinated in the blood. These poisons keep the internal lining membrane of the nose in a constant state of irritation, ever ready for the deposit of the seeds of these germs, which spread up the nostrils and down the fauces or back of the throat, causing ulceration of the throat; up the eustachian tubes, causing deafness; burrowing in the vocal chords, causing hoarseness; usurping the proper structure of the bronchial tubes, ending in pulmonary consumption and death. Many attempts have been made to discover a cure for this distressing disease by the use of inhalants and other ingenious devices; but none of these treatments can do a particle of good until the *amœba* are either destroyed or removed from the mucous tissue.

**HAY FEVER IN CALIFORNIA.**—Dr. Lindley, of the Los Angeles Medical College, has been collecting statistics and reports concerning the disease known as "hay fever" or "hay asthma" in Southern California, and after wide research he enunciates three conclusions: 1. Hay fever never originates in Southern California. 2. All cases of hay fever that have come, seeking relief, to Southern California, have been benefited—almost all have been cured. 3. That a few miles inland, in the foothills, relieves such cases as are not benefited by a residence at the seaside. During Dr. Lindley's researches, Dr. John C. Kerr, of Pasadena, wrote him: "I think you will find it the universal opinion of all physicians that hay fever does not prevail in Southern California." And Dr. J. A. Crane, of Santa Ana, wrote: "Somewhat less than two years since my attention was especially directed to the subject of hay fever in Southern California by a question put to me by the Hon. H. H. Markham, M. C. If I remember rightly, he had been a sufferer from this complaint during a residence East, but had experienced entire immunity from attacks since coming to the Pacific."—*Pasadena Union*.

**A REMEDY FOR HICCUGH.**—Dr. A. G. Gibson calls attention in the *Edinburgh Medical Journal*, April, 1886, to the old Hippocratic aphorism, "Sneezing occurring after hiccough removes the hiccough," and suggests, in cases of hiccough, the production of sneezing by tickling the nostril, and he tells us that he has in this way been very successful in arresting this disagreeable affection. Hiccough, as well as sneezing, is one of the specially modified respiratory movements, and it is quite in accordance with what we know of the transference of nervous action, that the spasmodic contractions of the diaphragm should cease on the induction of the explosive expirations which constitute the act of sneezing. There is one point, however, which deserves special mention. It is not necessary that the stimulus applied to the nose be followed by sneezing. The application of a gentle irritant to the nasal mucous membrane may be quite enough to put a stop to the hiccough, by diverting the nervous energy into other channels, although it may not be of sufficient power to induce sneezing.

**CHANGING THE VOICE.**—As the result of an experimental inquiry, Dr. Sandras, a physician of Paris, claims to be able to change the nature, intensity, pitch and extent of the voice in a surprising degree by the use of different inhalations. A few inspirations of alcoholic vapor impart a decided hoarseness, some vapors weaken the voice, while others strengthen it to such an extent that it acquires new notes, high and low. If the same effects are produced upon people generally, this curious discovery must prove of great practical value to public speakers, singers, and all who use the voice considerably.

**SMOKING AND DRINKING.**—Tobacco blindness is becoming a common affliction. At present there are several persons under treatment for it at one London hospital. It first takes the form of color blindness, the sufferers who have smoked themselves into this condition being quite unable to tell the color of a piece of red cloth held up before them. Sometimes the victim loses his eyesight altogether. Although smoking is to a large extent the cause of the malady, and so gives it its name, heavy drinking is also partly responsible.

**IF A SUMMER SICK-ROOM** has a fire-place, put a candle in it. The upward draft makes an excellent system of ventilation, especially if a window be left open to allow fresh air ingress,



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**NEW LONDON.**—Amador Ledger, July 31: Prospecting operations at this promising claim near Plymouth continue with unabated vigor. The shaft is down 400 feet, still in good ore, estimated to go from \$8 to \$15 per ton. The shaft is of a substantial character, made to last, evincing the confidence of the stockholders in the permanence of the mine. It is 8x5 feet in the clear, double compartment, and heavily timbered. No drifting has been attempted so far, but it is probable that at the present level, 400 feet, a tunnel will be run to determine the extent of the ore body. The company will not commence the erection of a mill until the outlook warrants the putting up of a 40-stamp mill. About 23 men are employed about the mine.

**MOORE.**—We are pleased to state that the ore body at the lowest level, 400 feet, was struck last Sunday. It seems to be of good quality, and shows free gold. The ledge was encountered only 20 feet from the shaft, but, before finding it, tunnels several hundred feet in length were run, extending almost clear round the shaft. It seems that the ledge in the lower level has been found on the opposite side of the shaft to where it was struck in the previous level, and this sudden change is what has baffled the prospectors, and led to so much useless labor.

**SOUTH SPRING HILL.**—This mine continues to develop in a manner that stamps it as the coming mine of the county. Heretofore the ore body has been confined to the south side of the shaft, but lately in running a tunnel north they have come across a fine ledge, as rich as any yet met with. The additional 10 stamps to the mill have not been commenced, as far as work on the ground is concerned, although Knight & Co.'s foundry is busy with preparations.

**MISCELLANEOUS.**—Grading for the Kennedy mill was completed last Saturday. The machinery has not commenced to arrive yet. The 10-stamp mill at the Iowa was started up Monday morning. It is calculated to crush two tons to the stamp per day.

## Calaveras.

**ANGELS CAMP.**—Mountain Echo, July 31: Within the past 18 months the tide of prosperity has flowed in this direction, and with the discovery and development of our numerous mines of to-day sprang renewed energy and encouragement in the breasts of its residents. Many of those who had forsaken the town in its hour of decline have returned and re-established homes. Real estate that would scarcely bring \$100 two years ago, now commands from \$500 to \$700. Large steam engines have taken the place of the hand-windlass, and the stamp batteries now perform the work formerly done by the horse and water-power arastras; the Diamond and Burleigh drills have been substituted instead of the antiquated hand-drills; the gold-bearing sulphurets that were formerly considered valueless are now saved systematically and reduced, and the precious metal extracted. The development of our mines continues with a vim never heretofore equaled. Upon lodes which formerly required the work of five or six men, now give employment to from 20 to 60.

## El Dorado.

**RICH GRAVEL.**—Placerville Observer, July 29: James Jeffrey has been made happy the past week by striking immensely rich gravel at the old Green Mountain mine, south of this city. The men who recently had the mine gave it up in disgust, and Mr. Jeffrey went to work with two boys, as much out of curiosity as from a hope of returns. From the start the gravel prospected well, and a few days ago he ran on to a number of nuggets, the largest weighing \$22. Many smaller ones were found, and it is believed the present crushing will yield as well or better than ever before known in this famous old mine.

**SEAM MINES.**—El Dorado Republican, July 27: The seam mines in course of prospecting around Greenwood are looking very well, and there is not much doubt but what this section will soon make a stir in mining circles. T. G. Bilty, who is developing the Garfield mine, has recently run into a blue slate formation, and is very enthusiastic over the outlook. Before leaving the town we called at the stores of Chas. Nagler and F. Ricci, whose well-stocked shelves showed that they were well prepared to furnish the community with all requirements in the way of merchandise.

**KELSEY.**—Owing to the scarcity of water, those engaged in mining the placer claims have been compelled to abandon their work for the present; but judging from the current report, Peter Shepherd is still interested in his American Flat property. Considerable prospecting on seam and quartz ledges is being done in this vicinity, but your correspondent has yet to learn of any one being so fortunate as to have found anything that could equal in riches the palmy days of '49.

## Inyo.

**THE MAXIM.**—Inyo Register, July 29: The Maxim mill near Chrysopolis will start up next week on custom ore. The property has received a thorough overhauling during the last few weeks at the hands of S. D. Thurston.

**TO START UP.**—The improvements which have been and are now being made in the Coldwater-Casey mill are nearly finished, and it is expected that the stamps will be dropped early next week on ore from the Casey mine.

## Mono.

**LUNDY.**—Bodie Miner, July 28: The Gorilla Mining Company are working about 20 men. The mine is looking well, with plenty of ore in sight. The mill runs like clock-work. Erickson, Vance & Co. are having about 25 tons of rich ore, from the Josie Green mine, crushed at G. Ash's arastra.

**THE STANDARD CON.**—Bodie Miner, Aug. 2: Number of men employed in and about the mine, 44. 400 level—South upraise advanced 10 feet; winze, same level, advanced 11 feet. 300 level—West drift north advanced 15 feet; north drift ad-

vanced 18 feet; west drift south retimbering. Ore bodies hold well in quality and quantity. Ore shipped to mill for week, 292 tons. Standard side of Bulwer mill running steadily.

**THE BODIE.**—The south drift from upraise above 400 is extended 25 feet. The north drift, 620 level (Lent shaft), is extended since last report 16 feet in good ore. We are grading for a new mill, jointly with Mono, at the Lent shaft.

**THE MONO.**—The north drift from west crosscut, 700 level, extended 13 feet; there is rich ore in it. The south drift, 700, is extended 23 feet; the east crosscut from south drift, 700, is extended 5 feet. We are grading for a new mill, jointly with the Bodie Con., at the Lent shaft.

## Nevada.

**DEVELOPMENT.**—North San Juan Times, July 31: New mining companies are forming daily in this place, and work of development is being pushed everywhere. Frank Morris and George Powell are opening a ledge on the north side of the Middle Yuba that promises to turn out very rich. We were shown a specimen Tuesday taken from the ledge which carried coarse gold in large quantities. The rock is of the same description as that found in the Boss mine, but the gold appears to be coarser.

**RICH QUARTZ AT BRONCO.**—Truckee Republican, July 27: A fine ledge of gold-bearing ore is said to have been discovered a few days ago, about three miles below Bronco, near the river, on the opposite side from the railroad. The ledge is six feet wide and the rock is said to assay \$75 per ton. The discovery was made by a sheep-herder. A number of locations have been made, and the vicinity is alive with prospectors. This may be a good mining camp some time.

**POWNING MINING CO.**—Grass Valley Union, Aug. 3: The annual meeting of the Powning Gold and Silver Mining Co. was held on Monday evening, at which the following directors were elected to serve for the ensuing year: A. B. Brady, Dennis Meagher, Joseph Gilbert, John Stocks and Charles Nettle. The Board subsequently organized by the election of A. B. Brady as president and superintendent, and Joseph Gilbert secretary and treasurer. A. B. Brady, superintendent, presented a written report at the stockholders' meeting, in which it was stated that a shaft had been sunk on the company's ground, 5x7 feet in the clear, and timbered, to a connection with the shaft sunk from what is known as the Callaghan tunnel, and that shaft cleaned out to the depth of 42 feet, making a total depth of 80 feet. A contract has also been let to sink a shaft near the line of the Coe Company down to the ledge, in consideration of 20 loads of quartz. The shaft is now down 40 feet, with good indications of a ledge. In both shafts the walls are from 3 to 4 feet apart. On account of the quickness of the water, machinery for pumping would be necessary for the further prosecution of work, but owing to the financial condition of the company, it was not deemed advisable to put up such works at present.

## Shasta.

**NOTES.**—Shasta Democrat, July 28: Three mills are running in the Bullychoop district. Barney Conroy is superintending work at the Ballakala mine. The reduction works on the Scheerer mine will be running by the middle of next week. Weil, Conroy & Co. are running a tunnel on the Ballakala mine to tap the ore body between 300 and 400 feet deep. It is thought that by Oct. 1st, or sooner, Jack Conant will be crushing ore from the Uncle Sam mine on Squaw creek. The lower tunnel in the old Fleming mine in Old Diggings district shows up a body of good milling ore 12 feet wide. Johnny Doblin has sold one of his quartz claims on the Clear creek side of Muletown mountain to Shasta parties. It is a fine prospect. A party of Sacramento capitalists were out in Old Diggings district last Sunday, examining some mining property with a view of purchasing. Geo. McDaniels & Co. are developing a fine gold prospect on Olney gulch, about five miles west of Redding. They have sunk about 25 feet on the vein, which is some three feet wide. The ore carries a large percentage of rich sulphurets, besides prospecting well in fine gold. The vein is confined to porphyry and black slate rock. It has all the earmarks of developing into valuable property. The Live Oak gold quartz mine, about four miles north of Shasta on the Iron mountain road, is doubtless one among the many good mining properties in the county. It consists of two full claims which were patented several years ago, a good water ditch that supplies power for the mill, and a good heavy five-stamp mill. Several years ago Mr. Welsh worked 100 tons of ore which netted him a little over \$10 a ton. Knowing that he was not saving all there was in the ore, he shipped a ton of tailings to San Francisco, which worked \$33. This proved conclusively that he was losing more than he saved. Not being a quartz miner, and being engaged with other interests that required all his attention, he shut the mill down, and the property has lain dormant ever since. It is his intention, this fall, to fit up the mill and reopen the mine.

**BULLYCHOOP.**—Anderson Enterprise, July 29: Senator Foster, of Red Bluff, passed up to Bullychoop, in company with George Grayson and Mr. Buckmaster, of San Francisco, last week, and Tuesday evening last the party returned, having in their possession many specimens of gold-bearing and sulphurets rock from that mining district. Mr. Foster has purchased a two-thirds interest in the great Mammoth mine, the mother lode of that mineral belt. This gives the Potts, Foster & Wallace Company control of 3000 feet on this huge deposit of gold-bearing quartz. And their property is in far better shape than it ever was before, and it is quite reasonable to suppose that that great mining interest will, sooner or later, pass into the hands of able quartz operators. Whether Mr. Grayson will take hold of the property hinges on what returns his assays will show. The Mammoth lode, when tapped at sufficient depths, will surely show large deposits of sulphurets ore, carrying a great deal of free gold and, perhaps, considerable silver. But this ledge will have to be struck at about 600 feet in depth, for from about that point up the ledge has given up its free gold to its many stringers, which branch off from the mother vein like branches from a tree. Work in Bullychoop is progressing rapidly. Everybody is busy, mills are running night and day, and the bright "yellow stuff" is being taken out, forwarded to the mint and coined. The Bullychoop Company are taking out exceedingly rich ore at about 25 feet

west of their old original shaft. The Williamson mill is at present running on the Pound Cake rock. Mr. Enright is busy, and crowding his work along as fast as he can. Titus & Co. are also meeting with good success, and are running both mill and mine. Mr. Grant passed down to Red Bluff with Senator Foster, to make a transfer of his interest in the Mammoth, we suppose.

## Trinity.

**QUARTZ SALE.**—Trinity Journal, July 31: During the past week Mr. C. C. Shattuck, of San Francisco, has made a conditional purchase of Wm. Farmer of the mine recently discovered on Hay Fork, and which gives promise of much value. The agreed price is \$7000, a portion being cash down and the balance in installments. Work of development will begin at once.

**SPLENDID PAY.**—Detlef Hansen returned on Thursday from a visit to the Hansen quartz mine, on Know Nothing creek, beyond New River district and on the Salmon side of the mountain. The first cleanup was made from 16 tons of the rock, ground in a 10-foot arastra, which yielded at the average rate of \$80 per ton. This is excellent, the mine promising to be a veritable bonanza, as the ledge is of good size and well defined.

## Tuolumne.

**NEW REDUCTION WORKS.**—Tuolumne Independent, July 31: Prof. B. Shraff has purchased the Experimental Gulch quartz mine, located about 1 1/4 miles north of Columbia, and will put up works—the largest-sized Frisbee mill and Blanding crusher—of capacity to reduce from 40 to 50 tons of ore per day. He has ordered 40,000 feet of lumber of Mr. Bradford for the buildings, and the machinery is now on the way from San Francisco. He has already commenced grading for the buildings. A dozen men will be engaged in putting the property in order, and then some 20 hands will be employed to work the mine. Some 15,000 tons of ore are on the dumps, and 100,000 tons more are above the water level in the mine. The vein runs from 6 to 20 feet in width. The ore, by mill test, yields from \$5 to \$15 per ton. Mr. Shraff intends to have the mine worked in the most systematic manner, and feels assured of success. This mine was located in 1852, and is believed to be the first quartz mine worked in Tuolumne county; and, so far as known, was the first mine supplied with a mill. In a report upon the geology of California, presented to the U. S. Senate in 1856, by Dr. Trask, he says a mill and reduction works were put on this mine in 1854, but the power (water) giving out soon after, operations were suspended for that time. The report says that 1500 tons of rock yielded \$16,150, or over \$14 per ton. Considering the primitive way of working quartz mines in those days, the result showed the ore to be very valuable.

## NEVADA.

## Washoe District.

**CHOLLAR.**—Enterprise, July 31: On the 3200 level the south lateral drift from the Combination shaft station is in 75 feet, following the east side of the ore vein. Thirty feet south of the station a crosscut west has been started, which is now in 30 feet. It is getting into the ore vein itself, the ore met with giving excellent assays. Forty feet north of the station, in the drift going to the deep winze of the Hale and Norcross, another crosscut west has been started, which is now in 30 feet. This crosscut also shows excellent ore indications. This drift, since the completion of the connection with the Hale and Norcross deep winze, has been trimmed out into regular shape, properly timbered, etc., and thoroughly completed to the Hale and Norcross line. The connection was made all right, and the whole level is well provided with good, healthy ventilation.

**SAVAGE.**—On the 600 level the main south lateral drift is being again advanced directly into the valuable ore body found at that point. It is 30 feet or more in width and shows the regular old-time black sulphurets and chloride ore. The best of it assays over \$200 per ton, and it is all being carefully saved for milling. As before mentioned, there is plenty of room there for a good-sized bonanza with millions in it. The face of the drift is 180 feet south from the Gould and Curry south line. Crosscuts Nos. 2 and 3 west from the main lateral drift are in 40 or 50 feet, and the faces of both are in the same good ore vein or deposit found in the face of the main drift, showing that it lies to the west and extends well northward. The crosscut east, together with the lateral drift to the southeast from it, following the clay wall, has been discontinued.

**BEST AND BELCHER.**—The water is easily held at a point about 20 feet below the lowest level, which, as it connects and corresponds with the 2500 level of the C. and C. shaft, is to be hereafter for convenience sake designated as the 2500 level. The air engine and blowers have been placed in position on this level and the air pipes carried through to the point northward, where the heavy stone bulkhead is being constructed. On the 600 level a west crosscut is being run from the main northwest drift at a point 20 feet from the main west drift. It is in 45 feet and in virgin ground, with favorable ore indications.

**HALE AND NORCROSS.**—The connection having been made on the 3200 level with the Combination shaft from the deep winze, work has been concentrated upon trimming and straightening up the drift, putting in drain boxes, etc. A crosscut west will be started in a day or two to intersect and explore the fine ore vein developed in the Combination shaft and Chollar workings on this level. The lateral drift north from the deep winze station for the Savage is looking well, but showing no new feature of interest worthy of special mention.

**CROWN POINT AND BELCHER.**—Shut down at present, all mining work being suspended since Tuesday, in order to make necessary repairs or improvements to the main incline engine on the 1100 level. The settling of the ground had at last got this engine so badly out of line that it was deemed unsafe to proceed with it any longer. It will take probably two weeks yet to get it reset in perfect working order again, but this will be done as speedily as men, money and true engineering capacity can effect the object.

**CON. CALIFORNIA AND VIRGINIA.**—Yielding

about the usual 350 tons per day, assaying, from mill battery samples, not far from \$12 per ton. On the 1400 level two branch drifts have been started from the end of the northwest drift from the C. and C. shaft. One is running in a northerly direction and the other southerly. Both are in favorable material. On the 1600 level the northwest drift is now in about 260 feet. Material, vein porphyry and quartz.

**KENTUCK.**—Forty tons is the regular daily yield of this mine, and not 140, as mistakenly given last week. The Pelton water wheel on the 700 level continues doing most excellent work, supplying the hoisting power in deeper working at merely nominal expense.

**OPHIR.**—On the 1465 level the south drift is being repaired and put in good working order. On the 1300 level the south drift is in 137 feet; material, favorable. Operations on the 300 level are suspended.

**GOULD AND CURRY.**—The only work this week has been in the north drift, 150 feet above the 600 level. This reached a length of 93 feet, with its face in good-looking quartz and other vein matter.

**SIERRA NEVADA.**—On the 520 level north lateral drift No. 2 gained 38 feet, making a total of 388 feet, following along the east clay wall of the ore vein in porphyry with streaks of decomposed quartz.

**POTOSI.**—Owing to delay in procuring the requisite diamonds from below, drill hole No. 6, near the Chollar line, has not been started, but will be in a day or two.

**YELLOW JACKET.**—About 140 tons continues to be the regular daily yield from the 1300 level up. The low-grade ore supply seems inexhaustible in all directions.

**MONTE CRISTO.**—The main drift west on the 150 level from the new shaft is within a few feet of cutting into the ore vein of the mine.

**ALTA.**—The west crosscut on the 700 level is cutting into the old Keystone ledge.

## Bernice District.

**QUIET.**—Reno Gazette, July 30: E. L. Williams, who arrived at Reno from Bernice, Tuesday night, says the camp is comparatively quiet. He says the proprietors of the Golden Crown mine are not doing anything on account of the depreciation of silver. The Hoyt mine is being worked on a limited scale. The ore taken from that mine when sorted for the mill runs about \$150 per ton. The vein is not large, but pays to work. Mr. Hoyt will soon largely increase his working force. The next crushing from the Hoyt mine will be a greater source of profit than any former one. Keeler & Horton are running a tunnel into the Razor Blade claim, which is considered among the best and most prominent claims of the district. James Ironside is at work on his claim known as the Moonshine. From the present indications that claim will develop into a good mine.

## Cottonwood District.

**TO WORK THE NICKEL ORE.**—Eureka Sentinel, Aug. 1: R. H. Parker, treasurer of Churchill county, is building a hotel at Cottonwood. About the first of July the English company that purchased the cobalt and nickel mines made another payment of \$6000 to George Lovelock, who located the several claims. The company is preparing to work these mines on a large scale, and the prospects are that Cottonwood will soon be a lively camp.

## Esmeralda District.

**LOOKING UP.**—Walker Lake Bulletin, July 29: Aurora is once more looking up, times are improving, and miners and business men are becoming more hopeful. It is reported that there is considerable improvement in the ore of the Humboldt mine owned by the Esmeralda Consolidated Co., and its mill is constantly running. The company has also started work on another of its mines. Mr. Colcord, the superintendent, will remove his family from Bodie to this place, and will occupy the two-story brick building, known as the Sanchez house. Work is being vigorously prosecuted on the Antelope. They are still taking good ore from the Lord Byron. Tanagerman is now hauling ore to the Miner's mill from the '85, formerly the Prospectus.

## Eureka District.

**ORE SHIPMENTS.**—Eureka Sentinel, July 27: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Richmond works—Silver Lick mine, 20 tons; Bullwhacker, 11; White Pine, 6; Empire, 7; Colorado, 7; Oregonian, 2; Geddes and Bertrand, 6; Hoosac, 4. To the Eureka Con. works—Dunderberg mine, 38 tons; Alexander, 32; Summit, 10; Black Prince, 2; Reveille, 1; Ernst, 1/4.

**SPEISS FURNACE.**—Eureka Sentinel, July 27: The Sentinel learns that Mr. B. S. Bernard, of the Ruby-Dunderberg Mining Co., will shortly establish a furnace in Eureka for the working of speiss, refractory and low-grade ores, which, if it meets his anticipations, will undoubtedly create a revolution in ore smelting on the Pacific Coast. Inasmuch as letters patent have not yet been granted in America on the furnace and process, we are unable to give particulars of the invention, which originated with a Frenchman, and on which letters patent have been granted in Australia, Spain, England, France and other countries. Mr. Bernard says the furnace and process are in successful operation in Europe, and that \$10 ore can be worked here and made to pay. Another good feature is the cost of the invention. He says a furnace with a daily working capacity of 30 tons can be established in Eureka for \$2500. The fuel used is charcoal and coke, and by condensation of the heat generated the economy is surprising.

## Osceola District.

**LEASED.**—White Pine News, July 27: From Hon. Robert Briggs, just in from Osceola, we learn that Jack Gilmer, who owns half the Eagle mining and milling property, has leased the other half from ex-Senator Spencer. He has now a force of men at work on both mine and mill, and expected to start the mill the latter part of this week.

## Ophir District.

**BULLION.**—Belmont Courier, July 29: The output of bullion continues steady from the Chicago Mining and Reduction Company's Works at Ophir.

## Park Canyon District.

**TOO REBELLIOUS.**—Belmont Courier, July 29:



Work has been suspended in the mine and mill of Park Canyon. The ore proved of too rebellious a character for profitable leaching.

#### Secret Canyon District.

**NOTES.**—Eureka *Sentinel*, July 27: The Scorpion mine is yielding ore, some of which is very rich with horn silver. Large deposits of oxide of antimony and silver are said to exist in Woodside canyon. Sam Delmew has just made a shipment of ore to the furnaces at Eureka from Woodside canyon. The boys leasing the Irish Ambassador are said to be taking out some very rich ore since their last shipment. Morris Joseph is working alone at present in the Water Jacket mine, putting it in shape for fall and winter work. It is looking very well. John Steel has just made a shipment of rich ore from Cave canyon to the furnaces at Eureka. The amount was small, but prospects for larger quantities are good. The Geddes Company has given several parties the privilege of prospecting some of their claims for what they can find, requiring no tribute, but reserving the privilege of taking the pitches and putting the adventurers on day's pay. Messrs. Pope and Hanlon have returned from White Pine and will prospect the Slackton ground, where very rich ore is known to exist. The old hands of the camp are confident that there are valuable ore deposits in that ground. Ben. C. Levy, of Eureka, is backing Charley Turner, who is running a tunnel in Cave canyon to tap a well-known vein of rich ore at the bottom of an incline, which has been filled up with waste rock. The scheme is said to be a good one. J. Berryman has taken a lease of the Munroe mine. This property in former years yielded some very rich ore, and assays from samples that were taken from several places a few days ago gave results from a few dollars up to several hundreds. Barney McRory and Tom Gilligan are driving a tunnel to tap the ore veins in their property. They have abundant water in the tunnel for all mining, and, if necessary, milling purposes. They will soon commence laying a track to facilitate their work. Capt. J. M. Foley has just completed a new connection from the surface with his tunnel, which had caved for a hundred feet near the mouth. At the junction some timbering will be done. This tunnel is intended to tap several ore veins in a larger tract of mining ground. Hon. Thomas Wren and a party of friends were out from Eureka lately viewing this property. Charley Ruden and the Berrymans, who have been so fortunate lately in the Iron Clad mine, Page canyon, are still at work and continue to do well. They will shortly resume work in the tunnel in order to tap the old works, in which remain immense piles of waste rock, which they intend sorting over. Out of this they expect to realize very good results. The clearing out of the waste rock will also give them a chance to prospect the old workings that paid handsomely in former years.

#### Sprucemont District.

**PANNING OUT.**—Cor. *Elko Free Press*, July 26: Our population at present is small, but a bright prospect for an increase at an early date. The mines are panning out well. The ore is being shipped to Wells by teams, thence to Salt Lake City for reduction, owing to the smelter being switched off on a side track.

#### Ward District.

**FINE BULLION.**—White Pine *News*, July 27: Supt. Culver, of the Martin White, at Ward, shipped this week bullion 925 fine, while dispensing with the roasting process. This is the best showing ever made there. Even with roasters, which are a heavy expense, Martin White bullion never before went over 715 fine.

#### Wild Rose District.

**PARADISE VALLEY.**—*Silver State*, July 27: Milling ore, 194 tons, 500 pounds; shipping ore, 23 tons, 1030 pounds. Total, 217 tons, 1540 pounds. Ore delivered to the mill, 217 tons, 1540 pounds. Number of tons of ore milled, 145. Average assay value, per ton, 62.12 oz. silver, 0.39 oz. gold. Bullion produced, from 31,035 lbs. concentrates, \$10,862.66 par value, 282 sacks of ore, estimated value \$3214.50. Shipped to Boston & Colorado S. Co., Argo, Colorado, concentrates and ore valued at \$14,077.16. Mill work—Three Huntington centrifugal roller mills and six Triumph concentrators. Number of men on payroll, 126, of whom 46 are miners; on dead-work, 31; ore extraction, 15; ore sorters, sack sewers and rock breakers, 12.

#### ARIZONA.

**MOHAVE CO.**—*Miner*, July 27: J. Quaid and Rees Jones have leased a portion of the Christie mine, near Honkle's wells, and are getting out some good ore. Tom Christie will make a shipment of ore in a day or two from his bonanza. Harley Fay had several tons of ore from the Black and Tan mine worked at the Kingman sampling works last week. Wm. Miller had a carload of ore worked at Kingman on Wednesday, from the Hackberry South mine. Beecher & Co. have taken the contract to haul all the ore from the Signal mine to the mill, a distance of nine miles. Johnny Burt makes his last shipment from the Rainbow mine under his present lease to-day. Hereafter the mine will be worked by Messrs. Sherman and Patridge, the owners, in conjunction with Mr. Burt. Charley Richardson made a small shipment of ore from his mine near Chloride yesterday. Johnny Seidel shipped a couple of tons of high-grade ore from the Juno mine last night.

**DUNCAN.**—Cor. *Clifton Clarion*, July 20: Our neighboring town of Carlisle is picking up rapidly and enjoys a mild sort of a boom. A stamp mill has been erected at East Camp, and the ground near the company's works in town is being graded preparatory to the erection of a new 20-stamp mill.

**COPPER.**—Notwithstanding the drop in the price of copper, individuals here and there are doing quite a good deal toward the development of copper properties. Among the new claims which promise well is the Fairbanks, discovered by Messrs. Hill & Campbell and recently sold to Mr. Church. This mine is near the Queen and adjoins the Ray of the Arizona Copper Company. The vein is from 12 to 14 feet in width, and yields a rich ore of green carbonates running from 20 to 40 per cent in copper. A shaft 58 feet has been sunk to a considerable depth and about 200 tons of ore are now on the dump. Messrs. Hill & Campbell have secured the contract from Mr. Church to do extensive develop-

ment work upon this claim. Adjacent to this are the claims Gen. Miles, Panama and Gen. West, owned by these gentlemen, and all promising well.

**PLACERS.**—Mr. W. R. Muir has shown us some fine specimens of coarse gold which he washed out on Chase creek. Gold occurs in considerable quantities in the cement and gravel along the Frisco and in its tributary gulches, and we have no doubt but that some system will yet be devised to work these placers on an extensive and profitable scale.

**MILLS.**—Prescott *Courier*, July 30: The Catocin mine is being worked 70 feet below the surface. A level and stope are being run. The pay streak is from one to three feet thick; the ore thereof is all rich. Near by, Geo. Wickler and Mr. Ferguson are getting rich ore in their mines. The Basin mill, near Bradshaw mountain, has had to suspend, on account of scarcity of water. A gentleman just from there tells us that a great many lots of ore remain to be crushed. The Del Pasco people have added a self-feeder to their little mill, and are running 12 out of every 24 hours on gold rock which pays in the neighborhood of \$50 per month. Capt. Brann has been working rock from a small ledge near the Bully Bueno, which, he states, paid very well. The Peck mill will soon commence crushing ore from an old dump pile. Those who ought to know say the mine will not be free of water for some time. A dry-washing machine, made by Ed. I. Johnson, is in successful operation between Prescott and Skull valley. It is claimed that it saves very fine gold. Three men in 5½ days secured \$93, all fine gold. Those who have seen it work say it is a great improvement upon all other dry washers.

**NO REASON FOR DESPONDENCY.**—*Silver Belt*, July 27: People of Globe have no reason to be despondent over the outlook for copper mining here. The Old Dominion Company is abundantly able to continue operations, even with the present low market for copper. Their mine, the Old Globe, never looked better than now. The ore bodies are large and the ore of very high grade, and it is confidently expected that after September 1st work will be pushed more energetically, with an increased force of men. The consignment of 100 tons of coke to J. Liberman & Co., for the Old Dominion Company, in addition to nine carloads recently received at Wilcox, is significant of the company's intentions.

#### COLORADO.

**LEADVILLE.**—As Denver and all Colorado owe much of their growth and present prosperity to Leadville, there is not a citizen of the city or State who does not rejoice in the renewed mining activity in the carbonate camp. It is not too much to say that Leadville is a busier city to-day than it was five years ago. There is not the slightest doubt that Leadville's new boom rests upon a sure foundation. There are three or four mines that can ship a hundred tons of ore a day for several years. This is a strong statement, but it is made upon trustworthy authority. There are other mines that are shipping a great deal of ore, and which promise to have a heavy output for some years to come. Properties that for a year or more were neglected have been reopened, and strikes have already been made in some of them. It is only natural that a great deal of development work should follow the good feeling which exists in Leadville. The output for this year will be very large.

#### IDAHO.

**ABOUT THE SMELTERS.**—Ketchum *Keystone*, July 24: The company is making daily shipments of bullion. Improvements are constantly being made at the Philadelphia smelter. Workmen are now engaged in putting in new roasters, which, when completed, will enable the company to treat all ores mined in the country. Ores from the smoky region containing base metals can be worked advantageously. The company mines, the North Star, Ten Brooke, West Fork and Ervin, are coming to the front and are making daily ore shipments to the smelters. A rich vein of carbonate ore has been struck in the West Fork which shows every indication of widening out as the depth increases.

**CONCENTRATING.**—Coeur d'Alene *Sun*, July 27: The owners of the Bunker Hill and Sullivan mines are considering a proposition from the concentrating company to increase their contract, so as to warrant the erection of additional works of large capacity. Eight men were discharged a day or two ago because the concentrator was not able to dispose of the ore as fast as the force employed could get it out. The present works concentrate an average of fully 60 tons per day. In Buckskin gulch, boxes are being set to-day on claim No. 2. There will be a cleanup next week, and judging from the appearance of the ground and the bedrock, it will be a good one.

**FLINT.**—Idaho *Avalanche*, July 31: This old mining district has been resuscitated, and under the management of Mr. R. B. Stanton is again showing signs of life. There are about 65 hands at work in the camp, 50 of whom are employed in and about the mines and in grading for the plant and building necessary houses. The place is probably one of the liveliest in the Territory, and as work progresses, no doubt more men will be employed, until Flint will remind one of old times. All the old settlers in this country have the utmost confidence that the camp has an abundance of rich ore, and that all that is needed is a man who understands his business, as we are informed Mr. Stanton does, to make it not only one of the liveliest but one of the best dividend-paying camps on the coast.

**CHARLES DICKENS SOLD.**—*Challis Messenger*, July 27: The Charles Dickens mine was sold last Wednesday noon, in front of the Challis house, at sheriff's sale, to satisfy the judgment of W. S. McCormick and John E. Dooly and various liens, and brought the sum of \$52,000, or about two-fifths of the indebtedness of the estate. The one-third of the mine that was located, held without change and owned by William A. Norton at the time of his death, and against which W. S. McCormick's stood, was sold separately and brought \$24,000, and the other two-thirds brought \$28,000. This amount—\$52,000—was a few hundred dollars short of enough to pay the mortgages above mentioned and three preferred liens and interest and costs. The property was purchased by Jas. W. Hamilton, of Challis, for Robert C. Chambers, of Salt Lake City.

#### MONTANA.

**BEAVERHEAD.**—Cor. *Inter-Mountain*, July 27: The usual steady influx and shipment of ore continue. On account of the many sources from which it is received, the platforms are kept piled full awaiting the arrival of sufficient of the respective kinds to make up a shipment. The first shipment of bullion from the Ball smelter was made last Monday. It consisted of 480 bars weighing 70 pounds each. The smelter was closed down during the week on account of needed repairs and shortage of charcoal, but will start up the first of the coming week. Encouraging reports come from all the mines being developed; especially is this so of the Kent, Bismark and New Departure, which are said to have struck ore bodies larger and richer than any heretofore encountered. Mr. James McGrail, formerly of Cornwall, and Chas. Alstrom, assayer, arrived Friday morning from the East, as experts to visit the tin mines. Some of the specimens shown them here caused considerable enthusiasm. Mr. J. T. Connor visited your city during the past week to obtain a few more men to put the finishing touches upon the mill of the Dillon Mining Company. Mr. Julian Smith, J. B. Scheicky, and two others accompanied him upon his return. The mill is nearly complete. Mr. M. Hogerty is setting the boiler in position. The Bannack Con. is still idle, and Bannack necessarily is despondent. I am requested to suppress notice of a large sale of mining property which, though considered sure, it is thought best not to publish until part of the money is actually paid.

#### NEW MEXICO.

**SOCORRO NOTES.**—*Bullion*, July 25: We are informed that the Ambrosia mine, in the Magdalena district, has been sold this week to Mr. Foley, of Leadville, for \$20,000. T. J. Hudson, one of the most reliable prospectors in this section, is prospecting in the Water Canyon gold belt for a wealthy Virginia syndicate. H. A. Robinson, of Kelly, is preparing to run in a 500-foot tunnel on one of his most important properties, situated in the vicinity of the Ambrosia. The Bullion, Ida, Napoleon III and Nellie will all be actively explored next week. All of the claims are recent locations, made adjoining or in the immediate vicinity of the Ruby mine. John McCalla, the old-time Pueblo prospector, made three locations last week in Hell and Ellis canyons. It is his opinion that he has the same character of rock as is found in the Ruby. Socorro is wild with excitement over the recent rich gold strikes made near that place. They are said to exceed in richness anything ever before discovered in the Southwest. Guy Cox and W. M. Glasson have returned from Garcia canyon, where they have been prospecting. They express themselves well pleased with the gold outlook there and in the vicinity. T. Dorsey, C. T. Brown and Ed Henson will commence work Monday on the Maud, a northeast extension of the Ruby. One thousand dollars will be spent immediately in opening up this promising quartz claim. The Chloride mine, in Pueblo district, has a three-foot vein with two-foot pay streak. This week we were shown assays made at the U. S. mint and by Prof. Dickinson from this ore which run as follows: 69 ounces, 53 20-100 ounces and 53 2-100 ounces silver.

**THE GOLD BELT.**—Socorro *Bullion*, July 25: In corroboration of the *Bullion's* view of the existence of gold in place on the east slope of the Magdalenas, we offer to our readers the opinion of Manager J. B. McGee of the Graphic M. & S. Co., who for two years was head smelter of the Richmond Con. Mining Company of London at Eureka, Nev., and for three years manager of the same company. Coming from such a source, his opinion carries weight. Manager McGee has, from personal observation, come to the conclusion that an important gold belt lies on the east slope of the Magdalenas, commencing at Water Canyon or further south, and extending north until it crosses the A., T. & S. F. railroad, where it crops out in the Eozoe mine and other claims in the vicinity.

**GOLD STRIKE.**—Silver City *Enterprise*, July 29: One ton of ore shipped from the new gold strike near Socorro by the Graphic Smelting Company returned \$7215 in gold and \$150 in silver. There are other prospects in the immediate vicinity of the new strike which are said to be very rich. The new strike has caused great excitement and many prospectors are flocking to the scene. As near as can be learned at this distance the new strike is not extensive. It is simply a very rich pocket of gold ore, and does not justify the great rush that is being made to that point. When in St. Louis, the preliminary arrangements were entered into by Capt. Cooney and capitalists there, looking toward the erection of a smelting plant at Cooney camp. The plan is the same as has been proposed by the captain and prominent metallurgists with whom he has been in consultation regarding the matter. It embraces all the features of the original scheme, including a copper matte smelting furnace and refinery. If carried out, the project is one that will materially benefit the whole camp. Funds for the purpose are now being subscribed in St. Louis. The new mill at Telegraph was compelled to close down last week owing to the low stage of the water in the Gila river, which is said to be lower at the present time than it has been in the history of the Telegraph camp. Five stamps of the mill were run for 11 days previous to the closing down, and everything is said to work very satisfactorily, but some slight changes will be made before the mill again resumes operations. A mining deal was closed in this city on Wednesday which is of the greatest importance to the Gold Hill camp, which will, in the near future, doubtless become one of the leading producers of Grant county. The Standard and the California mines, the former of which has been a steady and profitable producer from grass roots, was purchased by George H. Utter, of Santa Fe, from Fred Rogers, John McLane and Napoleon Heart for \$15,000 spot cash. It is Mr. Utter's intention to immediately commence development work on an extensive scale, and also to erect a new plant with a capacity of 25 tons per day, using the Lucop pulverizer. He will also put in pans and settlers, which will enable him to treat all of the ores of the camp. The mill will be running in four months. Jesse Davis has been engaged as superintendent of the property.

#### OREGON.

**QUARTZ AND PLACER.**—Jacksonville *Times*, July 31: Operations at the Sterling mine are suspended for the season. Work is progressing satisfactorily on the tunnel C. C. Beekman is having run to tap his ledges on Jackson creek. Piatt & Shanks, who have been mining on Louse creek, Josephine county, secured some fine specimens of gold. The Wagner Creek Mining Co. is still crushing ore from the Pilgrim ledge, which promises well. A cleanup will soon be made. A number of huge blocks and a considerable quantity of lumber are now being hauled to Shively gulch for Baumle, Klippel & Co.'s quartz mill. Dan Fisher and Wm. Stuart are engaged in winddamming Rogue river. B. W. Huston has sold his interest in the mines at Foot's creek to his partner, Chas. Anderson, for \$600. He will probably mine in the Willow Springs district next season. McKenzie & Co. have let the contract for getting 100 tons out of the New El Dorado ledge on Jackson creek, and delivering it at the new mill on Shively gulch to Klippel & Co. at \$1.50 a ton. Blacklock, Owings & Co., who purchased several acres on Jackson creek of Judge Duncan a few months ago, picked a nugget of gold worth \$80 out of the cement they are crushing, as also several smaller pieces. A Gold Hill correspondent of the *Oregonian* says: F. M. Johnson, of San Francisco, agent for the Wiswell quartz mill, has purchased D. F. Fisher's ditch around Gold Hill. He contemplates putting up one of the mills, with a view of working Gov. Chadwick's mine. Ray & O'Donald, who discovered the rich pocket of quartz on Gold Hill which raised such an excitement last winter, are crushing quartz with an arastra and doing well. How much they extracted from the pocket is still a mystery, though the sum probably was not nearly so large as rumored. The California company, which purchased mining property in Josephine county some time since, has let a contract for digging four miles of ditch below Kerbyville to Fawn, the Chinese tye of Waldo, which will be five feet wide on top. They have a number of white men engaged in constructing waterways, and will eventually build a ditch from Sucker creek to the Illinois river, a distance of about 16 miles.

#### UTAH.

**SILVER REEF.**—Southern Utah *Times*, July 29: J. Hutchinson made a small shipment to the River mill from Toledo. Hessel-Maxwell leachers are in operation, and doing satisfactory work under a new process. It is expected that another shipment of sulphides will be made this month. Bailey, Nesbit & Co. leachers now have the Wall rolls crushing ore, beginning last Friday week. These rolls do better work than any other patent yet offered, and their capacity ranges from 5 to 6 tons an hour. The mill has had a thorough overhauling, and is ready for a long run. Uneasiness is felt by mine-owners, on account of the steady decline of silver and the momentous question as to how much more it will drop. A much greater reduction will close our mining industry. The Stormont's Buckeye mine furnished the River mill 34 tons of ore daily. The Thompson also furnished a few tons. The Buckeye stopes on the 700 are without change, and the ore bodies are about the same extent, with but little variation in value. The California is in every respect without change; the stopes on 3, 4, 5 and 6 are looking nicely and are producing ore. At the New Shaft, sinking continues, and at the bottom a break has been encountered which shut off the ore body. A crosscut is now being run to tap the ledge on the other side of the break. The crosscut below the Black stope is in 40 feet, exposing about six feet of good ore.

**ORE AND BULLION SHIPMENTS.**—For the week ended yesterday the Mackintosh sampler received 374,190 pounds of Ontario ore, and 102,720 pounds of Daly, and 89,130 pounds of Sanson ore. During the week the Crescent shipped 173,561 pounds of concentrates and about 236,000 pounds of first-class ore. The Ontario bullion shipment for the week aggregated 36 bars, containing 19,431 fine ounces of silver. Another shipment of Ontario bullion will be made (to-morrow) Sunday. The output of Daly bullion from the Marsac mill for the week ended July 24th was six bars, containing 6562 fine ounces of silver. On July 28th a shipment of seven bars of 7647 ounces, and on July 31st a shipment of six bars containing 6640 fine ounces of silver was made.

#### WASHINGTON.

**THE RICKEY HILL MINES.**—*Stephens Reporter*, July 27: About 15 miles west from Colville, and one mile from the Columbia river, are the famous Rickey Hill mines, that are attracting the attention of Montana capitalists. The particular group of which we speak are the Boston, Cleveland and St. John, although there are more properties that have promising outlooks on the hill. They belong to Mr. John Rickey, Marcus Oppenheimer, and the heirs of Capt. Pinkston, the late commander of the steamer *Kootenai*, running between the Little Dalles and Farewell. These properties have been leased by Mr. M. Courtwright, representing Messrs. Hauser & Holter, two of Montana's heaviest capitalists. About \$1500 of work has been done, and a number of men are now at work developing the prospects. There is a 30-foot tunnel in slate, run in to tap the vein. Very rich mineral is found, as croppings showing silver chlorides, recently assayed, going \$150 per ton, and ore working up in free amalgamation 85 per cent silver. The surface croppings run 3000 feet in length, and 15 feet wide, showing a vein that would attract the attention of all mining men. Good ore can be traced all along the vein. The west wall is granite, the east chlorite, with veins running three points east of north, and the same west of south. Some of this ore runs up into the thousands. An extension of time was asked on the bond, and has been granted, and it is thought \$10,000 will be spent to make the proper developments and open the mine. It is proposed to tap the vein with a 150-foot tunnel. Undoubtedly it will show this to be a property that will rival the best yet found in the Territory. A beautiful stream runs right past it, and a grand forest surrounds it. Standing on the mine, one can see the beautiful scenery of the Grand Rapids of the Columbia, and hear the roar of the rushing waters. The experts sent out here by all parties have reported favorably on this section, and at no distant day this will rival the best camps of Montana.



# DAMAGED BY FIRE!

## Engines, Boilers, Wood and Iron Working Machinery, Belting, Etc.

### FOR SALE CHEAP!

The fire which destroyed our building, Nos. 25 to 31 Main Street, on the 20th of June, will have no effect on our business.

We have already secured one of the stores in the magnificent Donahue Block, Nos. 34 and 36 Fremont Street, near Market, the finest in the city.

We have removed our Machine Shop to Nos. 225 and 227 Beale Street, and are now in full blast.

Our Oil Warehouse is located at 519 Front Street.

Our Oregon Branch is still at 91 and 93 Front Street, Portland.

Constant arrivals of new stock will enable us to supply our customers with everything of the latest and best description.

In addition, we shall have all of our old stock of Machinery, much of which had just come in, removed from the burnt building to our new store, where we shall be able to offer it at **EXTREMELY LOW PRICES.**

When the fire occurred, we had, fortunately, finished shipping the mammoth mills for La Trinidad and Silver Queen Mines, of Mexico, and the 20-Stamp Mill for the Buchanan Mine, of Tuolumne.

Notwithstanding our fire, the Pacific Lumber Company, of Humboldt, awarded us the contract for their new mill over all competitors, preferring to wait till our New Shop was ready rather than get their Machinery elsewhere, though they are in a great hurry. We consider their action conclusive evidence of the superiority of our Machinery, as they are determined to have the finest mill on the Coast.

Our New Concentric Set Works and Headblocks, and the Sinker, Davis & Co. Band Log Mill, which we recently furnished the Humboldt Lumber Company, of Humboldt, are pronounced by them superior to any ever seen in Humboldt.

We are now at work on nine Headblocks for Pope & Talbot Mills on the Sound.

From the above facts, it would appear that we stand fire pretty well, and if our patrons will kindly continue to favor us with their valuable business, we will do our best to excel our former efforts.

## TATUM & BOWEN, San Francisco and Portland.

### H. P. GREGORY & CO.

Nos. 2 and 4 California St., - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

## MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING MACHINERY.

FRANK & CO.'S WOODWORKING MACHINERY.

NEW HAVEN MANUFACTURING CO.'S MACHINISTS' TOOLS.

BEMENT & SON'S MACHINISTS' TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND EXHAUSTS.

SHIMER MATCHER HEADS.

BRAINARD MILLING MACHINES.

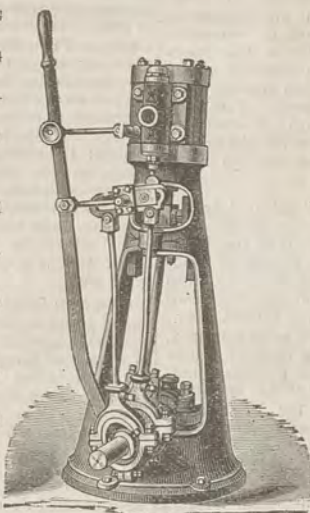
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS.

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISHERS.



YACHT ENGINES.

WILLIAMSON BROS' HOISTING ENGINES.

ATLAS ENGINE WORKS ENGINES AND BOILERS.

PAYNE'S VERTICAL AND HORIZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS.

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECTORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

## THOMAS PRICE'S ASSAY OFFICE,

524 SACRAMENTO STREET, SAN FRANCISCO.

Working Tests of Ores by all Processes.

SPECIAL ATTENTION PAID TO THE CONCENTRATION OF ORES.

ORES SAMPLED and ASSAYED.

## CHILLED CAR WHEELS.

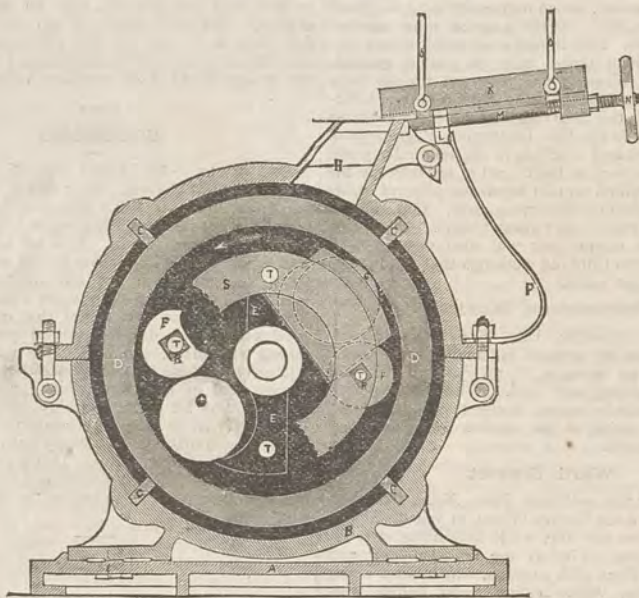
Medal Awarded Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.

Certificates as to performance of the Mills, and any information required, furnished on application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 & 106 Washington St., NEW YORK.  
OR PACIFIC IRON WORKS, SAN FRANCISCO.

## THE SCIENTIFIC PORTABLE FORGE

—AND—

## BLACKSMITH HAND BLOWERS.

GUARANTEED

The Lightest Running! The Strongest Blast!  
The Most Durable!

ADAPTED TO ALL KINDS OF WORK,  
AND MADE IN STYLES AND SIZES TO SUIT.

THE FOOS MANUFACTURING CO., - - Springfield, Ohio

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

**MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.**

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

UTAH OFFICE—SALT LAKE CITY, UTAH.

Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,  
JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

**Metallurgy and Ores.****SELBY  
SMELTING and LEAD CO.,**

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY  
And Assay Office.

Highest Prices Paid for Gold, Silver and  
Lead Ores and Sulphurets.

....MANUFACTURERS OF....

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,  
Under Chamberlin Patent.

C. H. AARON,

ASSAYER AND METALLURGIST,

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

515 California Street,

Bet. Montgomery and Kearny, SAN FRANCISCO.

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

**JOHN TAYLOR & CO.,**

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco.

We would call the attention of Assayers, Chemists,  
Mining Companies, Milling Companies, Prospectors, etc.,  
to our full stock of Balances, Furnaces, Muffles, Crucibles,  
Scorifiers, etc., including, also, a full stock of  
Chemicals.

Having been engaged in furnishing these supplies since  
the first discovery of mines on the Pacific Coast, we feel  
confident from our experience we can well suit the de-  
mand for these goods, both as to quality and price. Our  
New Illustrated Catalogue, with prices, will be sent on  
application.

Our Gold and Silver Tables, showing the value per  
ounce Troy at different degrees of fineness, and valuable  
tables for computation of assays in grains and grammes.  
will be sent free upon application. Agents for the Patent  
Plumbago Crucible Co., London, England. Also for E.  
G. DENNISTON'S Silver Plated Amalgam Plates. The  
plates of this well-known manufacturer are thoroughly  
reliable, and full weight of Silver guaranteed. Orders  
taken at his lowest prices.

JOHN TAYLOR &amp; CO.

**Nevada Metallurgical Works.**

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869.

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the  
most suitable Process for Working Ores.

Special attention paid to Examinations of  
Mines; Plans and Reports furnished.

C. A. LUCKHARDT &amp; CO.,

(Formerly Huhn &amp; Luckhardt),

Mining Engineers and Metallurgists.

**THOMAS PRICE'S**

ASSAY OFFICE,

CHEMICAL

LABORATORY

Bullion Rooms and Ore Floors

No. 524 Sacramento Street,  
San Francisco.

J. KUSTEL.

H. KUSTEL.

**METALLURGICAL WORKS,**

318 Pine St. (Basement),

Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my  
Process.  
Assaying and Analysis of Ores, Minerals and Waters,  
Mines Examined and Reported on.  
Practical Instruction given Treating Ores by im-  
proved processes.

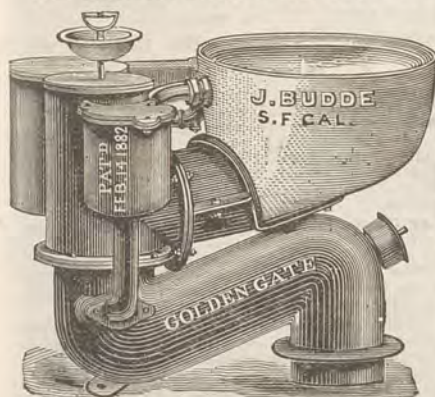
G. KUSTEL & CO.,  
Mining Engineers and Metallurgists.



**H.H.H. HORSE LINIMENT.**  
FOR  
MAN  
OR  
BEAST  
D.D.T.  
1868

THE H. H. H. Horse Liniment puts  
new life into the Antiquated Horse!  
For the last 14 years the H. H. H. Horse  
Liniment has been the leading remedy  
among Farmers and Stockmen for the  
cure of Sprains, Bruises, Stiff Joints,  
Spavins, Windgalls, Sore Shoulders, etc.,  
and for Family Use is without an equal  
for Rheumatism, Neuralgia, Aches, Pains,  
Bruises, Cuts and Sprains of all characters.  
The H. H. H. Liniment has many imita-  
tions, and we caution the Public to see  
that the Trade Mark "H. H. H." is on  
every Bottle before purchasing. For sale  
everywhere for 50 cents and \$1.00 per  
Bottle.

For Sale Everywhere.

**THE GOLDEN GATE PLUG CLOSET.**

The only secure-locking device to keep sewer gas entirely  
away from dwelling houses.  
JOSEPH BUDDE, Manufacturer, 43 Fremont Street,  
All kinds of Water Closets, Slop and Waste Hoppers  
always on hand. Write for information



**FLOUR AND OTHER MILLS.**  
Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco

**THE RUSSELL PROCESS COMP'Y.**

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.



HERCULES SLAYING THE GIANTS.

**HERCULES POWDER**

Derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman  
strength. On one occasion he slew several giants who opposed him, and with one blow  
of his club broke a high mountain from summit to base.

HERCULES POWDER will break more rock, is stronger, safer and better than any other  
Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize  
the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

**No. 1 (XX) is the Strongest Explosive Known.**

**No. 2 is superior to any powder of that grade.**

PATENTED IN THE UNITED STATES PATENT OFFICE

**THE CALIFORNIA POWDER WORKS,**

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES Powder.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street, - - - San Francisco Cal.

THE CONSUMERS' COMPANY.

**VULCAN B B AND AJAX.**

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

**Vulcan Nos. 1, 2 and 3,**

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank  
Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**

218 California Street, San Francisco, Cal.





## Idaho Mines.

(Continued from page 85.)

the camp. The Banner group of mines, owned by the Elmira Silver Mining Company of New York, consists of seven claims. The Banner, Crown Point and Wolverine are the best properties, so far as developed, of the company, the two former especially, they having produced considerable money.

## The Banner.

This claim is 1500x600; course of vein, east and west; dip, nearly perpendicular. The general formation of the country is granite and porphyry; here the vein matter lies on or against a granite foot-wall and is capped by a porphyry hanging wall; the ore-body being a blue, brickle quartz, varying in width from 6 to 18 inches, carrying sulphide, antimony, chloride, ruby, horn and native silver; the latter occurring in chimneys and with a regularity that is surprising. The ore from the levels of this mine has run on an average of \$107 per ton; this, too, for a season's run. Development has been pushed, apparently, with a view of taking out money rather than a systematic opening which this property deserves. A two-compartment shaft has been put down on the ledge to a depth of 400 feet. Levels have been run at 200, 300 and 400 feet, as follows:

## Two Hundred Level.

Eastward from the shaft a tunnel, nearly 200 feet on the ledge, with one or more floors stoped out. Westward on this level, over 500 feet in tunnel and stopes have been excavated, showing ore still in all the headers.

## Three Hundred Level.

East about 175 feet on a good 8 to 10 inch vein. West 300 feet on average size vein, portion of which was not as high a grade. This level has been stoped up to within about 20 feet of the 200 level. The ore taken out of the floors of this level runs well and showed the property averaged all the way down. An 8000-gallon sump on this level drains it, and a No. 6 Knowles vertical plunger pump raises the water to the surface for use in the boilers.

(To be continued.)

## Siphon Action in Discharge Pipes.

EDITORS PRESS:—In a recent issue of *Wood and Iron*, I find a reprint of my recent letter to you relating to siphon action in hydraulic pipes, with some comments by the editor, that call for notice on my part. I am represented as finding fault with Mr. Van Loben Sels' pumping plant—promulgating theories, writing diatribes and so on. I am at some loss, as the readers of *Wood and Iron* must be, to find the connection between my letter and the comments.

In the first place, I was in no position to judge of the expediency of arranging Mr. Van Loben Sels' plant with siphon pipes, and plainly intimate as much in my letter, believing, at the time, that Mr. Van Loben Sels and the makers of the machinery could best judge of that matter. The main point of my letter was to disclaim authorship of the statement that this arrangement of pumps was being adopted to the exclusion of non-siphoning pipes in Europe. This matter is not mentioned in the editor's remarks, and the purpose seems to be, as before said, to put me in the position of contending with Mr. Van Loben Sels and the Tool Co. The expediency of providing for siphon action in pump, discharge or other pipes is hardly a matter for discussion, and certainly not one to connect with the merits of a particular pumping plant.

A siphon discharge pipe properly cleared has nothing to do with a pump's performance one way or the other, as the editor of an engineering journal should know.

In respect to theories I am at a still more loss to know what is referred to, and must conclude that the remark relating to negative pressure equal to the difference in water level of the discharge must be the "theory" referred to.

If so it is good theory—is, moreover, obvious fact. If there is other means for maintaining siphon action in such pipes I am not aware of it.

It may in California, as elsewhere, be expedient or even necessary to employ siphon pipes. It is a problem belonging to the particular circumstances in each case, and, as I said before, is as old as iron pipes, and, as further claimed, is avoided by hydraulic engineers whenever avoidable. This is the point. It is not determinable by particular facts or cases, but a proposition relating to general hydraulic practice. If there is anything new in the matter I am not aware of it, and will gracefully concede the mistake of the position.

Sausalito, August 5, 1886.

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Bodie Con M Co.	California.	5.	50.	June 21.	July 26.	Aug. 16.	G. W Sessions.	309 Montgomery St
Best & Belcher M Co.	Nevada.	34.	50.	June 14.	July 20.	Aug. 9.	W. Willis.	309 Montgomery St
Con Amador M Co.	California.	13.	15.	July 15.	Aug. 16.	Aug. 31.	F. B Latham.	327 Pine St
Dudley M Co.	California.	12.	25.	June 21.	July 27.	Aug. 16.	J. Stedfield Jr.	419 California St
Elntrachs Gravel M Co.	California.	22.	05.	June 5.	July 28.	Aug. 21.	H. Kunz.	209 Sansome St
Eureka Con M Co.	Nevada.	10.	1.00.	July 28.	Sept. 8.	Sept. 25.	E. H Willson.	328 Montgomery St
Forty-Nine M Co.	California.	3.	05.	July 8.	Aug. 9.	Aug. 30.	A. L. Perkins.	310 Pine St
Golden Fleece G M Co.	California.	5.	20.	May 23.	July 31.	Aug. 21.	W. J. Gleason.	309 Montgomery St
Gould & Curry S M Co.	Nevada.	53.	50.	June 21.	July 26.	Aug. 17.	A. K. Durbrow.	309 Montgomery St
Hil & Norcross M Co.	Nevada.	91.	50.	July 16.	Aug. 18.	Sept. 8.	J. F. Lightner.	309 Montgomery St
Indian Spring Drift M Co.	California.	6.	03.	July 26.	Aug. 30.	Sept. 30.	L. H. Sharp.	213 Sansome St
Mount Como M Co.	Nevada.	1.	10.	July 7.	Aug. 14.	Sept. 8.	M. Horwinski.	331 Montgomery St
Mexican M Co.	Nevada.	32.	25.	June 17.	July 22.	Aug. 12.	O. E. Elliott.	340 Montgomery St
Mexican Gravel M Co.	California.	31.	25.	July 1.	Aug. 9.	Aug. 31.	J. Morizio.	328 Montgomery St
New Goss M Co.	California.	19.	20.	July 13.	Sept. 15.	Sept. 15.	J. H. Hunt.	5 Pioneer Place
Potosi M Co.	Nevada.	24.	30.	June 25.	July 25.	Aug. 19.	C. E. Elliott.	309 Montgomery St
Savage M Co.	Nevada.	66.	50.	June 17.	July 20.	Aug. 9.	E. B. Holmes.	309 Montgomery St

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Alta S M Co.	Nevada.	W. H. Watson.	302 Montgomery St.	Annual.	Aug 19
Liberty Hill Con M Co.	California.	F. E. Luty.	330 Pine St.	Annual.	July 30
Martin White M Co.	Nevada.	J. F. Scoville.	309 Montgomery St.	Annual.	Aug 13
Navajo M Co.	Nevada.	J. W. Pew.	310 Pine St.	Annual.	Aug 10
Occidental M Co.	Nevada.	A. K. Durbrow.	309 Montgomery St.	Annual.	Aug 9

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Holmes M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	25.	Mar 20
Mono M Co.	California.	G. W. Sessions.	350 Montgomery St.	25.	Mar 10
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	25.	July 26
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Aug 16
Young America M Co.	California.			40.	May 20

## Mining Share Market.

The share market is in a very depressed condition, and prices fluctuate very slightly. Crosscutting west has commenced on the 2200 level of the Chollar, and Norcross will follow suit directly. These crosscuts have not yet got into the main ore vein, but will do so shortly. The rich ore body recently developed on the 600 level of the Savage mine shows better as further developed. The body is about 30 feet in width, the great proportion of which is ore of the rich, old, early-times Comstock character, kindly and fertile in quality, liberal in quantity, and assaying over \$200 per ton. The low-grade ore bonanzas at both the north and the south ends of the lode continue to hold out well, but a temporary set-back is experienced in the Crown Point and Belcher mines, caused by having to shut down for the purpose of lining and straightening up the heavy hoisting engine at the head of the incline on the 1100 level of the Crown Point shaft. This throws about 250 miners out of employment for a couple of weeks, after which work will be prosecuted to better advantage than ever.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Moulton, July 27, \$15,904; Alice, 30, \$22,886; Silver Bow, 31, \$10,440; Plutus, 30, \$6000; Freeland (for June), \$28,366; Argus, 24, \$6400; Martin White, 24, \$5400; Pyrenees, 27, \$5000; Germania, 27, \$6013; Alice, 28, \$11,835; Germania, 29, \$7644; Hanauer, 30, \$3130; Stormont, 30, \$3305; Queen of the Hills, 30, \$1690; Germania, 30, \$3912; Hanauer, 31, \$3255; Germania, 31, \$3709; Pascoe, 27, \$2111. The Salt Lake banks shipped last week \$127,372 in bullion. From Salt Lake the last week's metal and ore shipment was as follows: 36 cars bullion, 868,347 lbs.; 26 cars ore, 701,770 lbs.; 4 cars copper ore, 115,050 lbs.; 4 cars sulphur, 140,000 lbs.

## New York Metal Market.

Telegraphic advices dated August 4th give the following New York prices:

BORAX—6 1/2% @ 7 1/2%  
BAR SILVER—91 1/4 per oz.  
COPPER—LAKE—\$10.00  
IRON—No. 1, \$17 @ \$18.00; No. 2, \$15 @ \$16.00.  
LEAD—\$4.85 @ 4.95.  
QUICKSILVER—43 @ 43 1/2 c # lb.

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Quiet but steady; Lake offered at 10.00c. Transferable Notices (Lake) offered at 10.05; Transferable Notices (Chili Bars) offered at 13.95.

LEAD—Nominal at 4.80 @ 5.00c. Transferable Notices (Domestic) issued at 4.90.

TIN—Weaker, closing at \$21.50 @ \$21.75. Transferable Notices issued at \$21.85c.

SILVER—New York, 93 1/4 per oz. London, 42 1/4 d. MAKER'S PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18 @ \$18.50; No. 2, \$17.00 @ \$17.50; Grey Forge, \$15.00 @ \$16.00. Hudson River, Grade No. 1, \$18 @ \$18.50; No. 2, \$17.00 @ \$17.50; Grey Forge \$15.00 @ \$16.00. Southern, Grade No. 1, \$18.00 @ \$18.50; No. 2, \$17 @ \$17.50; Grey Forge \$15 @ \$16.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$21.70 @ \$21.85; Billiton Tin, \$22.25 @ \$22.50; Banca Tin, \$22.40 @ \$22.80; Baltimore Copper, \$9.25 @ \$9.75; Orford Copper, \$9.25 @ \$9.75; P. S. C. Copper, \$9.25 @ \$9.75; Foreign Lead, \$4.80 @ \$4.90; Foreign Spelter, \$4.80 @ \$4.85.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING July 15.	WEEK ENDING July 22.	WEEK ENDING July 29.	WEEK ENDING Aug. 5.
Alta.	.95	1.00	.75	.90
Alta.	.60	.70	.60	.75
Anders.	.35	.40	.35	.40
Argenta.	1.30	1.25	1.30	1.25
Belcher.	1.00	1.25	1.60	1.85
Best & Belcher.	1.00	1.25	1.60	1.85
Bullion.	.40	.40	.40	.40
Bonanza King.	1.40	1.45	1.75	2.00
Bodie Con.	1.40	1.45	1.75	2.00
Benton.	.05	.10	.10	.10
Bodie Tunnel.	.70	.75	.75	.80
Bulwer.	1.30	1.60	1.40	1.60
California.	1.30	1.60	1.40	1.60
Challenge.	.40	.40	.40	.40
Chollar.	1.30	1.60	1.40	1.60
Confidence.	2.75	3.00	2.60	3.00
Con. Imperial.	.15	.15	.15	.15
Con. Virginia.	1.30	1.60	1.40	1.60
Crown Point.	1.10	1.25	1.10	1.15
Day.	2.50	3.30	3.05	3.25
Eureka Con.	.25	.40	.30	.40
Eureka Tunnel.	.25	.40	.30	.40
Exchequer.	1.05	1.40	1.15	1.55
Grand Prize.	1.05	1.40	1.15	1.55
Gould & Curry.	2.45	2.90	2.55	2.80
Goodshaw.	3.05	2.50	2.50	2.15
Hale & Norcross.	.70	.85	1.15	.75
Holmes.	1.00	.50	.50	.60
Independence.	.25	.30	.30	.35
Julia.	.25	.30	.30	.35
Justice.	.25	.30	.30	.35
Martin White.	1.90	2.00	1.95	2.10
Mono.	.60	.70	.60	.85
Mexican.	.60	.70	.60	.85
N. D. Diabolo.	.60	.70	.60	.85
North Belle.	.70	.85	1.15	.75
North Belle Is.	.40	.50	.50	.60
Occidental.	1.10	1.75	1.40	1.60
Ophir.	.30	.25	.25	.30
Overman.	.60	.85	.65	.80
Potosi.	2.50	3.90	2.75	4.20
Practical.	.60	.80	.55	.70
Union Con.	1.00	1.25	.85	.90
Yellow Jacket.	1.35	1.65	1.25	1.40

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., Aug. 5.	10 Jackson.	1.50
700 Alta.	20 Mexican.	.65c
50 Alpha.	40 Navajo.	.75 @ .80c
200 B. & Belcher.	100 Ophir.	1.05
200 Bodie Con.	100 Overman.	1.15c
100 Bulwer.	800 Potosi.	.85c
50 Bullion.	100 Peerless.	.55c
600 Benton.	2700 Savage.	2.50 @ 2.75
1120 Chollar.	150 Sierra Nevada.	.60c
100 Con Va & Cal.	100 Syndicate.	.15c
300 Gould & Curry.	50 Silver King.	.75c
500 Hale & Nor.	500 Scorpion.	.05c
100 Holmes.	200 Union Con.	.50c

## San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Aug. 5, 1886.

ANTIMONY—French Star.	9 1/2 @	8
BORAX—San Bernardino.	— @	6 1/2
Armstrong.	— @	6 1/2
Iron—Glengarnock ton.	— @	22 50
Eginton, ton.	— @	21 50
American Soft, ton.	23 00 @	24 00
Oregon Pig, ton.	21 00 @	23 00
Clippier Cap, Nos. 1 & 4.	22 00 @	23 50
Clay Lane White.	22 50 @	—
Shots, No. 1.	23 50 @	—
STEEL—English, lb.	10 @	25
Black Diamond, ordinary sizes.	4 @	5
Plow.	— @	2
Machinery.	5 @	6
Sanderson Bros.	10 @	—
COPPER—		
Braziers' sizes.	20 @	—
Fire-box hoods.	20 @	—
Bolt.	18 @	—
Sheathing.	18 @	—
Ingots.	12 @	13
LEAD—Pig.	4 65 @	4 75
Bar.	5 1/2 @	5 1/2
Sheet.	7 @	—
Shot, discount 10% on 500 bag.	8 @	—
Buck, # bag.	1 65 @	—
Chilled, do.	2 05 @	—
ZINC—German.	9 @	10
Sheet, 7x3 ft, 7 to 10 lb, less the cask.	35 75 @	36 00
QUICKSILVER—By the flask.	1 05 @	—
Flasks, new.	85 @	—
Flasks, old.	5 85 @	—
TINPLATE—Coke.	1 25 @	—
Charcoal.	6 75 @	—

It is reported that the South Pacific Coast Railroad Company will shortly tap Fresno valley with a branch road. Negotiations to this end are being made.

## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey &amp; Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY &amp; Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING JULY 27, 1886.

346,350.—HORSESHOE—J. E. Bingham, Walla Walla, W. T.  
346,351.—HORSESHOE—J. E. Bingham, Walla Walla, W. T.  
346,150.—WATER-PROOF COMPOSITION FOR FELT SHOES, ETC.—Feldmann & Dunbar, Portland, Or.  
346,287.—PIE-PLATE LIFTER—G. H. Hollidge, Tacoma, W. T.  
346,105.—BURGLAR ALARM.—J. E. Hunt, S. F.  
346,304.—WATER FILTER—McLean & Cumming, S. F.  
346,212.—PRESSURE-REGULATING VALVE—P. F. Morey, Portland, Or.  
346,226.—HORSE COLLAR—R. M. Sears, S. F.  
346,333.—BRAKE BEAM CONNECTION—Walsh & Smith, Taylorsville, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

COPPER.—Exports of copper from the port of New York in June aggregated 5,840,986 pounds. From January 1st to July 1st the exports of copper ores from all ports of the United States aggregated 16,672 tons, valued at \$1,339,784; of ingot bars, etc., 7,488,341 pounds, valued at \$762,412; of sheet copper, 14,275 sheets, valued at \$2396; other manufactures, \$38,857; total copper exports for half year, \$2,143,440. Last year, in same time, the value of exports was \$4,358,685.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
G. W. INGALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
R. G. HUSTON—Idaho and Montana.  
GEO. McDOWELL—San Luis Obispo and Santa Clara Co's  
FRANK W. SMITH—Idaho and Montana.

MEADOW LAKE.—The *Truckee Republican* advises people to go a little slow on the new Meadow Lake boom. It says: "The works being put up there are merely experimental, and may prove as flat a failure as all which have heretofore been tried. It is well enough to have confidence, but it won't do to bet much money on Meadow Lake."

THE oldest reliable optical establishment, C. Muller, the leading optician, 135 Montgomery street.

## TWENTY-FIRST

## Mechanics' Institute Fair,

SAN FRANCISCO, 1886,

Opens August 24th, Closes September 25th,

—IN THEIR—

IMMENSE PAVILION ON LARKIN ST.,

WITH A GRAND DISPLAY OF

NATURAL AND MANUFACTURED PRODUCTS OF THE PACIFIC COAST, including a magnificent collection of Oil and Water Color Paintings, Art Work, and Photography; MACHINERY in operation; a SPECIAL FLORAL EXHIBIT each week; the finest display of FRUITS, GRAINS, and VEGETABLES ever before presented to the people, and a Grand Instrumental Concert day and evening.

The San Francisco and North Pacific Railroad Company and the South Pacific Coast Railroad Company, and the steamers under the management of Messrs. Goodall, Perkins & Co. will transport perishable articles consigned to the Mechanics' Institute Exhibition free of charge, and other articles at half rates.

LIBERAL PREMIUMS of Gold, Silver and Bronze Medals, Diplomas and Cash, will be awarded. Members of the Institute entitled to Season Tickets at half rates.

PRICES OF ADMISSION—Double Season Ticket, \$5; Single Season Ticket, \$3; Adult's Single Admission, 50 Cents; Children's Single Admission, 25 Cents.

Full information given or sent on application to the Assistant Secretary, 31 Post St.

W. P. STOUT, Sec'y. P. B. CORNWALL, Pres.  
J. H. GILMORE, Sup't. J. H. CULVER, Asst. Sec'y.

## The EXPLORERS' and ASSAYERS' COMPANION.

A Third Edition of selected portions of the "Explorers', Miners', and Metallurgists' Companion."



## LUBRICATION.

Our readers can procure of CHARLES J. WOODBURY Manufacturer of Oils, 123 California St., San Francisco, a fine Lard Engine Oil, unsurpassed by any other Oil for general use, and which will flow through any feeder at all temperatures. Also, Cylinder Oils, Refined Cylinder Tallow, Lubric Compound, Farm, Machine, and strictly pure Lard Oil. The Woodbury Oils are in use on the Central, Southern, and Northern Pacific Railways, and on nearly every Railroad and Steamship line on the coast.

## American Exchange Hotel,

SANSOME STREET.  
Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50  
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

NATIONAL ASSURANCE CO.,  
OF IRELAND.

ATLAS ASSURANCE COMPY.,  
OF LONDON.

BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.

H. M. NEWHALL & CO.,  
GENERAL AGENTS,  
309 & 311 Sansome St., San Francisco, Cal.

H. M. RAYNOR,  
No. 25 Bond St.,  
NEW YORK.  
ESTABLISHED  
1858.

**PLATINUM**  
FOR ALL  
Laboratory  
—AND—  
Manufacturing Purposes.  
Wholesale and Retail.  
Native Platinum and Scrap purchased.

## FOR SALE.

Half Interest in Patent Right and Manufacture of the finest Quartz Breaker and Pulverizer of the age.

Machines in operation and subject to any test.  
Call on C. G. Y., at office of DEWEY & CO., 252 Market Street, San Francisco.

PERRY SEMINARY,  
Boarding and Day School,  
1625 Telegraph Ave., Oakland, Cal.  
MRS. HERMON PERRY, MISS KATE M. FULLER,  
PRINCIPALS.

Next Term will begin Monday, Aug. 2, '86

**HEALD'S BUSINESS COLLEGE,**  
24 Post St. S. F.  
Send for Circular.

Dewey & Co.'s Scientific Press  
Patent Agency.

OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

DEWEY & CO., Patent Agents.  
No. 252 Market St. Elevator 12 Front St.  
S. F. Telephone No. 658.

A. T. DEWEY. W. B. EWER. GEO. H. STRONG

## DIVIDEND NOTICE.

OFFICE OF THE  
Paradise Valley Mining Company  
San Francisco, California.

At a meeting of the Board of Directors of the above-named Company, held July 26, 1886, Dividend No. 7, of twenty-five (25) cents per share, was declared, payable immediately at the office of the Company.

W. LETTS OLIVER, Secretary.

OFFICE—No. 323 Montgomery Street, San Francisco, California.

## QUARTZ BREAKERS!

—AND—  
Pulverizers Combined.  
To Run by Hand or Power.  
Mining Machinery of Every Description: Drawings, Plans and Specifications.

E. I. NICHOLS, 316 Mission Street, S. F.

**RUPTURE!**  
A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort night and day. Gives universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDBELL, (Druggist) 701 Market Street, cor. Third, San Francisco.

**JOHN A. ROEBLING'S SONS CO.**  
**WIRE ROPE**  
GALVANIZED SHIP RIGGING, MINING, TILLER,  
ELEVATOR, TINNED, & COPPER ROPE, SASH CORDS.  
LARGEST WIRE ROPE WORKS IN THE WORLD.  
**IRON & STEEL WIRE OF EVERY KIND.**  
TELEGRAPH WIRE, HARD & SOFT COPPER WIRE  
INSULATED FOR ELECTRIC USE.  
SWEDISH IRON WIRE, CRUCIBLE STEEL WIRE.  
TRENTON, N. J. & 14 DRUMM ST. SAN FRANCISCO, CAL.

ADAMANTINE  
Shoes, Dies and Crusher Plates

We manufacture the above Adamantine Shoes, Dies and Crusher Plates. They are in use on the hardest quartz in the United States and South and Central America, and have been ADAMANTINE. for the last ten years; we warrant them to out-wear three (3) sets made of any other metal, and many report that they last from 4 to 8 times longer than any other make. They never break AT THE SHANK, and the wear is so light that little or no foreign matter gets mixed with the crushed ore.

Also CHROME CAST STEEL for Mining and General Use, of the finest quality.  
For further particulars, address

## CHROME STEEL WORKS.

H. D. MORRIS, Agent, 22 Fremont St., San Francisco.  
When ordering, a rough sketch, with full dimensions, is all that is necessary.

CALIFORNIA  
ARTIFICIAL STONE PAVING CO.

(SCHILLINGER'S PATENT.)

—FOR—  
SIDEWALKS, GARDEN WALKS, CORRIDORS, OFFICES, CARRIAGE  
DRIVES, STABLES and CELLAR FLOORS, KITCHENS, Etc.

The Courts here and in the East have decided that Artificial Stone Pavements with plastic concrete and in detached blocks, are infringements on the Schillinger Patent; and also, that when the plastic material is blocked off with a trowel and cut through far enough to control the cracking caused by shrinkage, that such pavement is in law the same as if laid in detached blocks, and is an infringement of the patent. All property-owners having such pavements laid without the license of the above Company, will be prosecuted.

OFFICE, 404 MONTGOMERY STREET, SAN FRANCISCO.

EGBERT JUDSON, President. ALBERT H. REICHLING, Secretary. G. GOODMAN, Manager.

## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as  
The Safest and Strongest High Explosives in the Market.  
**GIANT POWDER or DYNAMITE,**  
Of Different Strengths as Required.  
NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

## JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

## BANDMANN, NIELSEN &amp; CO.,

CAPS and FUSE for Sale. GENERAL AGENTS. SAN FRANCISCO, CAL.

THE GUTTA PERCHA AND RUBBER MANUFACTURING CO.  
—MANUFACTURERS OF—  
**RUBBER GOODS.**

Patentees of the Celebrated "MALTESE CROSS" Brand Carbolized Hose.

TRADE MARK.

The Best Belting for Threshing Machines is our MONARCH RUBBER BELTING, made with Cotton Stays or Flexible Rivets.



MALTESE CROSS.

We have also the Patent RED STRIP Rubber Belting, and our Superior STANDARD Rubber Belting. Send for Price List of kind wanted.

JAMES F. HOUGH, General Manager of San Francisco and Portland, Or., Branches  
15 and 17 FIRST ST., near Market, SAN FRANCISCO, CAL.

**PHOTOGRAPHING CO.**  
No. 659 CLAY STREET.  
**PHOTO SPECIALTY**  
**GALLERY.**

Engraving made from photographs, drawings and original designs, for newspaper, book, card and job printing. Engraved prints enlarged or reduced cheaply and quickly. Also copies of manuscript, signatures, portraits, buildings, machinery and printed documents reproduced with accuracy. Photographs, stereoscopic views, etc., duplicated, enlarged or reduced. Slides for magic lanterns made from photographs, lithographs, and steel or wood engravings, etc. Satisfaction guaranteed. Agents wanted in all cities and large towns. Address, for further information, S. F. PHOTOGRAPHING CO., No. 659 Clay St., S. F., or the office of this paper.



## Iron and Machine Works.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,  
EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

BUILDER OF

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines

Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Hennickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. **ORDERS SOLICITED.**

### UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

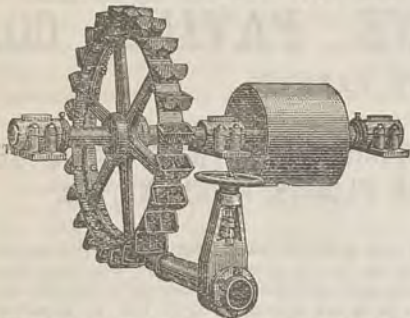
### STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front Street, Between N and O Streets,  
SACRAMENTO, CAL.

### PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED  
by the Idaho Company at Grass Valley, Cal., and  
gave 90 2 per cent., distancing all competitors. Send for  
Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street  
San Francisco, Cal.

### N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY  
Of all kinds made to order. Send for Descriptive Cata-  
logue. 17 and 19 Fremont St., San Francisco.

### San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope  
Sisa Rope, Tarrad Manila Rope, Hay Rope, Whal  
Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

811 and 613 Front St., San Francisco

### A Good Opportunity for a Ma- chinist.

A variety of good Tools, Patterns, etc., with business  
for sale cheap, by a party retiring from business. A  
splendid opportunity for an enterprising mechanic.

Address A. B. O., care of this paper.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold  
in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co.  
(Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting  
that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,  
Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded  
to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quanti-  
ties to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

## FULTON IRON WORKS,

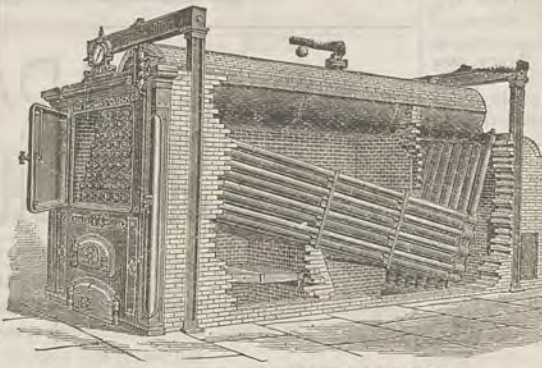
HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

## ENGINES AND BOILERS

OF ALL KINDS,  
Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

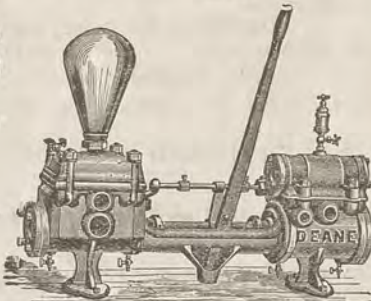
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

Deane Steam Pump.

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.

— ALSO —

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.



### FRASER & CHALMERS.



CHICAGO, ILL.

U. S. A.

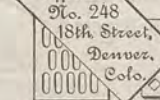
General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.

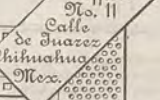
PERFORATED METALS FOR

REVOLVING and SHAKING-SCREENS,

JIGS & STAMP-BATTERIES.



Denver  
Office:  
No. 248  
18th Street,  
Denver,  
Colo.



Mexico  
Office:  
No. 11  
Calle  
de Suarez  
Chihuahua,  
Mex.

UTAH OFFICE—SALT LAKE CITY, UTAH.

NOTICE TO  
**MINING MEN,**  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.

Engineers' Tables of Progress

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, etc., address:

INGERSOLL ROCK DRILL CO.,

REPRESENTED BY

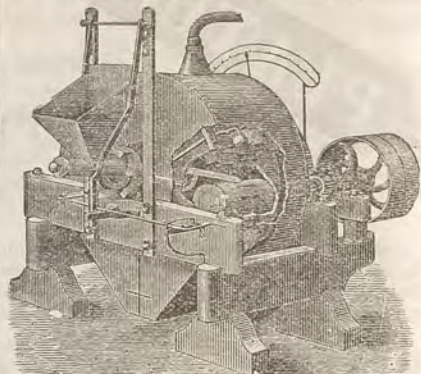
BERRY & PLACE MACHINE CO.

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

## Tustin's Pulverizer WORKS ORE WET OR DRY

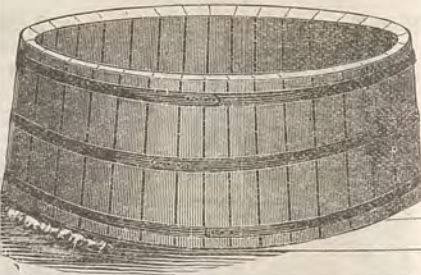
FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLY, SPIERS & HAYES,

Mining Vats and Tanks.



LEACHING VATS with FALSE BOTTOMS.

PRECIPITATING VATS,

SOLUTION and WATER TANKS

For Mining Purposes.

WELLS, RUSSELL & CO.,

Mechanics' Mills, San Francisco.

RICHARD C. REMMEY, Agent,  
Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of  
all kinds of  
Chemical Stoneware

— FOR —  
Manufacturing  
Chemists.  
Also Chemical Brick  
for Glover Tower.

INVENTORS, TAKE NOTICE

L. PETERSON, MODEL MAKER,

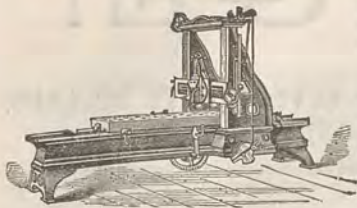
258 Market St., N. E. cor. Front (up stairs), San Francisco  
Experimental machinery and all kinds of metal, tin  
and Brasswork.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

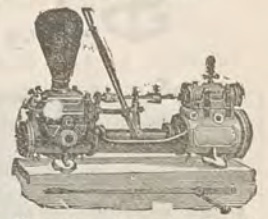
PORTLAND, OREGON.



Putnam Planer.

**PARKE & LACY.**

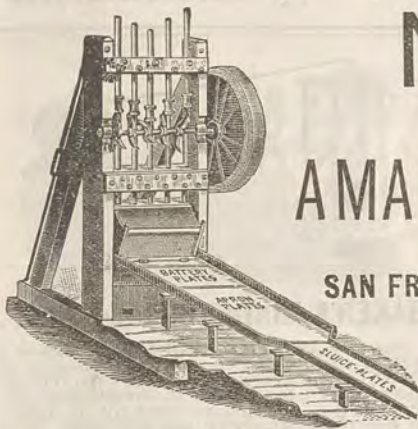
.....IMPORTERS OF AND DEALERS IN.....

**MACHINERY AND GENERAL SUPPLIES,**Knowles Steam Pump  
The Standard.

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

**Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
ENGINES and BOILERS.**

SEND FOR CIRCULARS.

**NOTICE TO MINING MEN!  
SILVER PLATED  
AMALGAMATING PLATES FOR SAVING GOLD!**

Get our Prices before ordering elsewhere. Samples furnished on application.

SAN FRANCISCO NOVELTY AND PLATING COMPANY, Removed to 108 First St.

JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 &amp; 523 Market St., San Francisco.

NOTICE TO MILL MEN.—All our plates are guaranteed to have the Full Weight of Silver agreed upon, and are all tested before leaving our Works, thereby avoiding the complaints about light-weight, made so often formerly before our starting in this branch of business. PLATES CAN BE FURNISHED AT ANY PRICE REQUIRED.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.  
J. O. B. GUNN, Secretary.**UNION IRON WORKS,**

Office, Cor. Market &amp; Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

**STEAM, AIR, AND HYDRAULIC MACHINERY.****Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

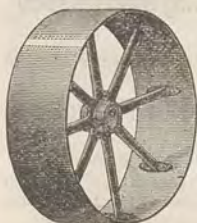
TRY OUR MAKE. CHEAPEST AND BEST IN USE.

**UNION IRON WORKS,**

Successors to PRESCOTT, SCOTT &amp; CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

**Chicago Prices Beaten!**  
ESTABLISHED 1860.**S. F. PIONEER SCREEN WORKS,**  
221 & 223 First St., cor. Tehama, S. F.  
**J. W. QUICK, Prop'r.**Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).  
Orders Promptly Executed**PERFECT PULLEYS**

First Premium Awarded at Mechanics' Fair, 1884.

**CLOT & MEESE,**

Sole Licensed Manufacturers of the

**Medart Patent Wrought Rim Pulley**

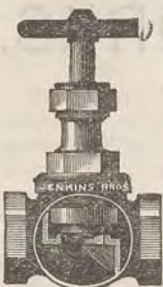
For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

**SHAFTING, HANGERS AND APPURTENANCES.**

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 &amp; 131 Fremont Street,

San Francisco, Cal.

**JENKINS PATENT VALVES.****Gate, Globe, Angle, Check and Safety.**

Manufactured of BEST STEAM METAL. We claim the following advantages over all other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN &amp; CO., San Francisco, Cal.

L. C. MARSHUTZ.

G. T. CANTRELL.

**NATIONAL  
IRON WORKS,**N. W. Cor. Main and Howard Sts.,  
San Francisco,

...MANUFACTURERS OF...

**Stationary and Compound  
Engines,****FLOUR, SUGAR, SAW and QUARTZ  
MILL MACHINERY.****AMALGAMATING MACHINES.****CASTINGS and FORGINGS**

Of Every Description.

All Work Tested and Guaranteed!

**Improved Portable Hoisting Engines**

...SOLE MANUFACTURERS OF...

**KENDALL'S PATENT  
QUARTZ MILLS.**

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that is claimed for it and give entire satisfaction.

MARSHUTZ &amp; CANTRELL.

Send for Circulars and Price List.

**CINCINNATI  
CORRUGATING  
COMPANY.**

JOHN F. HAZEN, Prest.

JAMES HICKS, Treas.

J. G. BATTELLE, Sec'y.

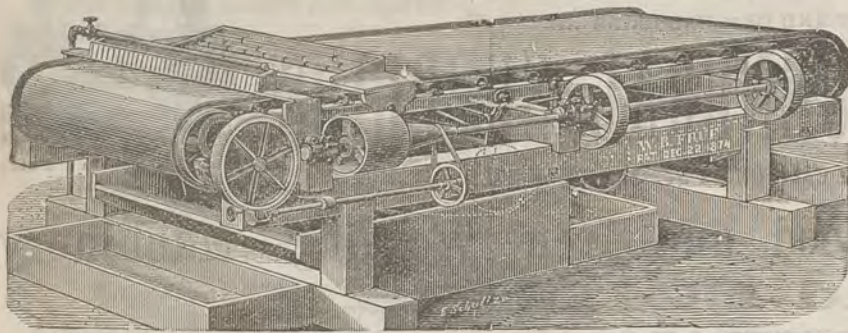
**Over 1500 Tons Iron in Stock!**

FOUR WIDTHS OF CORRUGATIONS MADE!

**STANDING SEAM PLAIN ROOFING!****All Paint Re-ground in Pure Linseed Oil!****DEWEY & CO.,** { No. 252 MARKET ST. } PATENT AGENTS.  
Elevator 12 Front St.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,  
OR VANNING MACHINE.**

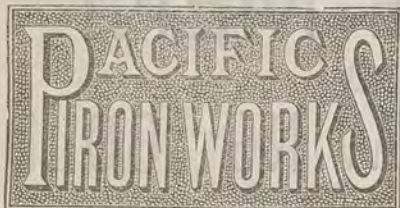
**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS.**  
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement. The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them. Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for. N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.



1850. 1885.  
**RANKIN, BRAYTON & CO.,**  
BUILDERS OF...  
**MINING MACHINERY.**

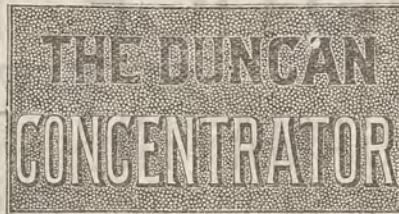
San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

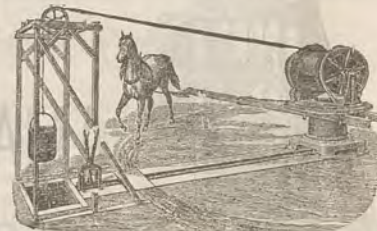
## WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



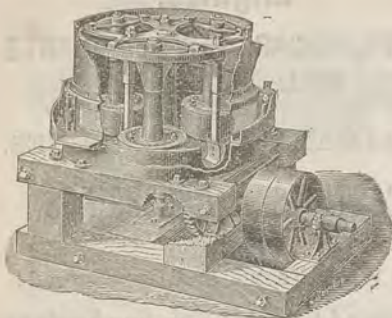
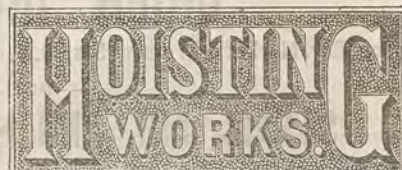
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



## BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700-pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE OF CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



Centrifugal Roller Quartz Mill.

## F. A. HUNTINGTON,

MANUFACTURER OF

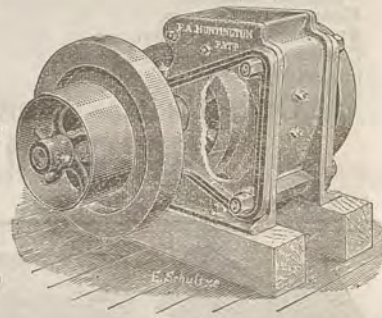
**Centrifugal Roller Quartz Mills,  
CONCENTRATORS AND ORE CRUSHERS,**

Mining Machinery of Every Description,

**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.



SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

BEST SOFT LAKE SUPERIOR COPPER USED.

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.**  
**E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

## THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
AIR COMPRESSORS—Rope Power Transmission.  
HYDRAULIC PUMPING and Hoisting Machinery.  
WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch pipe of 1-inch iron for Spring Valley Water Works Company, San Francisco.  
SAW-MILL MACHINERY of all kinds.  
STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.  
MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.  
WILSON'S PATENT GAS-PRODUCER.  
STEAM BOILERS of all descriptions.  
SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.  
STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.

Send for Circular and Price Lists.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, AUGUST 14, 1886.

VOLUME LIII.  
Number 7.

## Refining Coppery Bullion Produced by Amalgamating Tailings.\*

NUMBER 5—CONCLUDED.

### Treatment of Residues.

These consist of leachings and wash waters, freed from silver, but containing sulphate of copper in solution; and of concentrated mother-liquor from the crystallizers.

The former, if above 15° B. (the financial limit at Dayton, as determined by experience), were concentrated. Otherwise they were run (much diluted) through a series of vats (old crystallizers arranged so as to overflow from one into another) which contained scrap wrought iron. The copper thus obtained was washed, dried, and melted into bars for use in the silver-precipitating tanks. As the leachings from all the bluestone works was run into these vats, sufficient copper was obtained to supply the wants of the refinery.

The mother-liquor left after crystallizing concentrated solutions contained an excess of free acid, and was used in dissolving copper ore in the bluestone works. No credit was given in the accounts to the refinery for this material.

### Cost of Refining.

The following figures are for the year 1876, when prices were very high:

Sheet-lead cost (delivered) a small fraction over 12 cents per pound.

The refinery was charged, at the rate of 15 cents per pound, for the copper contained in the "base bullion" produced by the mill of the Lyon company. The copper in the "white bullion" and in the bullion received from other companies was taken as payment for refining, outside companies being bound, in addition, to purchase at prevailing market rates a fixed amount of bluestone for each 100 pounds of bullion refined for them.

The price charged for acid was unusually high, owing to expensive repairs and construction at the acid chambers, which items were always included in the running expenses.

The refinery, which was in operation only a part of the time, conformed in its work to the requirements of the mill and the bluestone works.

The rate of wages, per shift of 10 hours, was as follows: Masons, \$7.50; carpenters, \$5.00 and \$6.00; blacksmith and mechanic, \$5.00 each; lead-burner, who was permanently engaged, worked wherever he was needed, and was, in fact, foreman of the chemical department, \$4.50; head men on crystallizers and dissolving tubs, \$4.00; watchmen and outside men, \$3.00; Chinamen, \$1.53; all others, \$3.50.

The refinery treated 89,394 pounds of retorted bullion (part of which was received from other mills), and produced 285,224 pounds of crystallized bluestone, and, also, on special order from purchasers, solution containing the equivalent of 16,400 pounds of crystals. From one pound of copper about 3.6 pounds of  $\text{CuO} \cdot \text{SO}_3 + 5\text{H}_2\text{O}$  were obtained.

The following statement is not an estimate, but a record taken from the books of the expenses actually incurred. It should be remarked that, in figuring the cost per pound of making bluestone, the items of *roasting, dissolving, and concentrating* are divided by 301,624, the total number of pounds of  $\text{CuO} \cdot \text{SO}_3 + 5\text{H}_2\text{O}$  and its equivalent manufactured; the

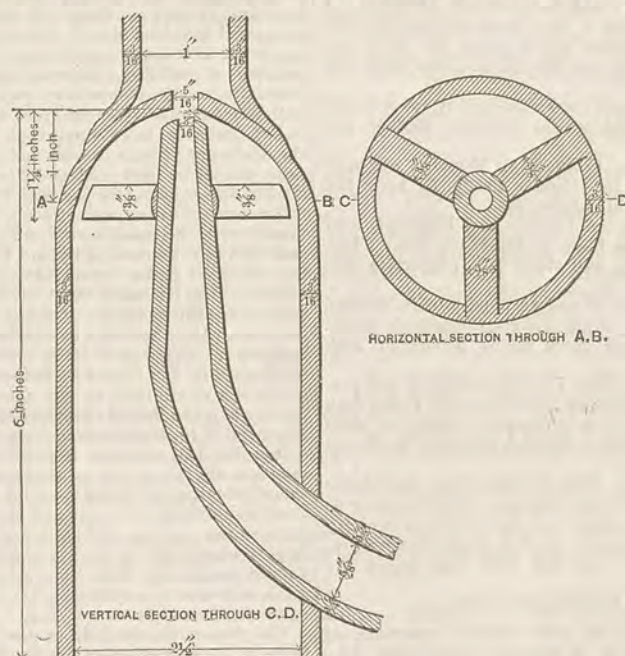
other items by 285,224, the number of pounds produced in the shape of crystals.

Under *dissolving* are included all expenses of handling the bullion after roasting; also the cost of making steam.

The figure given for *repair-material* is the

[For table showing cost, etc., see page 108.—Eds. PRESS.]

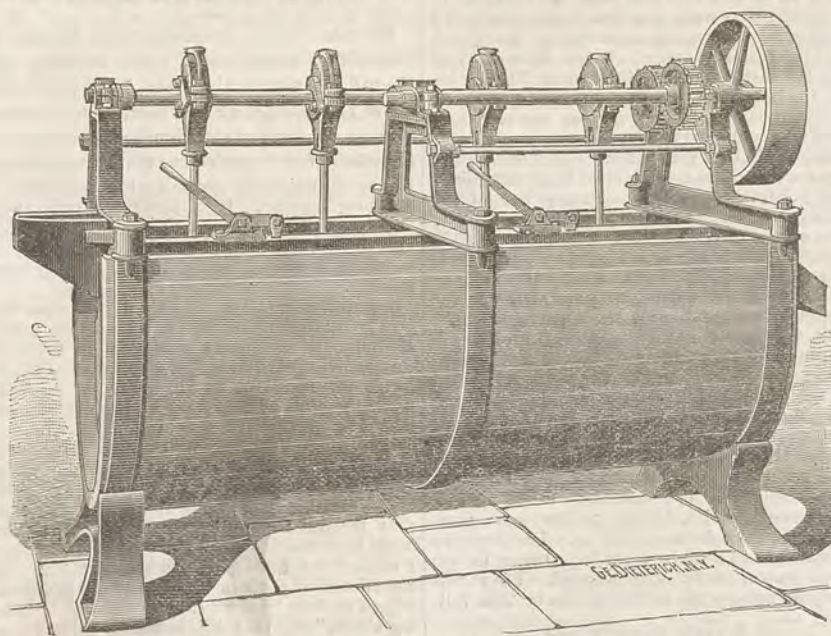
At the Omega refinery the bluestone was not crystallized,† but the sulphate of copper solutions were weakened to 20° B., and run into a stock tank, whence they were pumped by means



LEAD "STEAM-PUMP"—(Injector).

net amount after deducting old material (pig-lead, etc.) sold; that for *repair wages* is the sum remaining after charging, so far as possible, to each of the other items, the amounts belonging to it. Thus, a very large proportion

of a lead injector (called, locally, a "steam pump") to the mill for use in the amalgamating pans. Steam was furnished to the refinery from the mill boiler. The "steam pump" used (see engraving) was devised by my former lead-



PLUNGER JIGS FOR IRON ORE CONCENTRATION.

under *crystallizing* is for repairs. The wages of the lead-burner, who was permanently employed, are divided according to his work, among all the items except that of *general*.

The bluestone establishment, it should be noted, had been running for years, and most of the plant was well worn.

The item of *general* includes superintendence, office expenses, watchmen, insurance, taxes, interest, and freight on material delivered.

burner, J. L. Robertson, and was very simple, durable and effective.

† I understand that later the solutions were crystallized.

THE Anaconda mine, of Montana, proposes to run as before, in order to make 86,000,000 pounds of fine copper per year.

Two companies are actively preparing for the erection of smelting works in Reno.

## Concentration of Iron Ores.

In making charcoal-blooms washing or cleansing of the ore from adhering gangue has been practiced for many years. A sluice-box is even to-day used for that purpose in the Southern Appalachian mountains. For the Lake Champlain bloomeries hard magnetic ores are crushed with stamps and then sluiced or jigged in hand-jigs. The stamps used in the Lake Champlain region are of the most primitive kind. They consist of a trip-hammer, dropping on a perforated cast-iron plate, through which the crushed ore escapes. The crushed ore is fed into jigs without previous sizing. In jigging this ore it is allowed to pass through the bedding into the "hutch." The tailings are scraped off and washed, though they contain a large percentage of fine ore. In many instances this is regained by subsequent sluicing. Up to 1882 no attempt had been made to introduce into this branch of ore dressing the improvements adopted in concentrating the ores of other metals. At that time, however, Mr. Arthur F. Wendt, of New York, built the "Crown Point Separator," which he has described before the American Institute of Mining Engineers. We shall give the arrangement of this plant in a future issue of the PRESS, confining ourselves now to a description of the arrangement of the jigs. The cut shows the jigs. They are of the usual type of plunger jigs, the peculiarity being the means employed to vary at will the length of stroke of the plunger, and the relative speeds of this plunger on its down and up stroke.

The desired result is secured by a combination of a pair of elliptic gear-wheels with two concentric eccentrics. As commonly used, the ratio of the short axis of the ellipse to the long axis is such that the maximum speed of the down-stroke can be made from 9 to 16 times the minimum speed of the up-throw. The stroke of the plunger permits a variation at will up to four inches. There is no jar whatever in the motion. On the down-stroke the motion begins at a slow speed, increases rapidly and uniformly until the lowest point is reached, then gradually diminishes until the plunger reaches its highest point.

Thus the theoretical maximum efficiency is closely approximated. The ore and rock are lifted bodily on each down-stroke of the plunger, and drop according to gravity during the up-stroke, almost as if the particles were falling through a long stationary column of water instead of a succession of short columns. Excellent work has been done by these machines in every instance, even where the difference in gravity is not very marked.

MEADOW LAKE.—J. R. Petrie, who is superintending the new works now being built at Meadow Lake, tells the *Truckee Republican* that "it is San Francisco, not English capitalists, that are operating in the district. The new process, as it is called, is but a combination of various old processes, and he thinks there is no doubt of its success. While the ore does not give evidence of great richness, there is an abundance of it and it promises to exceed in the outcome any mining development on the coast." The latter portion of this statement may be true, but many will doubt it. In the opinion of many persons, the reason why Meadow Lake ore has never been treated with a profit is because the metal is not in the ore on which to make a profit, no matter what process is used.

\*Read before the American Institute of Mining Engineers by A. D. Hodges, Jr.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eus.

## Idaho Mines.

(Continued from last issue.)

(For the Press by our traveling representative, FRANK W. SMITH.)

## Four Hundred Level.

East 170 feet, on the same excellent-looking ore, at which length the tunnel shows a good eight-inch ore vein. Owing to an excess of water in this ground, work has been stopped eastward, leaving ore in sight. West nearly 150 feet of a tunnel with three flows stopped toward the 300 level developed less firm vein matter, but of a higher grade. Chimneys of native silver abound in these stopes, some very rich pieces being picked down by the PRESS representative. The west drift, on the level just over this, exposed the ledge some 150 feet beyond where they now are on this level. A 10,000-gallon sump drains this lower level, the water being raised by a pump similar to the one used on the 300 level. The water from this level is raised to the 200 level and taken out of the mine through a 1300-foot tunnel that taps the ledge at the 200 level from the gulch north of the mine. Ore and waste is hoisted to the surface, and the former is hauled one mile to the 20-stamp mill at Banner for treatment. The pumps of the mine lack capacity to keep the property dry, and the machinery is not in keeping with the mine. A more handsome, regular and rich vein of ore cannot well be found than this. A comparison of the Banner with the average quartz mine of to-day results in her favor. When it is noticed that over 400 feet depth on solid and regular vein matter has been made; only a few hundred feet each side of the shaft has been taken out and nine men only to the shift are worked, it is plain to be seen that the property is as yet hardly opened. Heavier machinery for hoisting, larger pumps and doubling the present force a few times, would make this mine the Banner in every sense of the word. Little, if any, blasting is required, as the vein lies between decomposed layers of porphyry and granite. At present, however, the force is adequate to keep the mill running, as only so much can be crushed in 24 hours. This mine is not a gash vein, and if there is any virtue in a regular, well-defined ledge of high-grade ore, the company has it. A Western company in charge of this mine would never stop short of going down 1000 feet further, and realizing on the many tons of ore that this management has stored in the levels now opened. A glance at the other valuable mines of this company will show the nucleus they have for a great and valuable property.

## The Crown Point and Wolverine.

This mine is nearer to the town of Banner, and the 20 stamp mill and reduction works of the company are located alongside of and below this and its eastern extension, the Wolverine. The ore body of the Crown Point is much larger than that of the Banner, and it can be worked through tunnels and dumped directly into the ore-bins of the mill from the mine. A 200-foot shaft was sunk in the porphyry 140 feet north of the vein, and a 400-foot tunnel taps the 12-foot ore body at the depth of 200 feet. The drift at the bottom of the shaft extended 140 feet to the vein, and 200 feet west and 400 feet east on the ore body developed. No work has been done on this property for two years past. The machinery was taken off this property to open up the Banner. The management, I understand, contemplates doing some considerable work on both the Crown Point and Wolverine this fall. This latter claim has not been developed much. It adjoins the Crown Point on the east, and has produced about \$10,000; bars of 90 pounds running from 900 to 952 fine, the average value of each bar being over \$1000.

## The Elmira Company.

This company consists of a number of well-to-do New Yorkers who reside at or near Elmira, New York. The capital stock is \$100,000, all taken and owned in the immediate vicinity of Elmira. The officers are: President and Superintendent, John Brown; Secretary, N. P. Fassett; Treasurer, Christopher Preswick; Trustees, E. B. Smith, W. J. Thompson, N. P. Fassett, Christopher Preswick and John Brown. Judging from the actions of the trustees, there is no lack of confidence in the management as conducted solely by Mr. Brown, who, by the way, is the hardest-working, most economical (too much so) and careful superintendent I have ever met. Mr. B. is an Eastern man and an owner and associate with Eastern non-resident partners, who are adverse to working these properties in a manner a Western company would insist on; hence the mines are being prospected instead of being worked as they would and could be by coast capital. I am surprised that some live Western mining man does not make an effort to secure this group of mines.

## Treatment of Ores.

The Elmira Company have a 20-stamp mill, furnaces, pans, settlers, retorts, etc., that, like the hoisting machinery in the Banner, has seen its best days and is entitled to a place on the "retired list;" but, like the machinery last

aforesaid, continues to do the work. The ore from the mine is dropped into the ore-bin through a trap-door directly from wagons. A Blake crusher reduces it to feeding size. After drying and salting it is fed by hand into the batteries, elevators receiving and carrying from the batteries into the hoppers over the reverberatory furnaces, after being roasted in charges of 1500 pounds. There are four furnaces, with a combined capacity of 15 tons of pulp in 24 hours. After the proper time on the cooling floors, the pulp is wheeled into the mill and deposited into four pans in charges of 3000 pounds to the pan, thence being discharged into three large settlers. After amalgamation the product is taken to a new and model retort-room adjoining the mill, where it is melted, weighed, assayed and marked for shipment into

## Banner "Tailings."

The Elmira Company board their men. There is not much prospecting going on about Banner.

The Elmira Company have 26 men on their pay-roll.

Only a few men are kept at work all winter at Banner.

The mail is carried in on snowshoes during the winter months.

Miners are paid \$4 per shift of 10 hours. Board is \$1.25 per day.

The Silver Chief is working a day and night shift of seven men.

The fare from Banner to Idaho City is \$3; to Boise City, \$8; to Kuna, \$10.

The Banner mine was discovered July 6, 1864, by Jess Bradford and James Carr.

The Crown Point has produced \$107,000. A run of 1100 tons of this mine netted \$100,001.

A few Chinamen are working the river bars of Beaver creek and the old placers of Gold Hill near Banner.

Charley Magee runs a tri-weekly accommodation stage and wagon between Banner and Idaho City.

A California, Colorado or Montana company would work the Banner group to their full capacity, and all winter, too.

Assays from the Bullion and Imperial, near Banner, run as high as \$1500 per ton. Thos. Graney, et al., will work the properties this season.

A small force of underground miners worked all last winter on the Elmira Company's mines. The mill closes down about November 15th every winter.

The Golden Gate, 74 feet south of and parallel with the Banner, shows a four to ten inch vein; nearly 100 tons recently taken out went \$75 per ton. Over 200 feet has been developed on this vein.

Tim Carroll, County Recorder, was at one time foreman of the Banner. While acting as such he was caught in a snow-storm and lay five days and nights in the snow without fire, food or water. He lost both legs below the knee.

## The Silver Chief.

This mine is the first western extension of the Banner. It is owned by a Joliet, Ill., company, and is in charge of James Monroe, superintendent. The development as yet has been very meager, and consists of a two-compartment shaft down 180 feet. The shaft was put down 45 feet south of the ledge, the dip of the vein bringing it under the shaft at 170 feet. At this point the vein is of the same size and quality of the Banner. After going down 10 feet on the vein, a 60-foot drift was driven in west, all on ore. At this point water came in so rapidly that work was abandoned here and a force of men put on the east end of the Chief, working from the tunnel of the Banner, that taps the east end of the Chief some 70 feet below the bottom of the two-compartment shaft. They are now up 30 feet, stopping toward their shaft and taking out good, fair-grade ore, with a 6-inch vein that gets better as they open it up. The ore taken out on this level heretofore averaged \$109 per ton. The hoisting power of the shaft is a whim and bucket (horse power). They have a good ore dump that will go over \$100 per ton. This property is a good one, and needs only machinery, elbow grease and a little money invested without waiting to get a string on the output before putting up to properly work the mine. If the Joliet company or the Elmira people think they can work mines with prospecting machinery, and expect to make bonanzas out of mines by prospecting instead of developing them, they will never realize their expectations. The officers of the Silver Chief are: President, Geo. H. Monroe; Secretary, Geo. J. Monroe, of Joliet; Treasurer, James Whitten, of Wilmington. The Golconda mine, also in the Banner district, belongs to this same company. It has a 5-stamp mill on. Development consists of but a 50-foot shaft. Owing to too much water, work was stopped. They will likely do some work on this property this fall.

## Payette River Mines.

Three miles north of Banner a district known as the Payette River district has been prospected to some considerable extent. The formations are trachyte and granite, the ledges being heavy in black sulphurets and milling about \$125 per ton gold. A 200-foot tunnel run into the side hill out two veins; the first 100 feet deep, the other 35 feet deeper. Both veins are said to be nearly ten feet thick, and they dip toward each other at an angle that indicates their coming together. A San Francisco firm recently offered \$40,000 for these properties but did not get them.

## How to Get Here.

The following routes are the easiest and most practical to reach this part of the Territory: Union Pacific and Oregon Short Line from the East; South, Omaha and Denver, or the D. & R. G. and the Short Line from Denver via Salt Lake to Kuna station. From the Northwest the O. R. & N. and the Oregon Short Line to Kuna, thence by stage to Boise City.

## California, Oregon &amp; Idaho Stage System.

The above company runs daily stages from Boise City to the camps hereinafter named, charging fare as follows: Idaho City, \$5; Centerville, \$6.50; Placerville, \$7; Silver City, \$8; Kuna, \$2; Emmettville, \$3; Payette, \$5; Falk's Store, \$4. The traveler can add these prices to the fare from their starting point to Kuna, and thus get the cost of visiting Boise basin or vicinity. I go hence to Silver City, from which I will write you next week.

## Mining on the Lower Klamath.

EDITORS PRESS:—The mining season on the lower Klamath from Orleans Bar down is about closed, and it has been a successful season for this section. A few claims are still running, but will soon shut down. Much more interest is being taken in the gravel deposits below Martin's Ferry, and a number of locations have recently been made on well-known and extensive gravel deposits, with a view to operating the same the coming season. Miners are beginning to appreciate the fact that the debris in junction is not a thing of terror on this river, and that the nearer the coast they get the better the water holds out. There are a number of privileges here in this immediate vicinity, covering extensive pay gravel, that will afford ample water the year round.

But probably more important than this is the discovery of both silver and chrome here near the river and within 12 to 15 miles (air line) of the coast. Ore has been found carrying \$27 a ton of silver, and the country seems to bristle with chrome of an unusually high grade, and both are surrounded by and lie contiguous to unexcelled means for working and transportation. The Klamath river offers a universal and never-failing avenue through which transportation can go forward to deep water at nominal rates. There is a large country to the northward of the Klamath, and near the coast, which is a virgin field to the intelligent prospector, and the fact of its accessibility ought to commend it to those seeking new fields of research for the precious metals. There is an immense deposit of brown hematite of exceptionally high grade lying north of and near the river and within a few miles of the coast, but I suppose the growing probability of iron being largely supplanted by the use of aluminium will detract essentially from the value of such a mine, however favorable the conditions might be to its advantageous working.

The mammoth ditch from Red Wood creek to Gold Bluffs, projected by Dr. Hood, is still undergoing the preliminary of adjusting the different test surveys. It is thought the active work of excavation will commence this fall. The beach mines have not turned out for a number of seasons, though the work is kept up in a small way at different points.

## Klamath Bluffs.

OBSERVER.

## Quartz Grinders Again.

EDITORS PRESS:—Referring to the PRESS correspondence between Mr. Louis Blanding and the "Old Man of the Mountains," will you kindly allow an outsider wholly disinterested, except as an aged miner and stamp-mill superintendent, to make a few remarks on that controversy? I have no prejudices for or against one kind of mill over another. If we could only get a thoroughly effective, economical roller or grinding mill to fully take the place of stamps, surely it would be a great blessing to the mining community.

I regret to see that "the old man" comes before your readers merely as a captious critic. He offers no testimony whatever in favor of stamps over grinders. His whole argument, so far as it is entitled to the name, is made to hinge upon his age. I have known old farmers who would not adopt new implements or machinery because their fathers did not possess corresponding advantages, and yet got along very well indeed. "The old man" says quite clumsily: "It is the facts and brains presented that interest the public." Just so; if he has made your readers a presentation of his brains, I suspect few have got a glimpse of them. He has offered no facts in support of his opinions, except that he "knows exactly what he is talking about," and that does not seem to be a fact, after all. On the "little knowledge" point he is quite "smart," but it is not "smartness" that is needed when a grave subject, bearing on the success or non-success of a great army of practical miners, is under discussion.

If he has a personal grudge against Mr. Blanding, let him expatiate over it in some local journal; but in writing for the PRESS, plain, experimental data are necessary, and 36-year-old shoe-and-die assertions are worth very little. Elihu, the Buzite, felt called upon to rebuke vapid senility, and though I am not a young man as he was, I follow his excellent example.

CENSOR.

## Washington Territory Mines.

EDITORS PRESS:—The output of first-class ore from the Old Dominion mine has been up to the standard during the past month, and has all appearances of keeping up her reputation for some time to come. One carload, or 20 tons, a week has left the depot from Spokane Falls bound for Omaha, where it will turn out on an average nearly \$250 a ton.

During this time, four times as much second-class, or \$75 ore, has accumulated on the dump awaiting much needed reduction works which the prospector and miner have waited so patiently for. There must be between 3000 and 5000 tons of \$75 ore on the dump at present. The lower workings look better than other parts of the mine, there being large bodies of the richest of our sulphide and chloride ores.

The Ella, joining the Old Dominion on the north, is being developed by a perpendicular shaft with the intention of running a crosscut at a depth of 100 feet. This is one of the cheapest mines worked on the mountain, the depth gained being one foot a day of 10 hours for two men at the drill. A double compartment shaft is being timbered with tamarac—a tree very plentiful among the mines. The Ella is an east and west vein at the surface in crystallized limestone, carrying a net-like formation of manganese. The ore is of a carbonate nature with a large percentage of oxidized iron and some galena and sulphide, assaying at the smelter about \$100 a ton. The ore will average two and a half feet wide. Sixty tons were shipped from a 25-foot shaft, and as much more left on the dump.

E. E. A.

Colville, W. T.

GOLD MINE IN HIS EYE.—A remarkable case of surgery occurred last week in the practice of Dr. J. L. Mayon, of Sutter Creek. A man named Thomas Hackett, 50 years of age, applied to him for relief, stating that his left eye has been a source of constant pain to him for the last three months. A slight examination of the optic—which had been blind for 17 years—showed that a foreign substance was imbedded in the eye-ball. An operation was performed, resulting in the extraction of three pieces of gold quartz, the largest about the size of a bean, and weighing eight grains. The patient experienced immediate relief on getting rid of the load. It seems that 17 years ago, while working in the mines of Nevada county, a piece of rock struck him in the left eye, entirely destroying the sight. The real state of fact—that the quartz had buried itself in the ball of the eye—never dawned upon the attending physician. After a time, nature being unable to throw off the foreign body, formed an independent bag or cyst around it. In other words, it became isolated from the system, although imbedded in it, and its power to cause pain was thereby destroyed. For 17 years the man had carried it in his eye, never dreaming of its presence there. The eye is one of the most sensitive organs of the body, and the fact of the quartz becoming encysted in that organ at all is a remarkable, if not unprecedented, occurrence. Latterly, nature again made an effort to expel the invader, and actually forced the quartz through its cyst, and this led to its discovery and removal as above stated. The quartz was ordinary gold rock, with a large percentage of sulphurets, and specks of gold visible to the naked eye. Hackett is joked about carrying a gold mine in his eye for 17 years without knowing it.—*Amador Ledger*.

THE CLEARWATER COUNTRY.—In a recent conversation with a gentleman regarding the southern part of Shoshone county, we expressed some surprise that the mountains along the forks of the Clearwater and their tributaries had never been extensively prospected for gold. We were told a few locations were made years ago when the placer excitement began to decline, but that hardly any work was done on them, and none amounting to anything except one in Democratic gulch, a tributary of the North fork of the Clearwater. On this a small mill was built, and we are told that it is still in operation. Silas W. Moody, our last joint councilman, and now Territorial controller, is said to be a part owner of the mine and mill. The stampede to the Boise basin nearly depopulated the southern section of the county, then the only part that contained a white settlement, and practically put a stop to the prospecting for quartz which had then only fairly begun. Scarcely anything has been done there since '67 or '68, when there was a little mining on Moose creek, another tributary of the North fork of the Clearwater, which heads in the mountains that constitute what is called the St. Joseph divide. Many believe that these mountains contain numberless rich ledges and that in the near future the region will prove a veritable paradise for prospectors. This season Cœur d'Alene prospectors have found fine-appearing float on the divide between the South fork of the Cœur d'Alene and the St. Joseph, and it is reasonable to believe that there are good ledges along the divide first mentioned.—*Cœur d'Alene Record*.

DR. F. M. ENDLICH, formerly superintendent of the Lake Valley mines, N. M., has patented a process for treating ores—especially copper. He claims that by his method copper mining may be made profitable in the Southwest.



## MECHANICAL PROGRESS.

## Progress in Saw Manufacturing.

The immense extent to which the lumber business has been carried in this country, and the millions of dollars invested therein, has kept the inventive mind of our mechanics constantly active in devising new and improved methods for manufacturing lumber, especially in the construction of saws. In 1830 there were only three saw manufactories in the United States. In 1880 that number had increased to 89. The value of the annual make of saws in the United States is \$3,619,718, of which the State of Pennsylvania produces nearly one-half. The saw is second in importance only to the ax, and in some form or other has probably been used quite as long. The first saws were doubtless very primitive in their construction—nothing but flat pieces of metal, simply with notches cut into the edge.

The best known, because the most widely used of all varieties, is the buck or wood saw. In this the Americans have discarded the use of the stick and twisted-cord strainer, formerly so conspicuous, and rods with a nut and screw are substituted. The blades of these saws are furnished either with the ordinary inclined tooth or with the double cutting form. The next best known is the hand-saw of the carpenter, which, in its various forms of rip and cross-cut, is indispensable in building operations.

For a long period all saws were of the reciprocating pattern, that is, made with a flat blade and having a straight edge, and it was not until the year 1790 that the scope and power of the saw was largely increased by the invention of the circular or "buzz" saw. These saws are now made with either solid or removable teeth, and in their adaptability to machinery driven by steam power, they are of great value and importance to all industries. Previous to 1830 the United States was almost entirely dependent upon foreign manufactories for a supply of saws. At that time it is estimated the value of the saws made by the three saw manufactories did not exceed \$5000 per annum. In that year, Mr. Charles Griffith, who had been engaged in the manufacture in Great Britain, established himself in Boston in the making of circular saws. Since that time the ingenuity of American mechanics and the enterprise of American capital have established many concerns in this country, one of which is the largest saw manufactory in the world, whose products find ready sale in competition with English goods. American steel is also used in their manufacture, and Europe may learn from us in saw-making. All saws are hardened or tempered in oil, and the forms and sizes of the teeth depend upon the quality or substance to be cut. Iron bars, shaftings, etc., are cut into lengths by a steel circular saw, which revolves very rapidly. The iron is presented to the saw red hot, and a bar two inches in diameter can thus be cut through in a few seconds. The swaging, or spreading of the teeth to give clearance in cutting; the filing or sharpening of the points; the setting or the bending of the teeth, and the well-known process of gumming, are all operations which require skill, and upon the accuracy of which depends largely the value of the saw. The entire process of making a saw from the raw material to the polished finish is based upon scientific principles, and, with the aid of ingenious machinery, is performed with a wonderful degree of accuracy.

**SKETCHING FOR MECHANICS.**—While the value of a knowledge of mechanical draughting to a mechanic is indisputable, there is a sort of free-hand drawing or sketching that is also useful. The faculty for its practice may be innate, and in that case but slight instruction is necessary to enable its possessor to illustrate his thought far better than he could impart it verbally. But even those whose natural tendency does not impel them to sketching as explanation can get enough facility by practice to make themselves understood readily. Probably nothing is more difficult to explain and exhibit by words alone than mechanical construction and mechanical movement. It is not only difficult for the narrator, but also for the listener. The memory must hold all the points of the information in contact ready to make a completed idea at the climax. But an appeal to the eye, however crudely made, presents the entire image at one view without any laborious action of the mind. And it is a noticeable fact that those mechanics who are of an inventive, improving and originating turn of mind are most apt with pencil and paper, or chalk and slab. To them the mechanical idea has received a form in their own mind, and by a partial representation they seek to impart their knowledge to others. The practice of sketching, as illustrative of verbal statement, is an excellent one for mechanics generally to acquire. Shop work demands the ready hand at sketching. There are many jobs which do not require the preliminary preparation of the draughting-room that are greatly expedited if the foreman has a facility with pencil, crayon or chalk.

**A GIGANTIC STEEL FORGING.**—One of the most remarkable efforts at heavy forging was recently effected at the works of Schneider & Cie, at Le Creusot, France. The work turned out was a revolving turret or fighting tower for the Italian armor-clad *Lepants*. A huge block of steel was first cast, which weighed

65 tons. This ingot was worked down to a diameter of six and one-half feet, then bored out, placed upon a mandrel and forged to an outside diameter of 10 feet, with an inside diameter of 7 feet 11 inches. The walls of the turret when completed were 12½ inches thick, and 4 feet 9 inches high, weighing 30 tons. It is intended to be occupied by the captain of the ship in battle, and not for the reception of cannon. It is the first fighting tower that has ever been made in one single piece, and it is said that no other firm in the world possesses the necessary appliances for such a construction.

**WIRE PAINTING MACHINE.**—Barbed and other wire fences often require a renewal of the paint usually placed upon them before sale or use, and hitherto the cost of such work has been great, for self-evident reasons. Mr. R. Quatermess, of Molin, Kansas, has invented a machine for doing that work which is very efficient, and which may be operated either after the wire has been placed in the fence or as it is coming from a reel. The machine is carried along the wire by two men upon opposite sides of the fence or wire. Its weight rests upon the wire and it is worked by the operators moving along. The vessel in which the paint is placed is carried by two handles, which may be raised or lowered, and held in any desired position, according to the height of the wire to be painted. The wheel is journaled in bearings which may be set higher or lower, as the quantity of paint in the vessel may require. In a groove in the periphery of the main body of the wheel are teeth upon which the barbs of the wire catch, thereby rotating the wheel. Beyond these teeth are fixed annular brushes. The surplus paint is removed from the brushes by a properly-arranged wire, and paint from the sides of the wheel is removed by wipers, which prevent the paint from being wasted by adhering to the sides, or by being thrown from the vessel by centrifugal force as the wheel revolves. The machine is carried along the wire, the operators simply walking along the fence, one at each side, when the wire is thoroughly painted by the revolving brushes. Should the bristles of the brushes become set or inclined to one side, the wheel may be reversed in its bearings, so as to operate the other way. It will be seen that by means of this machine fence wires may be painted thoroughly as rapidly as two persons can walk, and with no waste of paint. Should the fence wires be placed too closely together to admit of carrying the machine upright, it may be inclined to one side.

**LUBRICATION OF STEAM ENGINES.**—It has been a long time the practice of horologists to use graphite as a reducer of friction, in even the most delicate pieces of mechanism. In blowing engines, also, if the gearing is copper, graphite is the only lubrication. These facts led M. Thoma, of Memmingen, to try a mixture of graphite (prepared by decantation) and hog's lard, first in the stuffing-box of a pumping engine, and subsequently upon a steam engine. The result was very satisfactory; the only care requisite was to keep up the quantity of graphite in the mixture, as otherwise it becomes too fluid. The next experiment was made with a paste of graphite and water. The result was equally good; the slight escape of steam into the stuffing-box was sufficient to keep the graphite moist, and the lubrication seemed quite perfect, although there was no fatty matter present.

**BOILER NOTES.**—Hard wrought iron is weakened from 15 to 30 per cent by punching.

In punched holes the small sides of the holes should come together.

Drilled holes should have the edges chamfered.

Friction due to this tension would be about 7000 pounds per square inch of riveted section.

The usual diameter of rivets in hand riveting varies from one-half inch to seven-eighths inch.

In machine riveting they may be used up to one and one-fourth inch diameter.

Maximum efficiency of single riveted joint equals two-thirds strength of plate.

Maximum efficiency of double-riveted joint equals four-fifths strength of plate.

When the lap exceeds three times the diameter of rivet, the caulking is apt to open the joint unless done very lightly.

**IMPORTANCE OF THIN-BLADE SAWS.**—The Germans use at the present day among their furniture-makers, carpenters and joiners, 13 different varieties of saws, each one of which has its own peculiar size of the teeth, as well as a different relation of the teeth to each other. How important the thin saw-blade is, not only as a means to save power, but also as a means to save wood, can be seen from the following: A log of walnut, 4 meters long and 1 meter diameter, cut into 20 pieces by the new horizontal saw-frame, saves 30 millimeters of wood when compared with the cutting of the old-fashioned vertical saw. This is equal to a profit of \$9 to \$12. For Germany, where annually 100,000 cubic meters of this wood is used in various industries, this would represent a saving of \$37,500 to \$50,000.

**TO PRODUCE A RED STAIN ON WOOD,** the wood is plunged first in a solution of one ounce of curd soap in 35 fluid ounces of water, or else is rubbed with the solution, and then magenta in a state of sufficient dilution to bring out the tone required is applied. All the aniline colors behave very well on wood.

## SCIENTIFIC PROGRESS.

## Science in America.

A Compliment Paid to this Country by a Prominent Englishman.

In his pleading for more State recognition of science, Sir Lyon Playfair, the President of the British Association at Aberdeen, pointed out the present activity of Germany and France, and especially of the United States:

"Both France and Germany make energetic efforts to advance science with the aid of their national resources. More remarkable is it to see a young nation like the United States reserving 150,000,000 acres of national lands for the promotion of scientific education. In some respects this young country is in advance of all European nations in joining science to its administrative offices. Its scientific publications, like the great paleontological work, embodying the researches of Professor Marsh and his associates in the geological survey, are an example to other Governments. The Minister of Agriculture is surrounded with a staff of botanists and chemists. The Home Secretary is aided by a special scientific commission to investigate the habits, migrations and food of fishes, and the latter has at its disposal two specially constructed steamers of large tonnage.

"The United States and Great Britain promote fisheries on distinct systems. In this country we are perpetually issuing expensive commissions to visit the coasts in order to ascertain the experiences of fishermen. I have acted as chairman of one of these royal commissions, and found that the fishermen, having only a knowledge of a small area, gave the most contradictory and unsatisfactory evidence. In America the questions are put to nature, and not fishermen. Exact and searching investigations are made into the life history of the fishes, into the temperature of the sea in which they live and spawn, into the nature of their food and into the habits of their natural enemies. For this purpose the Government gives the co-operation of the navy, and provides the commission with a special corps of skilled naturalists, some of whom go out with the steamships and others work in the biological laboratories at Wood's Hole, Massachusetts, or at Washington. \* \* \* The practical results flowing from these scientific investigations have been important. The inland waters and rivers have been stocked with fish of the best and most suitable kinds. Even the great ocean which washes the coasts of the United States is beginning to be affected by the knowledge thus acquired, and a sensible result is already produced upon the most important of its fisheries. The United Kingdom largely depends upon its fisheries, but as yet our own Government has scarcely realized the value of such scientific investigations as those pursued with success by the United States."

## History of an Ancient Cyclone.

Mr. John J. Campbell, of Rockville, Indiana, has succeeded in the very original work of tracing the course of a cyclone which must have passed over that portion of the country more than 300 years ago. The course of the storm was traced by means of what he calls "tree-graves"—that is, the little mounds which a tree makes when it is uprooted and allowed to decay upon the spot upon which it fell. The earth thus turned up by the roots, with the decayed root itself, will generally form quite a large mound, which is often taken for an Indian grave; hence "tree-graves." The date of the storm in question, as communicated by Mr. Campbell to the *American Naturalist*, was marked by noting the age of an oak which had grown on the top of one of the "tree-graves." Its course was found by inquiring where other "tree-graves" had existed or had been observed in the past, and was traced in a belt about 1000 feet wide for 15 miles. Where the "tree-graves" are numerous, as in the path of Mr. Campbell's cyclone, they are supposed to mark the place where a fierce battle has occurred. In the wild forest these marks are, though more than 300 years old, as well preserved and as distinct in outline as many made by trees that have fallen recently. But if the land is cleared and cultivated, they disappear in a very few years under the action of the plow and of exposure to frost and rains. The preservation of the little mounds in the woods, which under the continuance of the conditions might last for 5000 or even 10,000 years, is due to the thin coating of forest leaves that lie upon them. Says Mr. Campbell: "The leaves act as shingles in shedding the rains, so that they are not washed or worn down by the falling rain or melting snow. The frost does not penetrate through a good coating of leaves, and therefore they are not expanded and spread out by freezing and thawing. I can see a great difference between the mounds in the wild forest and those on land that has been set to grass and pastured a few years. The tramping of stock, and the frequent expansions from freezing, which the grass does not prevent, flatten them perceptibly. The grass, however, does preserve them against rain-washings."

**EARTHQUAKE WAVES.**—One of the most extraordinary phenomena connected with earthquakes is the effect which they have upon the ocean in the raising of great sea waves, sometimes of almost incredible height. The great wave which reached the coast of Spain and Portugal in

1761 was 60 feet high; that at Callao in 1724 was 80 feet, and the greatest on record is reported to have reached Lupatka in 1737 at the enormous elevation of 210 feet. No doubt but that report must be taken with many grains of allowance. These waves are often more destructive on land than the actual shocks; the influx is usually preceded by an outflow, which, in fact, acts as a warning. One of the most remarkable effects is the distance to which these waves are propagated as "great waves," *c. g.*, entirely across the Pacific. Thus most large earthquakes on the east or west coast of the Pacific produce waves which are recorded on the opposite coast about 24 hours after. As to prediction of earthquakes, nothing certain is yet known. In many cases there are noticeable changes in springs and wells preceding earthquakes. One useful warning is, however, obviously possible, viz., the report of an actual earthquake on one side of the Pacific could be at once telegraphed to the other side, thus giving 24 hours' warning of the probable advent of a great sea wave.

## Earthquakes and Other Earth Movements.

We are accustomed to think of the land of the earth as something solid and fixed, and, as a testimonial of this impression, the Latin phrase, *terra firma* (firm land, or solid ground), has been naturalized in the languages of nearly all civilized people. On the other hand, we speak of water as unstable. But the geological history of the earth, and the more careful observations of modern times, have taught us that these ideas do not correctly represent the qualities of the land masses and water masses of the globe as compared with one another. The ancient shore marks on the continents, and the phenomena of elevation and subsidence that have been observed in historic times, confirming their evidence, show that the land and the ocean are continually changing their level as to one another; and it has further been made evident, by experiment, as well as by *a priori* reasoning, that it is not the ocean that changes, but the land which undergoes alternate movements of elevation and depression. An earthquake shock is a phenomenon well adapted to destroy the faith of any person who feels one in the fixedness of the earth; and such, by the evidence, is the effect for the time on all who experience these shocks. Even the light pulsations which sometimes pass over parts of the United States occasion panic and excite a momentary impression that everything is falling over or sinking away, while the more violent shocks that are felt in earthquake-visited countries produce indescribable terror; and such catastrophes as those historical earthquakes of Lisbon and Caracas, and the more recent ones of Ischia and the Strait of Sunda, amount to a demonstration that the reason for such terrors is real, and that the continents also cannot escape the general law of change and perishability.

Earth movements—the name by which these phenomena may be most conveniently described—are various, and comprise, so far as they are now considered, earthquakes, or sudden violent movements of the ground; earth tremors, or minute movements which usually escape attention by the smallness of their amplitude; earth pulsations, or movements which are overlooked on account of the length of their period; and earth oscillations, or movements of long period and large amplitude—like the shifting of levels of land masses—which attract attention from their geological importance. Some of these movements have only recently begun to attract attention. They are all intimately associated in their occurrence and their origin.

**AFTER SUNSET GLOWS.**—From his observatory, at Colmar, M. Faye has noticed the phenomena of crepuscular lights at an altitude far higher than that of the terrestrial atmosphere. Without deciding on the merits of the different theories advanced to explain the origin of the after-glows, he considers that electricity alone would be capable of retaining at such an altitude the particles of matter producing the effect, whether these articles had a terrestrial eruptive source or had come from interstellar spaces.

**FERRIC SULPHATE** decolorizes indigo in the same manner as ferric chloride or potassium ferricyanide. In preparing iron mordants by the action of nitric and sulphuric acids upon coppers, indigo cannot be used to show the disappearance of the nitric acid, as the mordant formed acts itself upon the coloring matter.

**MODERN CAVE-DWELLINGS.**—It appears that there are inhabited cave-dwellings in Saxony even to this day. They are dug in a sandstone hill, have different rooms, dark and light, as well as chimneys, windows and doors, and are said to be very dry and habitable.

**OIL-CLOTH** may be improved in appearance by rubbing it with a mixture of a half-ounce of beeswax in a saucerful of turpentine. Set this in a warm place until they can be thoroughly mixed. Apply with a flannel cloth and then rub with a dry flannel.

**TO MAKE BAY RUM** from the bay oil, take 10 fluid drachms oil of bay, one fluid drachm oil of pimento, two fluid ounces acetic ether, three gallons alcohol and two and one-half gallons water. Mix, and after two weeks' repose, filter.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**PACIFIC.**—*Ledger*, August 7: At the 1500-foot level, the ore body in size and richness exceeds anything heretofore met with in this famous mine. It is said to be 30 feet wide, without any barren or waste rock in it.

**KENNEDY.**—Sinking is finished at the Kennedy. The shaft has a total depth of 975 feet. They are now engaged in cutting a station at the 950 level, preparatory to drifting. The machinery for the mill is expected to arrive this week. The frame-work and castings will all be shipped from below ready fitted, while the outside lumber will be obtained from the local sawmills.

## El Dorado.

**SHAFT.**—*Placerville Observer*, Aug. 4: A contract has been let to sink the main shaft at the Springfield mine 200 feet deeper. The shaft is now down 1200 feet, and the ore continues of a high grade. In fact, we believe the Springfield the best mine in the State. A mining expert, who visited Georgetown the first of last week, reports active work at the mine of Dr. Spencer, with a promise of good results. J. H. Bradley was over to the North Side last week, and reports considerable activity in mining. Hulburd, of the *Gazette*, has, in the opinion of Bradley, one of the best mines in the county, if he can get it opened.

**INDIAN DIGGINGS.**—Seeing that items from many places in the county are sent to the papers, this place, too, can furnish a few, and for good average mines cannot be beat in the State. Hale & Baughman made a partial cleanup, and are well pleased. They are still pining, and will continue so long as water holds out. Cape & Horrell have cleaned up, and made a success of it. Kimball & Dater, of Placerville, who purchased the Lamb mine, and who have been running a bedrock race for more than a year, have broken through into the gravel, which is quite rich.

## Nevada.

**DELHI.**—*Nevada City Herald*, Aug. 4: The latest news from the Delhi mine is that a rich strike has been made. For several months the company have been running a tunnel to tap the vein at a considerable depth below the old workings. It was feared by some that the chute of rich ore which was worked out in the upper tunnel would not go down very deep. A day or two ago the vein matter was reached and a sample taken from a stringer of quartz on the foot wall prospects at the rate of over \$600 per ton. The formation is as large as above and there is a good showing of ore, but the superintendent thinks that where the tunnel cuts the ledge the ore chute is not yet properly formed. When a drift shall be run on the ledge no doubt a bonanza will be found.

**WILLOW VALLEY MINES.**—*Transcript*, Aug. 6: The Buckeye has a ledge from four to six feet thick and is paying well. The new five-stamp mill runs steadily and does its work admirably. The drain tunnel at the Neversweat is being pushed ahead through hard ground, and will soon reach the ledge. The lessees of the Deadwood are reported to be taking out some good ore. The Hussey is idle on account of litigation between the owners. At the Rising Sun nothing is being done just at present. The owners are poor men and are necessarily compelled to proceed slowly in its development.

**MEADOW LAKE NEWS.**—*Foothill Tidings*, Aug. 9: Frank Walker came down from Meadow Lake district a few days since, and he gives us the following information concerning a mill that is being put up there by San Francisco parties, and which, it is thought, will be successful in working the ore. The machinery consists of the following items: First, a rock-breaker or crusher; second, a large cast-iron machine which looks as though it were to be used to grind the ore; third, two iron cylinders about six feet long, probably rotary ore-roasters; fourth, a concentrator of new device; fifth, a small dynamo and electrical apparatus; also numerous shafts, pulleys, pipes, etc. When Mr. Walker left Meadow Lake there were some 15 men employed in and around the mines and mill. Walker will not go back, as he and several others struck work because of a reduction in wages. It seems that the building of the mill is in the hands of a contractor, and that men who were hired at \$3.50 per day were forced to accept \$3 per day; men hired at \$3 were paid only \$2.50, and so on. About a week since, when payday came around with the results as above stated, several of the men, including Walker, quit work and returned to their respective homes. The men say that when the next payday came around they would have probably suffered another reduction, as the contractor had things all his own way.

**A RICH STRIKE.**—*North San Juan Times*, Aug. 7: A rich strike was made in the lower tunnel in the Delhi mine on Friday of last week. About eight months ago the Delhi Company, seeing that the rock in the main tunnel must soon give out, began running a tunnel 200 feet lower down the hill, expecting to strike the ledge when in about 300 feet. In this they were mistaken. In the meantime the pay ore on the main level gave out, and the men were put at work in the Puzzler claim, 1000 feet west of the Delhi, and the mill has been kept running on rock from that claim for several months past. On Wednesday of last week the men driving the lower tunnel at a distance of 700 feet encountered a stringer which assayed \$650 per ton, but it was soon lost again. On the following day it was again found, and on Friday a second stringer was encountered which assayed \$800 per ton. These stringers have now joined and form a ledge 2½ feet wide, which width increases as the work is pushed forward. As the mill is situated 200 feet above the tunnel, some means will have to be devised to get the ore to the mill. It was the intention of the company some time ago to move the mill down below this tunnel, but whether this will be done or a tramway built we are not advised. Supt. Spafford celebrated the strike on Wednesday evening last by giving the employees a fine banquet. A company composed of Martin Burth, Ed. Powers and Peter Graham is de-

veloping a ledge of quartz under Buckeye Hill, and is encouraged with unusually good prospects. And still the good work goes on. Ere many months have elapsed there will be six or eight miners working on this ledge, and extracting the precious metal, and that with a complement of men that will discount our former hydraulicers.

**THE MABEL MINE.**—*Transcript*, Aug. 7: The Mabel drift mine, just above North Bloomfield, is working about 40 men and pays well. There is an incline of about 250 feet and the tunnel is 500 feet, more or less. There is about 1500 feet of the channel yet to work, and at the present rate of yielding it will turn out a large quantity of gold. This is the mine which was opened by the late R. P. DeNoon.

## Placer.

**GOOD PAY.**—*Placer Argus*, Aug. 5: Good pay has been struck in the Doig mine, and Robinson and Shurtleff are happy. They took out over \$1000 last Saturday from a pocket of decomposed quartz. On Monday about \$10,000 was taken out, if report speaks truly, and next day a still greater sum. There are four men employed at the mine, including the two owners just named. The mine is about half a mile from Ophir, being situated near the Belvoir, formerly called the Boulder. At the old St. Patrick mine, also, some very good rock is said to have been taken out lately. Shurtleff and Shofer are operating there.

**RICH ORE.**—*Nevada Transcript*, August 7: Some remarkably rich ore has recently been taken out of the Rising Sun and Big Oak Tree mine, consolidated, near Colfax. Mr. Werry, one of the owners, on Sunday last showed Jesse Clemens and the *Transcript* man two small pieces, one of which is estimated to contain \$20 and the other \$50. It is just such quartz as carries the pioneer miner back to the days of long ago when he sees it. About 40 men are now working in the mine. The 10-stamp mill, recently rebuilt, runs nicely. The new hoisting and pumping machinery is about ready to start up. The owners are happy, the indications being that they have a first-class property.

## San Bernardino.

**THE ZARAGOZA.**—*San Bernardino Index*, Aug. 6: This morning we received, through the kindness of Mr. Knight, a sample of the ore taken from the Zaragoza mine, which lies between Holcomb and Bear valleys, and is owned by the Metzgar Bros. The sample sent us was taken from the mine at a depth of 33 feet, and is a splendid piece of free-milling gold quartz. Gold can be seen with the naked eye, and when a glass is used it fairly glitters with fine and coarse gold. We have not had an assay made, but should judge that the ore would mill not less than \$300 per ton. Mr. Metzgar writes that this is a fair sample of the ore that is now being taken out of the mine. If this be true, the boys have indeed struck a bonanza this time sure. He says: "The mine continues to improve the deeper we go, and we are more than pleased with the prospect. We struck another ledge on the same ground, about 100 feet from the one we are working, that is larger and bids fair to equal it in richness. We have another claim also that has a ledge of from two to three feet that looks as though it will prove a bonanza." Mr. Knight, who brought in the ore, says that the Zaragoza mine lies right in the heart of the old placer diggings, and was discovered by some Mexicans while placer mining. Mr. Knight is also of the opinion that much of the gold found in the placer mines came from the ledges now owned and being worked by the Metzgar Bros., and he has every reason to believe the mine will continue to turn out rich ore. We hope his opinion is correct, for it will cause the old camp to boom again as in the good old days gone by, and will bring more men and money into our county. There is every reason to believe that to-day there are just as rich gold mines in Holcomb and Bear valleys and vicinity as there were 20 years ago when mining paid handsomely there.

## Shasta.

**MILL.**—*Shasta Co. Democrat*, Aug. 4: Jack Conant will have a five-stamp mill crushing ore on Squaw creek inside of two weeks. Reily & Matthews have opened an eight-foot vein on the Black Bear, Squaw creek, and the ore prospects big. Tom Green's new five-stamp mill is doing splendid work, and Tom's bullion cleanups have increased accordingly. Bell & Hopping have purchased a larger engine to drive their milling machinery on their mine in Old Diggings. Sunderhaus, Busch & Co. are building a new house on the Snyder mine; they are also working three shifts in the mine, making an average of five feet a day.

**IGO.**—*Cor. Shasta Courier*, July 31: Messrs. Lytten & Bennett have leased the Continental mine and mill, and are putting things in shape for active operations. The starting up of the Chico mill has been delayed by a defective piece of machinery, together with the rapid shrinkage of the water supply during the hot weather of the past week. Good ore is being taken out at the mine. O. Engle is continuing the Dayton tunnel along the ledge, to tap the ore chimney worked on the surface. E. L. Balou's arastra is running on Manzanita ore. The Meek arastra is running on Atlantic ore. The good ore still holds out. F. Shirland is also getting out a run from one of the Atlantic series of ledges. J. Blank is running his ore through J. P. Wright's arastra. Water for the arastras is still plentiful, although there is some growling where water for power and irrigation is in demand at the same time.

## Sonoma.

**GREAT EASTERN MINE.**—*Sonoma Democrat*, Aug. 7: The Great Eastern and Mount Jackson quicksilver mines, near Guerneville, both operated by one corporation, are now running in full force and shipping large quantities of quicksilver. The manager states that the price received for the last lot of quicksilver sold was the highest price that has been paid in seven years, which was 36 cents per pound, or \$32.40 a flask. He anticipates that the price will go up to \$45 per flask.

## Sierra.

**EAST FORK.**—*Mt. Messenger*, August 7: There is quite a little mining excitement going on up the East Fork eight or nine miles above town, in gravel claims, running from the third divide a long distance down the river. It is a large district that has been only partially worked in early days. Some of the miners are, at present, making good wages.

The gravel beds are extensive, running from the ridges down to the banks of the river, and it looks as though there might be a mining camp opened up that will last for a long time.

**SIERRA CITY.**—The cleanup for the month of July at the Young America was \$38,700. The cleanup of the Buttes for the month of July was \$29,500. The cleanup for the month of July at the Cleveland was \$2700. Steelman & Hays found another nice specimen of gold at their claim near Gold Lake, on Tuesday; its weight was 52½ ounces.

**TUNNEL.**—J. Lang has the contract to extend the main tunnel just above Jack Hughes' residence, Downville, to tap the Wheeler ledge that paid so well above, and, though troubled with considerable water, is making good progress. The prospect is fair of a quartz mill being put up there, to infuse new life into Downville.

**CLEANUP.**—The cleanup at the Young America quartz mine, Sierra City, for July, was \$38,700—27½ days' run, with 30 stamps. From the start the ore has averaged \$26 per ton, and last month \$30; and better still, this is only one of the numberless similar valuable ledges, but awaiting the magic wand of capital—"the woods are full of 'em." State Mineralogist Wm. Ireland, Jr., arrived in Downville Wednesday, and will make his headquarters here while investigating the mineralogy of this county. There is no doubt that Sierra is one of the richest quartz counties in the State, and Mr. Ireland's investigations will be of material help to our prospectors. P. A. Lamping, superintendent of the Primrose quartz mine, in Hog canyon, called to see us Wednesday, and stated that his sawmill, to furnish lumber to repair the shaft, is about completed. The pump will soon be at work to drain the mine to the old Primrose chimney that paid so rich in former years. From the bottom of the present tunnel he will have 150 feet of stopping.

**THE MOUNTAIN LEDGE.**—*Sierra Tribune*, August 7: Harry Warner's mine, the Mountain ledge, which has been bonded to Mr. Stoddart, will have extensive operations begun upon it as soon as the latter-named gentleman arrives, which will be in a day or two. This mine lies just south of the Young America, of which it is believed to be an extension. Its outlook is very promising.

**THE PRIMROSE.**—The Primrose Mining Company have purchased the De Long claim and extension from D. P. Stewart. A sawmill has recently been erected and operations will be again resumed.

**THE LADY CANYON GRAVEL MINE.**—The Lady canyon gravel mine, situated in Lady canyon, five miles north of Sierra City, is owned by Chapman & Co., who have recently erected on the claim a dam costing \$500. Considerable pay gravel is supposed to exist at this mine.

**DENNIS & CO.'S CLAIM.**—Dennis & Co., in their claim below Loganville, have discovered a new channel, from which they are taking large quantities of good-paying dirt.

**SIERRA BUTTES.**—The last month's yield of the Sierra Buttes mine amounted to \$29,500.

**A BIG YIELD.**—Canessa & Castagnetti made a cleanup for the season last week, at their claim near Loganville. The yield was \$16,000, and only 12 men are employed at the mine.

**A NUGGET MINE.**—*Sierra Tribune*, August 7: Hayes & Steelman's drift claim seems to be a veritable "nugget mine." Our readers will remember that a chunk of gold worth between \$7000 and \$8000 was found in this claim a few weeks ago, and on Tuesday last a nugget weighing about 52 ounces, and valued at between \$800 and \$900, was discovered at the same place. The cleanup at this mine for the season has amounted so far to about \$21,000, and it is expected that the total yield will increase to between \$1000 and \$2000 more.

**SALINAS AND MERCER CLAIM.**—The Salinas and Mercer claim, owned by Messrs. Mooney, Hutchinson, Freeman and Stevens, lies 2500 feet east of the Florence ledge, in the Keystone mining district, and six miles southwest of Sierra City. Prospecting on the claim was commenced about a year ago, and up to present writing about 600 feet have been prospected. The rock, which has a fair amount of surface gold, averages about \$12.50 per ton. Mining men who have examined this property report it as being an excellent prospects.

## Trinity.

**DEADWOOD.**—*Cor. Shasta Courier*, July 31: Collop & Kearny have bought back for \$500 a half interest in the mine on the south side of Deadwood which they sold a few months ago for \$15 for the whole. They are now retimbering their shaft and are going to sink 30 feet more.

**DREADNOUGHT MINE.**—The mill, one of Huntington's roller quartz, is now doing its regular work in an excellent manner, under the supervision of Engineers Kelly and Richardson; attached to it is a self-feeder, two concentrators and a rock-breaker, all complete in every particular and everything about the machinery running evenly and smoothly. In the mine, where 11 men are employed, they have commenced stopping with good results. A piece of the ore now before me shows free gold, iron pyrites and plenty of galena sulphurets; just the same kind of rock of which a few tons were milled a short time back, and yielded about \$50 to the ton. They have about 75 tons on the dump and are still rolling it out in a lively manner. The capacity of the mill is from eight to ten tons in 24 hours.

## NEVADA.

## Washoe District.

**CONCENTRATORS.**—*Virginia Enterprise*, Aug. 6: Ten stamps of the Con. California and Virginia mill, near the C. and C. shaft, will start up to-day on ore from the mine. Four Frue concentrators will be put to work on the run from these stamps, and if found necessary or advisable more will be added. This is being done by way of practical experiment, and if the results are satisfactory, this method of working the vast amount of low-grade ores known to exist in the mines will be universally adopted by all mining men. Two of these concentrators have been in use for the past four months at the Santiago mill on Carson river, and the result has been so satisfactory that 14 more have been ordered and received, and will be set to work as speedily as possible. The Santiago mill runs on ore from the Crown Point and Belcher mines.

**SAVAGE.**—On the 600 level the main south or

southeast lateral drift has been extended about 35 feet, all in the same fine ore mentioned in last week's report. This drift is now about 225 feet in length from the Gould and Curry south line. Crosscut No. 2 west from it is in 75 feet and shows about 20 feet of very good ore. Crosscut No. 3, which is 54 feet further south, is in 15 feet and also in good ore, showing the ore vein or deposit to be continuous for 150 feet or more and of unknown width. It is the genuine old-time Comstock ore, some of it assaying high in the hundreds, and the active hoisting of it through the Gould and Curry shaft for milling was commenced on Thursday morning.

**HALE AND NORCROSS.**—On the 3100 level, east crosscut No. 1 is out 70 feet, all in vein material, but showing nothing of importance in the way of ore in that direction as yet. Crosscut No. 1, west, is in 18 feet, all the way in quartz, carrying strong mineral indications, and crosscut No. 2, west, is in 30 feet in quartz, and the face in good ore. Crosscut No. 3, west, was started yesterday at a point 70 feet north of the deep winze station, and crosscut No. 2, east, opposite to it, was also started yesterday. Both are in quartz and vein porphyry, with no water to interfere.

**CHOLLAR.**—The only work is on the 3200 level, in the crosscut west from the south lateral drift. This is 35 feet south of the Combination shaft station, and has been advanced westward to the distance of 57 feet, all the way in solid quartz, carrying but little mineral. It was expected that this crosscut would intersect the ore vein found in the west face of the station, and it may yet do so further in. A slight seepage of water comes in at the face of the drift.

**GOULD AND CURRY.**—The north lateral drift 150 feet above the track floor of the 600 level has been extended 49 feet, making a total of 157 feet. Material, quartz and porphyry. A northwest drift has been started at this point from the east side of the upraise winze. This is now in 15 feet in quartz and vein porphyry.

**BEST AND BELCHER.**—On the 600 level west crosscut No. 1 has been advanced 49 feet, making a total of 94 feet, in a vein porphyry and clay formation. The heavy stone bulkhead is being put into the north lateral drift on the 2500 level, and the pumps of the Osbiston shaft hold the water reduced to 20 feet below that level.

**CROWN POINT AND BELCHER.**—All mining work continues suspended until the repairs to the main incline engine at the 1100 level are concluded. This will take two weeks longer. All the machinery had to be hoisted out, the engine foundations cut down, and the machinery will, of course, all have to go down again.

**OPHIR.**—All work in this mine is now confined to the 1300 and 1465 levels, drifting south on both levels from the Ophir shaft. The shaft is also being repaired and put in good working trim in its lower portion. The upper levels are abandoned.

**YELLOW JACKET.**—Daily yield, 140 tons. Operations were interrupted last Tuesday by the breaking of the main spur-wheel, but it was replaced very shortly by a spare one which was fortunately on hand, and work was resumed yesterday as usual.

**CON. CALIFORNIA AND VIRGINIA.**—Daily yield, 400 tons, mill battery samples showing an average of \$14 per ton. The exploration and development drifts on the 1400 and 1650 levels are making the usual good progress.

**SIERRA NEVADA.**—North lateral drift No. 2 on the 520 level was advanced 39 feet, making a total of 427 feet. Formation, vein porphyry with streaks of decomposed quartz.

**KENTUCK.**—The old upper levels continue their regular yield of 40 tons per day of low-grade ore for the Rock Point mill to reduce.

**MEXICAN AND UNION.**—Work in these mines is confined to exploration and development operations on the 700 level.

## Amargosa District.

**A RICH REGION.**—*Cor. Candelaria True Fissure*, July 31: There are but few of your readers who are aware of the existence of the large and rich mining region lying to the south and southeast of Candelaria, in the southwestern portion of Nye county, distant about 120 miles. The country of which I would most particularly speak is on the headwaters of the Amargosa river, and was first discovered in the winter of 1881 by a party from Mammoth City, Mono county, Cal., of which I was one of the number. Little was done upon the prospects, however, until the winter of 1883, at which time a shaft was sunk about 50 feet on one of the claims called the United States, which opened up about nine feet between walls, carrying rich streaks of ore assaying from 100 to 400 ounces to the ton. The next winter the shaft was carried down to about 100 feet, not taking out the whole width of the vein on account of the broken character of the hanging wall. The ore continued and grew more solid, carrying same character of ores, which are somewhat base, similar to some of the ores in your portion of the country. This mine of which I speak is on the extreme southern end of the line belt which extends along and near the base of what is put down in Lieutenant Wheeler's map as the Bare mountains for a distance of about 14 miles in a northwesterly and southeasterly direction. There are about 20 locations made on the belt, all of which show on the surface the same rich character of mineral. Toward the northerly end, however, there are some claims which assay as high as 500 ounces in silver and 60 per cent lead, and some of them show 40 per cent copper and from 200 to 400 ounces of silver with a small quantity of gold. But little work has been done save the necessary assessment work, on account of the poverty of the owners. More work will, however, be done this coming winter. Wood in large quantity can be obtained within 18 miles, with no expensive roads to build. Water is plenty within three to nine miles of the different claims, with good roads. Large quantities of hay can be cut and vegetables raised on the oasis in close proximity, while grain in any quantity can be reasonably purchased at Pahrump and Yount's ranches, some 75 miles to the south. But little prospecting has been done in the surrounding hills, but every evidence points to the fact that a large and rich field awaits the thorough and experienced prospector, and it is, without doubt, a portion of country that will, in the near future, command the attention of men of capital. The main thing that now retards its growth and de-



velopment is the lack of railroad facilities to insure cheap transportation.

#### Columbus District.

**HOLMES.**—Candelaria *True Fissure*, August 7: In the east end of seventh level, we are extracting ore from the old Belle footwall ledge. The ledge is small, but the ore is good and is just like the ore that came from the upper levels during the early working of the property. The stope below the General Thomas stope near the old seventh level is producing well. The average assay from the ore is from \$40 to \$50 per ton. The drift running south to cut the continuation of this ore body has not reached the ledge. We expect to cut it during the present week. The stope below the eastern end of Bob Morris ledge looks well and is producing well. We think this ledge is the same as the Morris ledge, and what we supposed was the east end of the Morris ledge is only a barren spot in the ledge. All of this country is very promising. The stope below east end of eighth level continues to produce well. The ore from this stope is high grade. In the main tenth we are running south to cut the Yankee ledge. The Cross development looks well, and we have the ground open so that we produce a large amount of ore. The Creer stope still produces the usual amount of ore. Mill No. 1 is running on Mount Diablo. No. 2 started on full time this morning on Holmes ore. Everything at mills and mine is in good order and doing good work.

**CANDELARIA W. W. & M. Co.**—The new mill started up last Monday on custom ore, and after running three days resumed crushing Georgene ore.

**TILDEN.**—Notwithstanding the unprecedented depreciation in silver, S. W. Thomas continues to pile rich ore on the Tilden dump.

**MOUNT DIABLO.**—Bullion shipment August 3d, \$10,607.04. In accordance with orders received from the San Francisco office, we have stopped taking out ore and discharged 58 men, and the men now remaining are all engaged in exploratory work. We have stopped shipping ore to the mill and the ore remaining at the mill will be worked up and the mill cleaned up as soon as possible. We have resumed sinking the incline, which is now 45 feet below the eighth level.

#### Esmeralda District.

**AURORA ASSAYS.**—Walker Lake *Bulletin*, Aug. 4: The Esmeralda Con., in addition to working the Humboldt and Juniata, has commenced work on the old Esmeralda. The mill is kept constantly at work and the mines are paying. Tanagerman has resumed operations on the "85," which is opening up rich; the rock is being hauled to the Miners' mill. His claim is now attracting a good deal of attention, and within the last few days has been examined by several prominent mine-owners and operators. The Lord Byron is meeting the most sanguine expectations of its owners. The work on the Antelope is being pushed forward as rapidly as possible with favorable prospects. An accident occurred last Monday afternoon in the "85," which came very near causing the death of a miner named Frank Dorenberg. A rock fell from the roof of the tunnel in which he was at work, cutting his head in several places; the wounds are serious but not necessarily fatal.

#### Pennsylvania District.

**LOOKING WELL.**—Pioche *Record*, Aug. 4: At this district, as in regard to the mines, everything is looking well. The ore in the mine keeps gradually improving in silver and retains its high percentage in gold. The supply of water at the mill is insufficient at the present, owing to the drought, and the mill is not running steadily. Arrangements are being made to bring in another spring.

#### Pioche District.

**AN ACCIDENTAL DISCOVERY.**—Pioche *Record*, Aug. 4: Many are the strange ways in which mines have been discovered, and frequently through mere accident. As a couple of men were walking along the hills last Sunday they happened to see a tarantula come from out a hole near them. In looking for a stick to poke in the hole one of them picked up an old rusty scraper. In prodding the hole from whence the tarantula came they pulled out some dirt that took their attention. It was a sort of yellow-green in color. They cleared away the soft surface dirt, got some of the truck, brought it to town and had it assayed on Monday. It showed 53 ounces in silver. The men worked on the claim the most of the week, and, like all prospectors, they see millions in the near future. The showing is so favorable in Billy Keihler's mine that a couple of miners have agreed to sink it 60 feet deeper, and on the completion of the work they are to have a lease of the mine for sixty days.

#### Silver Peak District.

**HUBERT CONCENTRATORS.**—Candelaria *True Fissure*, Aug. 7: Joseph Hubert, the inventor of the celebrated Hubert concentrator, came in last evening from Silver Peak, where he has been putting up and getting under headway the first one of the machines ever operated in Nevada. When he left, everything was working smoothly. The tailings deposit upon which the concentrator is working contains about 18,000 tons. It is located at the old Blair mills and carries both gold and silver. Mr. Hubert left for San Francisco this morning. He will return in a short time and put up one of his machines at Pine Grove. But little is known in this section of the practical working of the invention, but a number of them have been and are in use in Arizona, where they give universal satisfaction.

#### ALASKA.

**Juneau Alaskan**, July 2: There are about 60 men employed in the placer diggings in the basin at this time, including Indians. There are some new grounds being opened up, and among them one on the west side of Gold creek, along the steep mountain side is yielding well. The Treadwell mill is running full time and force, and while they do not let the public know what they are cleaning up, you may set it down as certain that last month's outcome amounted to more than \$100,000—yes, several thousands more. There are a number of the other ledges on the island now being gotten in shape for further development, and the indications are that there will be one or two other paying mills in operation before long. Among the most promising of

these is that now under the management of Mr. George Nowell, representing Boston capitalists, and that in Mr. N. A. Fuller's charge, owned by parties near home. Mr. A. J. Johnson, representing certain French and California capitalists, has now on the wharf a novelty in the shape of an ore-crusher, which is facetiously called the coffee-mill, on account of its remote resemblance to that article. He has acquired some interests in the ledges of the basin, and proposes to develop them by means of this machine, which he claims can do very effective work. Mr. Johnson is agitating the question of a wagon-road from the town to the basin, and it looks as if the project will soon take definite shape and the work be begun.

#### ARIZONA.

**GLADIATOR.**—*Silver Belt*, Aug. 4: The property known as the Gladiator mine, which forms the north-western boundary of the Globe copper mine, can no longer be classed as a prospect. Recent developments prove the claim to be one of the most valuable in Globe district. A crosscut at the 40-foot level, near the northeast end, shows copper ore for eight feet; the breast is still in solid copper which assays 36 per cent. The Gladiator is owned by W. T. McNelly and A. Bailey of Globe and C. M. Hatch of California, represented by F. C. Hatch.

#### COLORADO.

**ORE.**—Idaho Springs *News*, Aug. 7: The Bald Eagle, operated by Cutler & Co., is shipping large quantities of ore. Dan Doyle has leased his great Eastern lode, Ute Creek, to Pat Pender & Co. A force of men will be put to work at once, and we expect to hear of good returns shortly. Little did we think a few years ago, when the monthly output of this district could be shipped in one car, that a few years would witness such changes. Now it takes hundreds of cars to ship the ore away. This week the sale of the Denhigh mine, discovered and owned by John Protheroe and others, situated near the Jones & Walker lode, Russell district, was completed, Mr. Fred Powell being the purchaser. The consideration named in the deed of transfer was \$20,000. Mr. Powell will work the property. On Tuesday we saw at Allen's works 11 tons of splendid looking ore from the Argo mine. The machinery is now in place, and everything ready for a large and continuous output from this promising property. Mr. Hall makes a splendid manager, and under his skillful and economical charge we hope the Argo will develop into a large and steady producer. The Wallace lode, Ute creek, owned by Robert Turner, Joe Allison and John W. Ward, and worked under lease by Wash Johnson & Co., is showing up well. About three tons sent to the sampler this week netted \$443. Some of the ore runs at the rate of \$235 per ton and some at \$103 per ton.

#### IDAHO.

**WOOD RIVER.**—Ketchum *Bulletin*, July 31: The present mining outlook for this section of Idaho was never more encouraging than at the present time. It is true a few of the mining properties are not showing up as favorably as heretofore, but the great majority of both prospects and mines in all localities in this section are developing into producing properties. The days of booms have gone by, but now the sober, industrious miner goes to work in a systematic way to develop the mineral wealth of the country. To-day the ore output on Wood river is greater than ever. The leasing system is the means by which the country's wealth will be shown up. Experience is a great teacher, and it has taught mining men that there must be perseverance, industry and practical knowledge combined to succeed in profitably operating and handling mining properties. This is now being done. The towns on Wood river are dull, money scarce and trade dull at the present time. This is the condition throughout the United States. The reaction will come surely to Idaho, but how soon is a question. It may be somewhat dull now, but it is only a question of time when Wood river will be one among the best mining sections of the country.

**CARBONATES.**—Ketchum *Bulletin*, July 31: They have struck an eight-inch vein of carbonates in the Black Horse mine. Charley Weaver and H. Delano have taken a lease on the old workings of the Black Horse mine. They are now working their lease and have some good ore in sight. Mike Carey has five men working his lease on the Irving mine, Boyle Mountain. Dead work is now being done, and it is expected a new ore body will be opened up in a few days. Messrs. Greenhow & Rumsey and L. Roberts and Andy Nelson have leased the Maud and May mine on Greenhorn. Louis Roberts went down to see the mine Thursday. He reports some ore being taken out. Sam Bergman has 200 tons of ore on the way over from his Tyrolse mine in Germania Basin, Custer county. It will be sampled at the Ketchum sampler. It averages 150 ounces to the ton. C. B. Marlatt has the contract to do the ore hauling. Jake Lockman, Lou Williams and Dave Jones have taken a lease on the Scott mine from A. Dollarhide & Son, on Smoky. They will have to run several feet of a tunnel before reaching the vein. Lou Williams and Dave Jones are now working the lease. H. L. Dickenson and Sam E. Snow own the Phoenix mine, about four miles from the Star of Hope mine, Lost River mining district, Custer county. Supplies and tools were taken over Thursday by J. H. Fitzgerald. George Mussar and Sam Snow have gone over to do representative work. They expect to remain at the mine about three weeks. A 50-ton capacity concentrator is being built at the Carrie Leonard mine. There are large quantities of concentrating ore in the Smoky section that is now unmarketable, but when the new mill gets to working, all this ore can be profitably handled. Joe Perkins came down from Boyle Mountain Thursday with a load of Irving ore. He informs us that Mike Carey has struck a new body of ore in his Alva mine on Boyle Mountain. Some time ago about \$3000 worth of ore was taken from a pocket in this mine, but the vein was lost. The present vein promises to be permanent, and a good output of fine ore may be expected. Popham brothers have sold their interest in the Star of Hope mine in Lost River mining district to Jos. Pinkham, I. I. Lewis and B. Boree. Mr. Boree is connected with the Philadelphia smelters.

**ANOTHER FIND ON WILLOW CREEK.**—Wood River *Times*, Aug. 7: Zach Hayes, who has a stopping place on Willow creek, a couple of miles from Vanlandingham's, accidentally discovered a good-looking, ore-bearing vein, the other day, while hunting on the divide between Beaver creek and the next creek west. The ore assays \$20 in silver and \$3 in gold. It is free milling. The vein is between four and five feet wide, and the croppings show up for over 600 feet. The Willow Creek country is evidently rich in precious metals, and next summer there will undoubtedly be quite a rush of prospectors to that region.

#### MONTANA.

**GRANITE MOUNTAIN.**—Helena *Independent*, Aug. 5: Captain John W. Plummer, manager of the Granite Mountain mine, registered at the Cosmopolitan yesterday morning. He came in on business at Marysville, where he went yesterday afternoon, and will return to-day and go home in the evening. Mr. Plummer says the Granite output during July has been about the usual amount, and the regular monthly dividend of \$100,000 has just been declared, making \$700,000 which the company has divided since the first of the year, and \$1,300,000 which has been paid in 20 consecutive monthly dividends. During the past week, Capt. Plummer says, the mill has been working on \$200 ore. He is constantly sacking very rich ore—ore worth \$1 per pound and even as high as \$5000 per ton. This ore is so very rich that it cannot be worked to advantage by ordinary plants, and it is not at present known where it will be shipped. He is shipping smelter ore from one ledge of the company's property to Omaha. Some idea of the magnitude of the Granite property may be gained when it is stated that beside great bodies of ore in the stopes, there are 1700 feet of tunnels and levels running along ore chutes that have not been touched except to crosscut them at intervals to ascertain their width, which is 10 to 14 feet and more. The mine is now in such condition that 100 tons per day could be taken out if necessary. The new mill is being built just as rapidly as possible, as there is lots of work for it to do.

**FROM THE YELLOWSTONE COUNTRY.**—James Gourley, of Bozeman, interviewed by the *Independent*, said: I regard Cooke City as the coming camp of the country. It has the carbonate character of Leadville. There have been some great developments there recently. The Great Republic Company is taking out eight tons per day, which averages \$250 in bullion. The company ships its ore to Cinnabar and is paying \$1000 per week for wagon transportation alone. The Ashe mine, owned by Jackson and others, is showing fine development, the mining corps having struck a rich vein of carbonate carrying silver. In the Shoo Fly a similar vein has been struck. This mine is owned by Gassett & Co. In fact, all of the work in the camp is making a splendid showing, when it is considered that the camp has no railroad and no capital to operate on. The work is done by the men who own the mines, as a rule. At Emigrant Gulch there are also big developments, both in quartz and placers. Conrad & Co. have struck a rich gold lead. They are running a tunnel about 180 feet, by which they have struck a six-foot vein. These men have been years on this lead, and have at last struck it. They are getting good results from an astrata that they are working. The placers are also panning out well, especially those of Gliddin & Co. and Flesher & Co. At Bear they are running the hydraulic works for all they are worth, and are bound to have big results in the course of time, as the mines are rich. As to quartz, they are making great progress in Bear Gulch. If they had machinery or easier railroad access, you would get some big results from Bear.

**ANOTHER STRIKE.**—Butte *Miner*, August 7: Yesterday Col. Desreivres, of Jefferson county, came into Butte and brought with him rich samples of ore from a prospect recently located by himself and his partner, Mr. McBee. The assay was made by Mr. M. E. Mayer, and shows 399.73 in silver and 15 per cent in lead. The ore is of chlorides and sulphurets and the gentlemen are satisfied they have struck a veritable bonanza. The location is in Soap gulch, about three miles from Meaderville, and in a county that has been prospected for years.

#### OREGON.

**MILL SOLD.**—Bedrock *Democrat*, Aug. 4: Since Laurence & Starr of Prairie City have sold the Keystone mine and mill on Dixie creek, there is considerable quartz excitement there. There are a number of other valuable ledges in that vicinity which are more extensive and prospect better on the surface than the one sold. This sale has given an impetus to the mining interests of that section which promise to result in a substantial growth and improvement in mining matters. The purchasers of the Keystone will discard the old mill and replace it with one capable of crushing not only their own quartz, but also all that will be brought to them from other ledges. There is talk of laying out a town near the mines and a great boom is expected. We understand that Laurence & Starr will expend the money paid them in developing other ledges they own a short distance from the Keystone.

**PINE CREEK.**—Men of the "I-told-you-so" class are now standing around with this favorite expression on their tongue's end whenever anything is said about Pine Creek. "I told you there would be no boom," said one of them to the *Sage Brush* reporter yesterday. That was the worst he could say about the camp, and that was nothing against it. We do not deny that better times were expected for this season in that section, but it is only a question of time when that will be one of the richest camps on the coast. There are no rich and extensive placer mines in that section from which to obtain rich results in a short time. The ore is refractory, requiring a large amount of expensive machinery—such as it requires capital to purchase. Such being the case, the development of the country is necessarily slow, and a poor man has but little chance to continue with his development for any length of time, as he has to make preparations for the winter. With a few exceptions the ledges are owned by men without means who must await the action of the Louisville or other companies before anything can be realized from their work. The great rush in all mining excitements is composed largely of poor men;

but what inducements does Pine Creek offer to these now? To be over-crowded with this class now would be a detriment to the camp. The poor man's day in Pine Creek is approaching; when there are mills and machinery, roasters and smelters, there will be plenty of employment, and the "I-told-you-so" men will be changing the same words to a different tune. Pine Creek is no failure, but on the contrary a country that will be noted even beyond the waters when the proper time comes—and that time is fast approaching.

**PLACERS AND QUARTZ.**—Jacksonville *Times*, Aug. 7: Many of the placer miners are already getting ready for winter. Considerable prospecting is still going on in Jackson and Josephine counties. A small quartz mill is being put up at Wm. Griffin's quartz ledge in Josephine county by Portland parties. B. A. Knott is busily engaged in taking rock from his ledge, and expects some one to put up a mill soon to crush it. He has a good mine. The quartz mines of the county are receiving more attention than ever, and we expect to see them prove valuable in the near future. Keaton, Klippel & Co. are busily engaged in opening their new mines on Applegate, and will have them in shipshape by the time winter comes. Grob & Braendel will soon resume work on their quartz ledge, and intend to have a considerable quantity crushed by Baumle, Klippel & Co.'s new mill. The quartz mill formerly at Medford, which has been removed to Wagner creek, is now in running order and pounding quartz from the Hope ledge. A number of prospectors are arriving from Idaho and other mining regions, several of whom propose to do considerable work in Jackson and Josephine counties. The past season has been much better than any of the three previous ones. C. C. Beekman, of this place, has bought a large quantity of gold-dust during the past few months. J. N. Casteel is making excellent progress with the tunnels of the Jacksonville Milling and Mining Co. and C. C. Beekman. He has almost finished his contract with the former. Messrs. Rush and Taylor, of Eugene City, are in this section looking after their mining interests. They have discovered and are opening a well-defined quartz ledge in Jacksonville district. A. W. Sturgis closed a successful run at his placer mines on Forest creek not long ago. He will have hydraulic pipe and a giant there next season, and has already given his order for the same. The Wagner Creek Mining Co., which has a Huntington mill crushing quartz from the Pilgrim ledge, made a cleanup lately, the result of which is unknown. The mill is being run day and night. Saltmarsh & Co., of Sterlingville, have about completed cleaning up. They picked up a nugget worth \$16, some time since, which denotes the existence of a rich ledge in that vicinity, as it contained considerable quartz. Work has been suspended temporarily at the mill at work on the ore from the Swinden ledge. It is said that L. D. Brown will soon put up better machinery which has more capacity, when operations will be resumed with renewed energy. There is no doubt but what the ledge will pay well and regularly, if worked properly. Several men are engaged in putting up the wood-work for Baumle, Klippel & Co.'s quartz mill in Shively gulch, which will be completed before long. Mr. Klippel has gone to San Francisco for more machinery, and as soon as it arrives no time will be lost in putting it in running order. This will prove of great benefit to the whole district, as it will be conducted on legitimate business principles.

#### UTAH.

**REVIEW.**—Salt Lake *Tribune*, Aug. 6: The bullion receipts in this city for the past seven months were as follows:

January.....	\$ 328,852 66
February.....	456,024 93
March.....	469,722 63
April.....	519,666 08
May.....	387,891 49
June.....	527,036 97
July.....	585,644 38
Total.....	\$3,274,888 24

This excludes all receipts of ore, and there are also undoubtedly some of the smaller producers not included in full. The output of the Ontario for July was \$80,894.93 in fine ounces, and \$60,226.01 from ore sales, an approximate total of \$141,120.97. This brings the Ontario product of the year up to \$1,027,839.39, not being exact owing to fluctuations in silver. Out of this have been paid seven monthly dividends of \$75,000 each, or \$525,000 in all. The Daly product for July was 45 bars of bullion, 61,809.93 fine ounces, and \$16,105.80 from ore sales, an approximate total of \$77,915.73; a total output for seven months of \$389,644.78. The shipments of the metals out from Salt Lake for the week ending Saturday, July 31st, inclusive, were 70 cars, 1,825,167 lbs. The receipts in this city for the week ending August 4th, inclusive, were—bullion, \$130,844.77; ore, \$77,403.32; total, \$208,248.09. The previous week the receipts were \$127,372.51, of which \$81,280.59 was bullion, and \$46,091.92 was ore. The Daly product of the week was 18,014.14 ounces of fine bullion, and ore sales \$7468.59, a total of \$25,482.71 for the month, approximately. Receipts of fine bars for the week were \$82,508; of base bullion, \$15,600. The Hanauer smelter shut down for its annual repairs and cleanup on the 1st. Its product for the week, prior to that date, was \$12,990; the Germania product was eight cars, \$14,936 77; for the week; that of the Pascoe \$1505. The Stormont sent up \$3305 in silver on the 29th.

**PARK NOTES.**—*Record*, Aug. 7: Supt. Jones, of the Sampson, has made some extensive improvements in the Sampson tunnel, and since air connections have been made the mine can be worked to good advantage. The ore shipments will assume large proportions very shortly, and the Sampson will undoubtedly be put on a good footing.

**ORE AND BULLION SHIPMENTS.**—The Mackintosh sampler received for the past week 440,040 pounds of Ontario ore, 111,620 pounds of Daly and 14,640 pounds of Sampson ore. During the week the Crescent shipped 285,000 pounds of concentrates and 190,000 pounds of first-class ore. The Ontario bullion shipment for the week aggregated 66 bars, containing 37,964.89 fine ounces of silver. The Daly bullion product from the Marsac mill for the week was seven bars, containing 7560 fine ounces of silver.



## A Colusa County Residence.

As our State is full of visitors, going about to see some new thing, we have thought we might entertain them as well as our old readers by giving a view and description of one of the most remarkable residence buildings in California. It is the home of L. F. Moulton, and is situated near Colusa. The general exterior aspect of the building, from one point of view, may be gained from the engraving on this page, which is made from a photograph. Perhaps the first feature which strikes the beholder is the height of the structure. A person standing upon the tower which crowns the residence has his eye about 75 feet from the ground, and this altitude gives a grand view of the Sacramento valley and river to the south, the Coast Range to the west, the Sierras to the east, and the eternal snows upon Mt. Lassen and Mt. Shasta to the north.

Mr. Moulton's residence contains many novel features, in fact, nearly everything about is novel and characteristic. Take first the portion that first strikes the observer by its bold elevation. The engraving shows that the central portion rises four full stories, and overtowers the other parts. This is, in fact, the tankhouse, for instead of erecting his tank-house apart from his residence, as is commonly done, Mr. Moulton has made his tank-house a central idea in his house planning, but has made such good use of the space and so elegantly fitted it up that no one would discover any likeness to its progenitor the tank-house. The interior of the tower is used for an elevator and around it is the stairway. There is also space for an observatory where a telescope may be arranged.

At the very top of the tower is a lookout which forms the roof or deck over the main tank holding 1500 gallons, situated 65 feet above the ground. This tank has a supply pipe of galvanized iron two and a half inches in diameter, which pours into it from above, and another similar pipe from the bottom for distributing the water. Connected with this are three-inch pipes which carry water for fire purposes to about 25 buildings situated within a radius of half a mile. From the tank there are also a 2½-inch and a 2-inch pipe leading to hydrants at all necessary places, for the purpose of extinguishing fires, watering stock, irrigation, etc. The water to supply the main tank is obtained in this way: There are two Garret pumps, one on each end of a 2½-inch iron shaft, 80 feet long. This shaft is supported on a frame and is run by steam or horse power as desired. It is so arranged that either or both pumps can be used at will.

Under each of the pumps are wells with pipes running directly into them, and pumps are also connected with four other bored wells, in different directions. In this way they draw upon a large area of water space below the surface, instead of one large well as is usual. Mr. Moulton finds that bored wells cost less and are not liable to get out of order.

Aside from the large tank surmounting the tower there is another of 500 gallons capacity, which receives the rain-water from the house-roof and is the head of the system of water supply for domestic use, in wash-bowls and bath-tubs, as there is hot and cold water throughout the different stories of the house. There is also a system for flooding the house-roof, etc., with water in case of fire and means for drawing off quickly any water thus set free,

which must be seen to be appreciated, as their plan is very ingenious and working effective.

Another notable feature of the residence is its chimney system, which is quite as remarkable in its way as the water system. The chimney is a large structure to the center of the

mantels. This chimney runs up through three grand rooms, one above the other, and each 22½ by 32 feet in size; other rooms, arranged to suit convenience, communicate with the main rooms. On the ground floor, as shown in the plan, the large room 22½ by 32 feet opens by

nomical observatories. The telescope support has eight arches, supported by columns, through the center of which runs 15-inch pipes, and these will be slanted up and out of the way above, so as to reach open air and unobstructed draft.

We have not space to comment at greater length upon Mr. Moulton's structure. A study of the engravings will show the reader many points not described. His house is located on a farm comprising 9000 acres of high grain land and 9000 acres more, which are partly subject to overflow; but the lowest is said to be good hay land, and also has fruit trees and vines that have lived through the worst overflow of many years. Mr. Moulton is now preparing to set out 100,000 young prune and pear trees, having a large lot of imported French stocks, which he will bud this summer, besides other hardy stocks now growing in the nursery. The farm has about 30 miles of fencing, inclosing all but the grain land.

We have heard that the ranch has produced as high as 120,000 bushels of wheat in one season, besides other products. There are now 200 acres of orchard and vineyard, just coming into bearing. An irrigation canal is projected from Chico creek to the land, which, it is thought, would supply water to irrigate the whole of it.

Colusa county, situated in the center of the great Sacramento valley, is now demonstrating its fitness for a great extension of its list of products, as it is found that its soil and climate are adapted to many fruits and other desirable growths, which will give the region wide fame and tend to the progress of the county in wealth and population.



RESIDENCE OF L. F. MOULTON, COLUSA, CAL.

house, as may be seen in the ground plan, and the top of it is located just back of the tower, in the prospective view. The chimney is 50

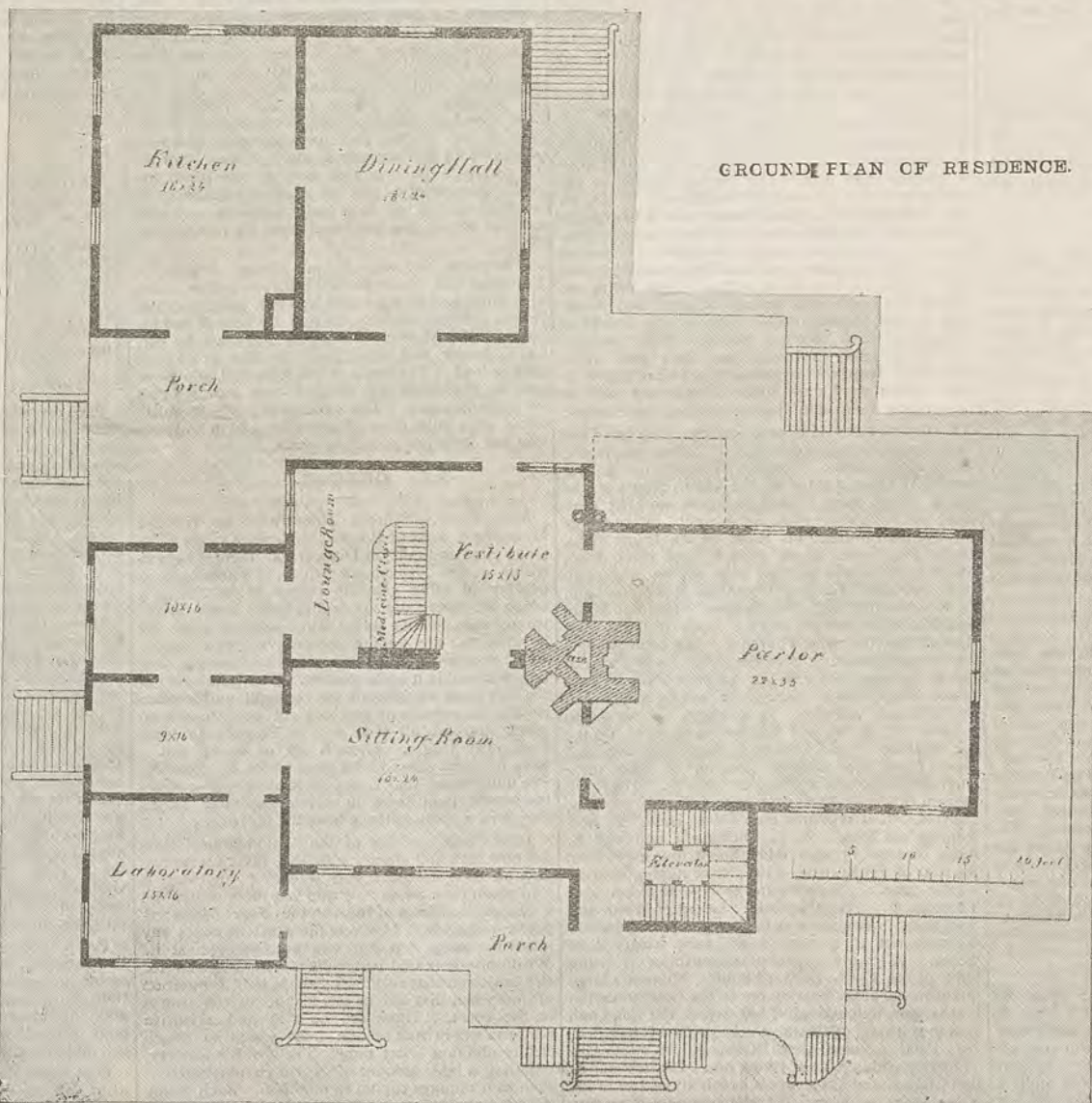
folding and over-head rolling doors into other rooms to the west, which, by double doors, open into rooms still farther west, and these by

IRON IN THE BLACK HILLS.—NEW YORK, Aug. 5.—At the Iron and Metal Exchange there is some conversation concerning the inter-

esting experiments just now being made in this city with quantities of tin ore that is now found in great abundance in the Black hills, D. T. The tin concentrates are said to be of fine quality. Considering the fact that we import some \$6,000,000 worth of pig tin annually, the domestic production is watched with great interest by the metal trade. A company of New York capitalists has been formed to mine the ore, and some of the more enthusiastic of these declare that Dakota will shortly be able to furnish the United States with tin, so that we need not import a single dollar's worth.

By the recent order of the Interior Department, saw mills in Alaska are not permitted to cut logs and manufacture the same into lumber, except for the personal use of the proprietors of said mills. The order is based on the fact that there are no land laws in that Territory, and no person can acquire ownership to real property. The only persons who have title to real estate are a few Russians who owned land in Sitka at the time of the transfer of the Territory to the United States.

THE proposition of pumping out the submerged mines of Gold Hill is a favored subject for consideration, and overtures have been made to that end, but the party holding the key to the situation is unwilling to consent. It is a movement which most certainly should be made before long, and one that would find good favor with the general stock-dealing public. Some very valuable prospects had to be abandoned when the overpowering flood of hot water took possession of the lower levels of all the Gold Hill mines,



GROUND PLAN OF RESIDENCE.

feet high and 10 feet in diameter at the top; upon which are now placed the pipes from the several flues, as shown in the picture.

The chimney has a hollow center, into which each fireplace discharges its ashes, which may be removed at pleasure from below. The fireplaces are furnished with the choicest onyx

double doors again communicate with the surrounding lawns and gardens in which are rows of orange, citron, lemon, lime and other choice trees which flourish in our mild climate.

It is Mr. Moulton's design to surmount his great chimney with an observatory with revolving dome, of the construction usual in astro-



**THE FEATHER RIVER TURNED.**—In conversation with ex-county Surveyor McGann, last evening, regarding the Big Bend tunnel, and its reported failure to convey all the water of Feather river, we learned that the water is all through at last. Mr. McGann received word last evening to the effect that the river had been effectually turned aside from its course, and that its bed is bare. The reason the tunnel failed at first to take all the water was that the dam that was built was not high enough, and the mouth of the tunnel was not large enough. The dam was only six feet high. The mouth of the tunnel was obstructed by several columns, and thus some of the water was forced back and flowed over the dam. But the dam has been raised in height to overcome the resistance offered by the columns, and the increased pressure has forced all the river's contents through the tunnel, leaving the bed bare for mining purposes. The only change that will have to be made will be the widening of the mouth of the tunnel. Its capacity is fully sufficient to hold all the water when it is once forced in.—*Chico Enterprise*.

**OCCURRENCE OF ALABANDITE.**—A mineral having the physical properties of alabandite, and, according to tests made by Mr. Robert Neuman, giving the reactions for that mineral, occurs in considerable quantity in the Queen of the West mine, in Horsehoe, Summit county. Should subsequent investigation prove the mineral to be alabandite, it will be its first observed occurrence in the United States. The mineral is of iron-black color and metallic luster, with a dark-green powder. It has a cubic cleavage, and when crystallized occurs in cubes and octahedrons. The theoretical composition of the mineral is: Sulphur, 36.7; manganese, 63.3. The Queen of the West mineral carries 30 ounces in silver to the ton. We are under obligations to Superintendent Foote for a specimen of the mineral. Alabandite has heretofore been found in the gold mines of Nagyag, Kapnik and Offenbanya, in Transylvania; at Gersdorf, near Freiberg; in Mexico, at the mine Preciosa, in Puebla, and a few years since it was found in Peru.—*Georgetown (Col.) Courier*.

**THE OIL WELL.**—The boring of the coal-oil well at Sargent's tar springs is in progress. The auger was down 104 feet from the surface on Saturday last, and more headway has been made the present week. Oil floats on the surface of the pulverized rock, sand and gravel of the strata through which the drill passes on its way to its source. Mr. Taylor considers the prospect more favorable than it has appeared to borers in places where the flow exists in paying quantities. He expects soon to be able to telegraph the cheering intelligence that he has struck oil, the supply of which will add to the business of the valley. As in Santa Barbara, it is probable that success might reward the oil men by tunneling the hill.—*Gilroy Advocate*.

**IF EVERY SUPERINTENDENT** of a mine would be given absolute power to push work on the property over which he superintends, and in what manner and to any extent he judges best, and is not subject to the orders of a Board of Directors living thousands of miles away, more of our mines, we believe, would pay larger, and give more satisfactory results. A practical mining man, who is well acquainted with the workings of a mine, is better able to judge as to requirements in the way of development, etc., than theoretical miners who know nothing about the practical operation of a property.

**THE NAPA & LAKE RAILROAD.**—Two hundred and fifty men are now working on the Napa & Lake railroad, and it is said there will be 500 working by Saturday. The road starts from Rutherford, and will go to Lower Lake, a distance of 45 miles; but it is intended to push right on to Lakeport. From Rutherford the railroad will connect with the Napa road at a point about 14 miles above Napa. The matter has been kept very quiet, but the company evidently mean business right away. John T. Davis is president and S. M. Holmes the treasurer. Both are Boston men.—*Sacramento Bee*.

**PNEUMATIC TUBE MINING.**—A dispatch from Oroville, Butte county, dated Aug. 4th, says: The mining company that has been operating the pneumatic tube at this place struck very rich gravel this morning. The company is very jubilant over their prospect, and will put in at least two more tubes. By the pneumatic process, ground can be worked that cannot be by any other process. The gravel deposit is in the bed of Feather river, and about 40 feet below the surface of the water.

**THE Redding Free Press** says: Clarence E. Foster, the great Tennessee colony organizer, has been visiting Shasta and Modoc counties looking for a location for a negro colony from the South. He found what he wanted in our northern valleys, and a colony will soon be on its way here. The object is to bring the negroes here to raise cotton.

**THE** fine and costly steel wire cable of the Yellow Jacket new shaft, eight inches in width and 3500 feet long, is being split in the middle for its entire length. This is in order to make two cables four inches wide, needed for use in the old shaft workings. The splitting is being done by means of coldchisels and hammers—a slow but very sure process.

## USEFUL INFORMATION.

### The Value of Brick-dust.

The clays from which bricks are burned are composed principally of silicate of aluminium, with varying proportions of other silicates (iron, lime and magnesia being present as bases). When burned, these clays are in just the condition of that which is employed in the manufacture of Portland and other artificial cements, and in the presence of moisture will promptly unite to form with lime the double silicate, the formation of which is the cause of the "setting" of such cements. The use of brick-dust as an ingredient of cements is by no means unknown, but in some localities is a well-established practice; and such cements figure as a regular article of commerce. Trautwine says on the subject: "Brick-dust or burnt clay improves common mortar and makes it hydraulic." Very positive testimony in its favor, however, is given by Mr. F. B. Miles, a well-known manufacturer of Philadelphia. His remarks on this subject are so interesting that we give them in full. Mr. Miles says: "It may not be generally known among builders in this country, that in the Spanish dominions, ordinary brick-dust, made from hard-burned, finely-pulverized bricks, and mixed with common lime and sand, is universally and successfully employed as a substitute for hydraulic cement. During an engineering experience of six years in Cuba, I had ample opportunity for testing its merits, and found it in all respects superior to the best Rosendale hydraulic cement for culverts, drains, tanks or cisterns, and even for roofs, whether for setting flat tiles or for making the usual tropical, concrete, flat roof. It is regularly known there as an article of commerce, sold in barrels by all dealers in such articles, at the same price as cement. The proportions used in general practice are one of brick-dust and one of lime to two of sand, mixed together dry, and tempered with water in the usual way. A greater or less quantity of the brick-dust is sometimes employed when considered desirable." Mr. Miles goes on to say that he does not know whether this composition has ever been tried in this country, or whether it would retain its virtues when subjected to the action of frost. It could undoubtedly be produced at less cost, he adds, than cement; and by the addition of pulverizing mills to our brickyards, to utilize the waste and broken bricks, it might afford a profitable return to enterprising manufacturers, or others who might interest themselves in the product. Trautwine adds to the above the statement that brick-dust cement is used considerably in France. In an experiment to test the strength of this product, he found that a block of the same, one-half inch in thickness, without sand, and after an immersion in water for four months, bore, without crushing, crumbling or splitting, a pressure of 1500 pounds per square inch. With regard to the doubt expressed by Mr. Miles as to the ability of brick-dust cement to withstand the action of frost, we see no reason why it should not stand it as well as other hydraulic cements, with which it is substantially identical in composition.—*Manufacturer and Builder*.

**HOW OATMEAL IS MADE.**—The first operation in the manufacture of the meal is the removing from the oats all the chaff, small oats and foreign seeds of whatever kind, for if any of these remain the quality of the meal is much injured. Black oats, if even of good quality, give a bad appearance to the manufactured meal, as it reappears in the form of black particles, which to the tidy housewife appears to be something more uncleanly. After the oats have been properly cleaned by sifting, they are subjected to the process of drying. This is accomplished in dry kilns, with special apparatus constructed for the purpose. This operation requires some care to prevent the oats from burning. As soon as sufficiently dry they are removed from the kilns while still very hot and stored in such a way as to have them retain their heat; after thus remaining three or four days, they are ready for the shelling operation. This shelling is accomplished by passing the oats through mill-stones of a special pattern. The product that comes from the stones is groats, or the whole kernels, dust, seeds, etc., and these must be separated. By means of combination of sieves and fans the groats are separated from the other material, and are then ready for grinding. For extra quality meal the groats may be shelled and also passed through a brushing machine. The grinding of them must not be long delayed, as a few weeks' exposure renders them unfit for milling. In grinding the groats the great aim is to avoid pulverization and to have the granules cut square and of uniform size. Oatmeal is generally denominated by the cut—as pin-head cut, rough cut, medium cut—although these terms have different meanings in different districts. After the grinding the meal is passed through sieves and the siftings graded according to size.

**BAND AND CIRCULAR SAWS.**—A practical correspondent of the *Mechanical News* writes, in regard to the comparative utility of band and circular saws, as follows: "The reason why band-saws are not run as fast as circulars is because it is not practicable. The limit of speed at which they can be run and do their work properly has been fixed by practice. I do not think a band-saw would cut 1000 feet of lumber

in an hour. As the band-saw is thinner than the circular, I should say, on general principles, that it would take less power, cutting at the same rate; and that a band-saw is considerably more difficult to set up and run than a circular saw. That has been my experience, and I think it will be confirmed by others."

**WHAT CAUSES VARNISH TO PIT AND ENAMEL.**—A REMEDY SUGGESTED.—There are several reasons why varnish will pit and enamel. The pitting comes first and is of most importance, because it occasions more trouble and expense than the other, and requires to be washed off entirely, while the other can be rubbed out and revarnished. The most generally accepted reason for pitting is that the varnish is too green or new from the vats to be placed on the market, although there are some varnishes which will pit no matter what age it has, or under what circumstances it is used. Sometimes the very best that can be got will go too. To take up all the reasons would occupy too much time and space, so we will only treat of a few. A damp, chilly room, a draught of cold air blowing in on a panel before it has thoroughly set; a current of electricity running through the air, caused by a thunder-storm. To counteract those influences is simply to avoid them. See that your room is thoroughly dried and ventilated before varnishing, and also see that it is kept so. Take your job out of the current, and do not varnish if a storm is coming or expected to come. About enameling: That can be caused by an overheated room or a heavy, foul atmosphere, or it can be caused by the under coats not being thoroughly dry, or sweating out under the finishing coats. Regulate your room to about 60 or 70 degrees. If there is any heavy, foul air, get it all out, and above all, do not varnish until your under coat is dried out of all possibility of sweating.

**THE NOMENCLATURE OF CARRIAGES.**—Fifty years ago the names of the different kinds of carriages, wagons, etc. in use were few and easily remembered; but at the present day we are overwhelmed with a multitude of fancy names used to designate the particular productions of various ingenious houses engaged in this class of industry. As to the wisdom of this system of multifarious nomenclature, there may be differences of opinion.

## GOOD HEALTH.

### What Science Says.

**The Wonderful Mechanism of the Human System.**

In the editorial columns of the *New York Analyst* H. Lassing, M. D., editor, writes the following beautiful description of the laboratories of the human system. We think we have never read a finer or more trustworthy one:

"Man is the greatest of all chemical laboratories. Magnify the smallest cell of the body and what a factory is spread before the eyes. Countless chambers in which are globes of air, masses of solid matter, globules of dying liquid; a flash comes and the whole is consumed and needful heat is carried into every part of the system. Electrical forces also generate and are conveyed to the brain, the muscles and the various nerve centers.

"In another set of a million chambers we see various classes and vapors. By chemical action these are changed and purified in the lungs and the skin. The blood, we often say, is a great living river. In its current are masses which the air in the lungs did not affect; blocks of chalk, slabs of tartar, pieces of bone-ash, strings of albumen, drops of molasses and lines of alcohol. How are these waste masses disposed of? Begin where you will in this great stream, you must come to the purifying places of the system. Here is all activity and an invisible force reaches out into the stream, seizes and carries this mass of waste into vast trenches, thence into a smaller reservoir, and finally into a larger reservoir, which regularly discharges its contents.

"This separation of lime, uric acid and other waste material from the blood without robbing it of a particle of the life fluid, passes human comprehension. In health, this blood-purifying process is carried on without our knowledge. The organs in which it is done are faithful servants whose work is silent as long as health remains.

"People strangely wait until pain strikes a nerve before they will realize that they have any trouble. They do not know that pain concerns chiefly the exterior, not the interior, of the body. A certain set of nerves connect these blood-purifying organs with the brain. They may not gnaw and bite as does the toothache or a scratch, but they regularly, silently report. When these organs are failing these nerves indicate it by drawing the blood from the face and cheek, leaving the lip and eye blanched, by sending uric acid poison into the smallest veins, the skin then becoming gray, yellow or brown. They also prevent the purification of the blood in the lungs and cause pulmonary difficulties, weariness and pain. Who enjoys perfect health, especially in this land where we burn the candle in one mass? The athlete breaks down in the race; the editor falls at his desk; the merchant succumbs in his counting-room. These events should not have been unexpected, for nature long ago hung out her 'lantern of alarm.' When the 'accident' finally comes, its fatal

effect is seen in a hundred forms—either as congestion, chronic weakness, as wrong action, as variable appetite, as head troubles, as palpitation and irregularities of the heart, as premature decay, as dryness and harshness of the skin, causing the hair to drop out or turn gray; as apoplexy, as paralysis; as general debility, blood-poisoning, etc.

"Put no faith, then, in the wisacre who says there is no danger as long as there is no pain. Put no faith in the physician, whoever he may be, who says it is a mere cold, or a slight indisposition. He knows little, if any, more than you do about it. He can neither see nor examine these organs, and depends entirely upon experimental tests, that you can make as well as he.

"If the output is discolored or muddy, if it contains albumen, lymph, crystals, sweet or morbid matter, is red with escaped blood, or roily with gravel, mucus and froth, something is wrong, and disease and death are not far away.

"These organs which we have described thus at length, because they are really the most important ones in the human system, the ones in which a large majority of human ailments originate and are sustained, are the kidneys. They have not been much discussed in public, because it is conceded that the profession has little known power over them. What is wanted for such organs is a simple medicine, which can do no harm to the most delicate, but must be of the greatest benefit to the afflicted."

### Alcohol and the Blood Circulation.

In chills or in cases of sudden cold, the blood fails to reach the surface and produce or keep up the needed external warmth. If, at such times, alcohol be taken into the stomach, it at once increases the action of the heart and arteries about one-fifth, thus driving, with an unnatural force, the blood to the surface, and producing there the needed glow of warmth.

But, under the same law of cause and effect, if we make an habitual use of alcohol in any of its numerous forms, we unnecessarily increase the circulation, and by frequent potations keep up a flow of blood to the surface faster than the veins can carry it back. Hence, the countless capillaries, whose minuteness makes them invisible under ordinary conditions, soon become distended with impure blood, and are kept in a state of permanent congestion. This impure blood will soon give rise to pimples and blotches, especially upon the face and nose. These are the "toddly blossoms" which are so disgustingly prominent on the face and nose of the hard drinker. If the pimples do not appear, a permanent and noted redness shows itself, as an emblazoned signal, proclaiming to every visitor the tipping habit of the person. The same action of the heart, and in the same manner, produces headache, a coated tongue, an impaired appetite, disturbed sleep, etc. All these things should be taken as notes of warning that the whole system is diseased, and is fast being prepared for a drunkard's grave. The *Medical Reporter*, in referring to the same matter, says:

"It is a medical fact that as the influence of alcohol reddens the dram-drinker's nose, and changes its appearance, so it reddens and changes the appearance of every organ of the body; and as the nose thus affected is not in a natural and healthy condition, so every organ of his body is changed from a natural and healthy condition to an unnatural and diseased condition; and as the skin of the nose takes on unhealthy action, so the substance and coverings of the internal organs take on diseased action, which results in the full development of incurable diseases, such as insanity, diseases of the heart, Bright's disease of the kidneys, hobnail liver, and slow inflammation of the stomach. All these diseases exist at the same time in the dram-drinker, but the organ most diseased is apt to take the lead in the morbid action."

"**WORRIED TO DEATH**" was the announcement that conveyed news of the suicide of a business man in Oakland last week. The words sound like the tolling of a bell. The intensity of business life is caused by the rapid facilities which modern progress has furnished. The old way of waiting for ships to come in had in it leisure. The new way, with every nation in the world connected by telegraph wires and cables, which join all commercial centers together, has put a speed into business to which business men have not yet adjusted themselves. It used to be 6000 miles from San Francisco to London. Now the distance to London is that between your counting-room and the nearest telegraph office, or, to be more exact, it is the few feet between your chair and the electric button you touch to call a messenger boy. Out of this condition of affairs which puts San Francisco and Hongkong nearer to each other than this city and Sacramento used to be, has come into business an increase of contacts, a multiplication of operations, and hence of risks, which would have appalled our fathers. But let no man decry this addition to the facilities of trade, for it has brought more genuinely great men into commerce than ever before. Under the old system a few men flourished, but they can be easily recalled. Jacob Barker and John Jacob Astor in New York, Girard in Philadelphia, and Peter Pan-ueil in Boston and the Winans family in Baltimore, gathered significant fortunes, but who can recollect the names of other cotemporary princes in trade?





A. T. DEWEY, W. B. EWER.  
DEWEY & CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

#### Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrearages must be paid for at the rate of \$3.50 per annum.

#### Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square).....	1.50	4.00	10.00	24.00
One inch.....	2.00	6.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.  
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

#### SAN FRANCISCO:

Saturday Morning, Aug. 14, 1886.

#### TABLE OF CONTENTS.

ILLUSTRATIONS.—Lead "Steam Pump"—(Injector); Plunger Jigs for Iron Ore Concentration, 97. Lava Covered "Old Channels," Showing Contour Line of Surface; Profile Line of Cross Section, 105. The San Francisco Tool Company's Siphon Centrifugal Pump, 107.

EDITORIALS.—Concentration of Iron Ores, 97. Mining Profits; Foundry Notes; A New Mining School; San Diego Mines; Silver and Gold, 104.

CORRESPONDENCE.—Idaho Mines; Mining on the Lower Klamath; Quartz Grinders Again; Washington Territory Mines, 98.

MECHANICAL PROGRESS.—Progress in Saw Manufacturing; Sketching for Mechanics; A Gigantic Steel Forging; Wire-painting Machine; Lubrication of Steam Engines; Boiler Notes; Importance of Thin-blade Saws; To Produce a Red Stain on Wood, 99.

SCIENTIFIC PROGRESS.—Science in America; History of an Ancient Cyclone; Earthquake Waves; Earthquakes and Other Earth Movements; After Sunset Glows; Modern Cave Dwellings, 99.

USEFUL INFORMATION.—The Value of Brick-dust; How Oatmeal is Made; Band and Circular Saws; What Causes Varnish to Pit and Enamel; The Nomenclature of Carriages, 103.

GOOD HEALTH.—What Science Says; Alcohol and the Blood Circulation; "Worried to Death," 103.

MISCELLANEOUS.—Defining Coperny Bullion Produced by Amalgamating Tailings, 97. Drift Mining in California, 105. Siphon Action of Discharge Pumps, 106. Siphon Action; Large Pumping Plants; The Siphon Centrifugal Pump, 107.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 104-5.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 112.

#### Business Announcements.

Assay Office—Thomas Price.  
Irrigating Pumps—S. F. Tool Company.  
Annual Meeting—Golconda Mining Co.  
Triumph Concentrators for Sale—906 Market St.  
Books—H. C. Baird & Co., Philadelphia.

See Advertising Columns

#### Passing Events.

The thousands of visitors from the East and the interior who have enlivened San Francisco for the past two weeks have returned or are returning to their homes. The attractions of the State will keep many here, however, visiting points of interest, and doubtless some of those who came here will eventually settle in California.

Mining in Southern California seems to be in an advancing stage of progress. Some of the newer camps are doing very well, and the older ones are experiencing a revival of industry, leading to the reopening of old mines which are now worked at a profit.

The Legislature is still in session, but thus far has accomplished nothing toward the settlement of the irrigation question.

The report of the directors of the Mint for the calendar year 1885, just issued, shows that California still holds second place in the rank of bullion-producing States and Territories, being led only by Colorado.

Miners' associations are being formed in the interior of this State, though thus far no steps have been taken to carry out the suggestion of our correspondent, "The Old Man of the Mountains," to organize a State association.

THE *San Diegan* says: Prospectors to the number of 50 or 60 are in the vicinity of Campo, investigating the mining belt, and considerable excitement prevails over alleged discoveries of valuable mines.

#### Mining Profits.

In discussing the profits of the mining industry, fallacious arguments are often advanced, though the subject is comparatively simple. A profitless industry is one which pays nobody, or where the actual costs equal or exceed the actual returns. A mine which pays no dividends, but yields sufficient products to settle its accounts for wages and supplies, is not profitless. Agriculture in many regions does no more than support those engaged in it, yet no one would maintain for a moment that a county capable of supporting a given number of persons by farming, even though they were unable to accumulate a surplus, was not by so much richer than a country capable of affording a livelihood to no one.

The wages of miners are among the profits of the mining industry; so, too, is the surplus over actual cost of the industries which depend upon the mines for a market and that of the industries which depend upon the mines for supplies. The loss which would ensue if the mines were to be suddenly wiped out of existence is the exact measure of the profit which is now derived from them. In short, the entire profit of the precious-metal mining industry is the entire product in dollars, plus the increment (if any) of the value of mining property, plus the net profit of manufacturers of supplies used in the mines and of wares of the bullion produced; minus the net cost of supplies, including plant consumed in mining, and minus the shrinkage (if any) of the total value of mining property. The increment and decrement in the value of mining property (plant being counted under the head of supplies) can only be measured by the yield of the mines, which fluctuates greatly, but on the whole increases at an average rate of say two millions a year in this country. The gross expenditure for supplies other than plant is, say ten millions, of which, perhaps, 25 per cent may be counted as profit, and a similar sum probably represents the profits on the bullion in the manufacture of wares.

#### Foundry Notes.

The Fulton Iron Works have obtained the contract for building the machinery, etc., for the new ferryboat of the South Pacific Coast R. R. Co., to be used between this city and the narrow gauge pier on the Oakland side. The contract is quite a heavy one, of which we shall give further details shortly.

Work at the foundries in general continues rather dull, there being very few large jobs in the market. The labor difficulties have had some bad effects also, one of the large works having had to obtain their castings by rail from the East, it is reported.

The Council of Iron Trades and the Boiler-makers' Union have been considering the difficulties with the Union Iron Works at their meetings this week. At a meeting of the Representative Council of the Iron Trades on Wednesday a communication from the iron manufacturers, relating to the strike at the Union Iron Works was considered. A resolution was adopted stating that the council made the following proposition as a basis of settlement: Work is to be suspended for 48 hours to give the present workmen an opportunity to be admitted into the different iron unions. All those who are refused admittance are to have a hearing before a board of arbitration, whose decision is to be final. The arbitrators shall consist of two members of the council, two from the Employers' Association, and the fifth is to be selected by the other four. Should this plan be carried out the strike will be brought to an end. The council further agreed with a proposition from the Employers' Association that all further difficulties shall be submitted to arbitration.

JOHN FROST, who located the famous Oregon ledge in 1862, and has ever since been closely identified with that and the group of mines which were afterward merged in the Manhattan Company, died at Austin, Nev., this week. Mr. Frost has been kept steadily in the employ of the company as managing superintendent of all the surface works, hoisting and pumping machinery, etc. He was an excellent mechanic, and all the best mining machinery of the company has been constructed and erected under his supervision. In fact, he was next to the general superintendent in authority.

#### A New Mining School.

A new school, supported by the State of Michigan, is just being organized to furnish a thorough training in mining engineering, and will be opened on September 15th. The course of instruction will embrace geology, mineralogy, chemistry, mining and mining engineering, and such other branches as will enable students to obtain a full knowledge of the science, art and practice of mining and the application of machinery thereto.

Special advantages are offered by the situation at Houghton, in Houghton county, in the center of the "Lake" copper region, and within a short distance of Marquette, Menominee and Agogebic iron-mining districts. The surroundings present excellent opportunities for the study of actual mining operations conducted on a large scale, while the ground has become a classic one in the history of American geology. As provided by the statute organizing the school, tuition is free to students of Michigan. The regular course will occupy two years, with a post-graduate course leading to the degree of mining engineer after sufficient actual practice. Facilities for instruction, study and practice will be offered to advanced special students and those pursuing optional branches. For the present, however, the purpose is to confine the curriculum to mining engineering and metallurgy; and, further, to devote attention particularly to local interests, making specialties of iron, copper and salt—the three leading mineral products of Michigan—though not neglecting a study of the other important mineral substances, especially gold, silver, lead and coal, so that graduates leaving the State for other mining fields will be thoroughly equipped.

The general instructions will be by means of lectures, recitations upon the lectures, and textbooks, reading, laboratory and shop practice, field work in geology and surveying, inspection of mines and metallurgical works with actual practice. The course will contain geology, mineralogy, lithology, chemistry and assaying, mathematics, physics, mining metallurgy, surveying, drawing, and shop work. Under the head of mining it is proposed to teach the general systems followed in the different kinds of mining; the use of hand and machine tools; prospecting; development; hoisting, pumping and ventilating machinery; timbering; blasting; ore extraction; supplies; transportation, surface improvements; mine inspection; records, accounts and reports. Besides the technical points, mining will be considered as a business. The metallurgical course includes the questions of crushing and sizing, sorting, sampling, mechanical tests, ore dressing and concentration, roasting, amalgamation, leaching, smelting, fuels, fluxes, furnace products, refining, etc. The theory of the different processes, the construction and use of the various furnaces, machines and appliances, working tests and checks, and the proper selection of method according to the character of the ore, and the local and economic limitations, will be leading features. Experimental apparatus will be supplied by the State.

The principal of this new school is Albert Williams, Jr., formerly connected with the MINING AND SCIENTIFIC PRESS, and for some years past Chief of the Division of Mining Statistics and Technology, U. S. Geological Survey. Mr. Williams is a graduate of the Columbia School of Mines. During the preparation of the Census Reports he visited the mining districts of Montana, Idaho and Nevada, and spent a couple of years in the mining regions. Since then he has been engaged in preparing his annual report, entitled "Mineral Resources of the United States," which deals with all the mineral products of the country, except gold and silver. Mr. Williams has made not only a reputation for himself but for the department with which he was connected, by the thoroughness of his report. The work is the most practical of any issued by the Government, and has been of the greatest value to the mining community all over the United States. The scheme of the reports was laid out by him, and he had the task of putting into shape the material collected by his assistants. The Geological Survey loses a most valuable member of its corps by the resignation of Mr. Williams, and the State of Michigan gains an active and intelligent principal for its new mining school. Mr. Williams has already chosen J. D. Hoffman, formerly of this State, as one of his assistants,

and Dr. Packard as chemist, and the choice of the others is left also to him. He is now organizing the school, and his practical experience in the mining regions on this coast will be of great use in the matter, since he is familiar with all the requirements. We are pleased to see a Californian chosen for so responsible a position.

#### San Diego Mines.

About 1870 there was quite an excitement in San Diego county over the discovery of gold mines in Julian district, some distance back of the city of San Diego, on the mountains overlooking the desert. The writer was one of those who went to the camp at the time of its discovery. Several pretty good mines were found, notably the Owens, Stonewall, Helvetia, Golden Chariot. Another district called Banner was afterward discovered in San Felipe canyon, a few miles from Julian, where were discovered the Redman, Ready Relief and a number of other mines, several of which paid well on the surface, and then gave out, while others are still worked. The two districts are now one. The Chariot was at one time listed on the stock board. All the mines were worked for awhile, when many of them were abandoned or left idle; but not long since it was found they would pay under the better condition of affairs and better knowledge. From a state of partial abandonment the district has again become active, and many of the old mines are being reworked and paying very well. Some mines have been sold to Eastern capitalists, and St. Louis parties are now examining others. There are now seven or eight mills in the district, including that at the Stonewall, some eight miles from Julian. In the Owens a second ledge, at first unknown, was found at the depth of 300 feet; the two ledges formed one eight feet wide. The district is well wooded and watered, and the climate is good. The present condition of affairs is another illustration that we have not always been aware of the value of our gold-quartz industry. After lying idle for some years the mines are again worked, but more intelligently, and are found to pay well. In other parts of the State the same lesson is being learned.

#### Silver and Gold.

Silver has been declining steadily and rapidly for some time, and was as low as 90 cents per ounce last week, while the standard of pure silver is supposed to be \$1.29 per ounce. A slight improvement is now noticeable, however, and all the small lots of silver in this market were bought up this week by two of the banks at a higher price than was bid last week. This is an encouraging feature to silver miners. The low price of late has caused the shutting down of some low-grade ore mines on this coast, and more would have to follow the same course should the decline continue further. There is more confidence now that the metal will rise again, and that the lowest point has been reached.

The action of the Treasury Department in the matter of worn gold coins is creating considerable annoyance in this city. All coin showing signs of wear is now stamped "light" when received at the Treasury, and must be taken to the U. S. Mint and sold for old gold, at a loss from the real value of the coin. The consequence of this is that people are refusing to receive worn gold coins, and those who have them on hand will be losers. The matter has come up suddenly and entails an unfair loss on many. It would seem that when the Government issues the coin, which all the people handle until it becomes worn, the Government should redeem it for its full value, letting whatever loss there is fall on the whole country rather than the individual who happens to possess it at the time an order is made to declare it "light."

THE pulverizing room of the California Powder Works, near Santa Cruz, was burned on Monday. The processes of powder manufacture are conducted in detached buildings, and the fire was confined to the building in which it originated. The machinery destroyed was very valuable and the loss will reach several thousand dollars. The company have a duplicate mill of the same character, consequently the works will not be compelled to stop.



## Drift Mining of California.

[By RUSSELL L. DUNN, M. E., of Auburn, Placer Co.]

Out of the peculiar conditions of situation of the auriferous gravels of California has been developed the method of mining generally termed "drift mining." Owing probably to its exclusive localization in California, and its comparatively slow development as one of the leading branches of the gold-mining industry of the State, is due the absence of much definite published information concerning the practical details of its operation. Also has it been to a less extent than any other branch of mining the subject of study and scientific investigation by trained mining engineers. In this article I have taken the experience of the practical working of many of the old and successfully operated mines, and from it have made such general deductions as will be of assistance in the exploration and development of new claims.

The drift-mining districts of California comprise practically the entire areas in the State containing the unworked out gold placers, and are part of the western slope of the Sierras included within the counties from Mariposa on the south, Shasta and Siskiyou on the north. It is in Nevada, Placer and Sierra counties that the most extensive areas of mining ground are found, and also the at present most important mines being worked. Plumas, Butte, El Dorado, Amador, Calaveras and Tuolumne counties have also considerable areas of mining ground and important mines.

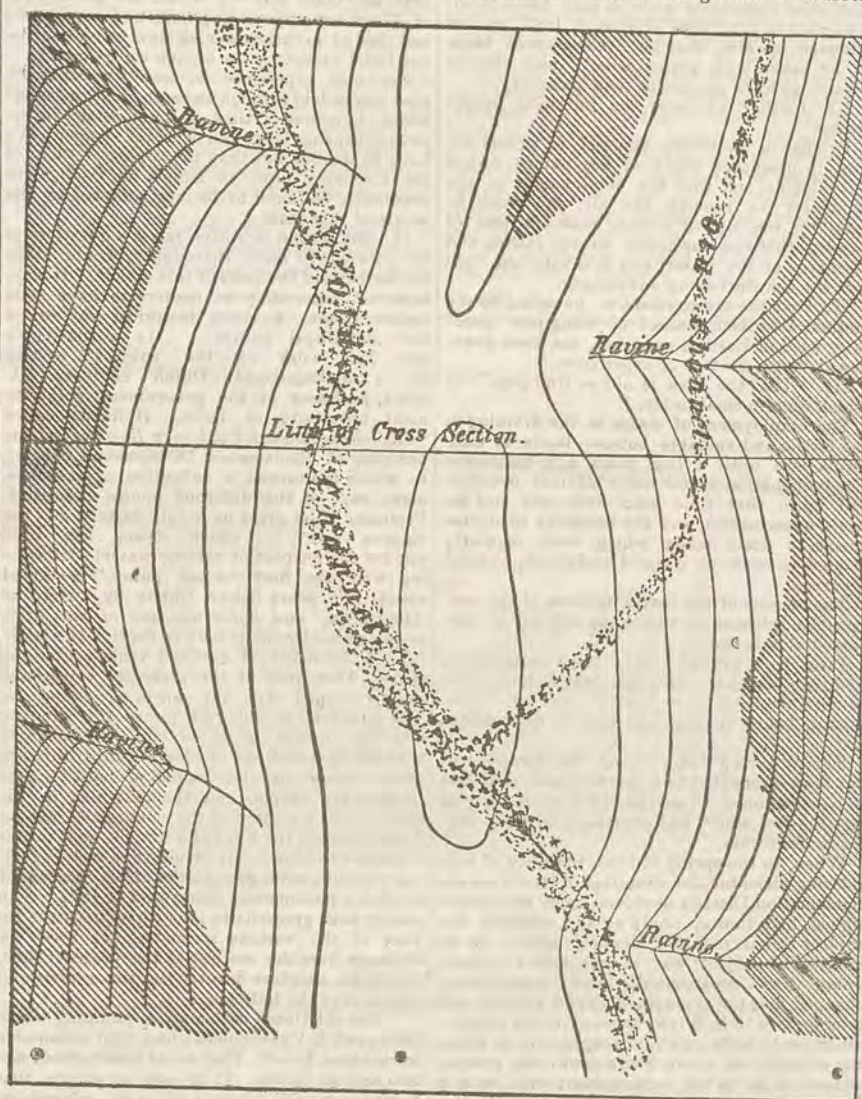
The geological character of this entire district is uniform throughout its entire extent. The main axis of the Sierras, and including the western slope to a distance from 10 to 30 miles from the summit, is granite. From the western edge of the granite, and overlying it from thence and extending to and disappearing under the alluvial plains of the valley, is an immense body of metamorphic stratified rocks. Of these, slate forms by far the larger part, limestone being the next most important. In a large area of Western Placer, Nevada and El Dorado counties, granite appears at the surface and is the country rock. The general topography of the country must have been rough, but hilly rather than mountainous. The river depressions do not seem to have been deep precipitous gorges and canyons, as at present, but apparently the streams run in beds very near the general level of the country. These ancient rivers were, judging from the disconnected fragments of their channels that have been explored in mining, comparatively short streams, but in some instances of great width and carrying large bodies of water.

In some localities two distinct sets of ancient river channels have been found, one cutting across the other, and so differing in every essential characteristic that they were undoubtedly formed during widely separated periods of time. All of these old stream channels necessarily became more or less filled with the detritus of their erosion. In some the debris consists almost exclusively of quartz, boulders, gravel, and sand; others, again, are marked by almost an entire absence of quartz, its place being taken by granite, slate, and lava, gravels, sands and clays. In nearly all of these gravel-filled channels was gold, gathered from the eroded auriferous quartz veins and seams. This, briefly stated, was the physical condition of this country during the Pliocene period and until a great lava flow swept over the surface and covered it from one or two hundred to as many thousand feet deep. This lava flow followed and became, of course, deepest in the channel depressions, but was still deep enough to cover nearly all the elevations as well. It closed the period of the old physical conditions and topography of the country and was the commencement from which this present topography dates. The present streams, principal among which, as draining the largest and most important part of the mining area, are the Feather, Yuba, and American, with their respective forks and branches, have gradually eroded tremendous canyons, in which they run one, two, and even three thousand feet below the summits of their precipitous sides. Their general course, more particularly in the region of the lava-covered old river channels, is, if anything, more westerly than the latter, though this is by no means invariable, the direct reverse of this being true in some localities and in others the courses being parallel. The erosion cut away first the lava,

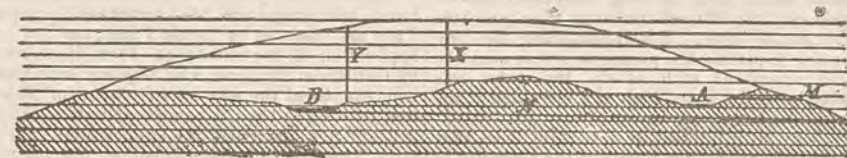
then the gravel drift in the buried channels, and finally far into the hard slates. The gold eroded out of the old channels, and some from the direct erosion of quartz veins, enriched the ravines, river beds and bars, making the rich placers from which immense sums were taken during the early years of the California gold mining. These were long since practically exhausted and abandoned, and the source of the placer gold at present being taken out and still valuable for the mining of future years, it is to be found in the fragments of the old river channels and drift left by the erosion of the present rivers lava-buried in the high divides or mountain spurs between the extremes. These divides are from a few hundred yards to several miles in width, comparatively level, except for a light upward grade toward the main mountain axis. The small tributaries of the rivers run on these divides in shallow depressions on easy grades until they reach the precipitous canyon

became too large to admit of economical handling. Accordingly, to afford natural drainage, and also to secure easier carriage for the gravel from the mine to the surface, where it was washed, tunnels were run in the bedrock on a light-ascending grade, and at such depths as it was supposed would leave it lower than the lowest point it was designed to work. From this time drift mining became recognized as a distinct branch of placer mining.

The annexed diagram is intended to represent, typically, a portion of one of the lava-capped divides containing an old river channel, as illustrating the methods of prospecting and mining. The large cut shows contour lines of surface. The shaded ground represents contours of bedrock, or country rock. The unshaded ground is lava. The vertical distance between contour planes is 50 feet; scale, 800 feet to an inch. The smaller cut shows profile line of cross section. The shaded ground is bedrock;



LAVA COVERED "OLD CHANNELS," SHOWING CONTOUR LINES OF SURFACE.



PROFILE LINE OF CROSS SECTION.

sides down which they plunge in cascades and waterfalls.

The genesis and history of the deep placers, as they are sometimes termed, have been given in this article at considerable length, as in them are much general data that can be practically applied in mining them. The original discovery of the deep placers of the ancient river system occurred in the working of the ravines and gulches by the early miners.

They kept prospecting and working up higher on the mountain-sides in search of the source of gold, and finally reached points beyond which it was impossible to find any traces of it on the surface. At these points they found auriferous gravel going into the mountain, and by means of short tunnels run following the pay on the surface of the bedrock, they mined it. It was, however, soon discovered that in going into the mountain, the bedrock, instead of keeping on an ascending grade, pitched away from the face of the mountain on a descending grade inward, and, as a consequence, the influx of water into the working, having no natural drainage, soon

unshaded, lava; A, B, beds of old river channels; M, N, tunnels; X, Y, shafts; vertical scale, 800 feet to an inch.

Surface indications of the presence of an old channel are not always to be found. In case the channel runs directly or diagonally through the divide or mountain spur, at the points of ingress and egress, gravel rich in gold is often found in large quantities, and this, with other indications in connection with it, is considered conclusive evidence as to the locus of the channel. More often, however, as in the case with the two channels indicated in the diagram, they run with the divide, and with entrances so far removed from the ground under examination that they cannot be identified as connected with it, and would be useless if they could, in which instances there is absolutely no direct evidence of the existence of a channel, and it for the time being must be regarded as suppositious or reasonable from analogy. Often these latter-described channels are located so close to the front of the mountain that the ravines and gulches, while not cutting through

them, have crowded so close as to remove some of the gravel and present the indications of a channel entrance. Some of the richest drift mines of the State have been located by tracing up these "break-outs," as they are termed.

If the surface on one of these divides be examined carefully and surveyed and platted, showing the true contours and line of junction of the bedrock and lava (or, as it is locally called, cement), it will, in its general features, resemble the annexed diagram. It will be observed that the surface line of junction of the two formations does not align with contour lines on the surface, but shows considerable variation in relative altitude at different points, and it is this fact that makes it possible to approximate to the varying locus of the hidden channel, other conditions dependent on ascertainable data being favorable. The high bedrock lying between the channel and the face of the hill on both sides is commonly referred to as being the "rims" or "rim-rock" of the channel. Two channels on the same divide, which are of frequent occurrence, each having only the outer rim visible at the surface, complicate considerably the solution of the problem referred to previously, and the approximate determination of the locus of the buried channel by engineering methods alone, and will often render it impossible.

Considering the case delineated by the diagram, suppose a number of cross-sections be made in lines parallel to the line marked "line of cross-section," at supposed right angles to the line of the channel sought for, and at, say, 250 feet apart. In each of these that would cross the upper portion of the diagram, where in each of the channels both rims come to the surface, there would be given the horizontal distance between the point of intersection of the rims with the surface and their difference of level. With two more conditions given, the slope of the rims forward, and the width of the channels, its location in that particular section line could be exactly determined. As to the mean slope angle of the rims, it must be so taken for trial that on applying it in calculation it will locate the channel depression symmetrically between the rims. It is a matter of judgment of the engineer with reference to the ground that is being examined, and it is advisable to try maximum and minimum limits. The probable width of the channel can only be guessed to its most probable figure. A knowledge of the known channels of the locality is the safest guide. The highest maximum of mean slope should not exceed 30°, and for width of channel not over 500 feet. Now, with the data already discussed, the horizontal distance from the surface point of the upper rim to the approximate center of the channel will be equal to one-half the distance from the first-named point to the point in its plane at which the mean slope line passing through the lower rim surface point would strike, the slope angle being the same for both rims, and the difference of level between the plane of the upper rim point and the depression of the channel equal to the half distance referred to above into the tangent of the slope angle, diminished by one-half the assumed width of the channel into the tangent of the slope angle. The graphical method is best suited for obtaining these quantities, no great degree of accuracy being required. The same rules being applied to the other cross-sections, a series of line and grade points will have been obtained, and by comparison an average can be obtained which will check out unconformable extremes, and will also determine points where only one rim is available, as is the case illustrated on the diagram. Having platted the presumed course and grade of the channel on the topographical map, the engineer can readily determine the points from which the channel can be prospected most thoroughly and economically, and, if found to contain enough gold to pay for opening and working, the best available point for that purpose, making use of the additional and exact data acquired in the prospecting.

It will at first consideration seem that, using such inconstant factors and unknown variables as can only be had under the circumstances, it would be impossible to place any reliance on the results so obtained. Such, however, is not found to be the case in practice. The limits for error are usually easily determined, and it is very rarely that an extreme case similar to the hypothetical one considered in this article will occur. More or less underground work can be







Gwynne connected its pumps by means of a tube and globe valve with the condenser of the steam engine; the engine is first started in order to create a vacuum in the condenser, and as soon as this is effected the globe valve is opened, when the water rises in the suction pipe. As soon as the water fills the revolving runner, the labor of the engine is greatly increased, and would cause it to stop if the engineer did not prevent this by opening the steam valve."

(It may be stated as a matter of curiosity that the latest catalogues of that firm carefully avoid mentioning the neat little way by which it primes its pumps, avoiding suction and discharge valves; can it be that Mr. Huet has been telling tales out of school? If so, we have reason to be very grateful to him.)

"No difficulty whatever is now experienced in priming the centrifugal pump; they are now universally placed at a considerable height above the level of the inside water, and the main objection against their use in draining low lands has thus been overcome. It might occur, however, that the water had to be raised higher than was required, as has been the case in the drainage of the Lutke sea. This difficulty, however, is overcome by bending the discharge pipe downward to a point below low water, giving it the shape of a siphon; hence the name siphon-centrifugal.

"The most important change, however, in the centrifugal pump during the last years is without doubt the direct connection of the shaft of the engine with that of the pump, making both one shaft; in this manner the transmission of power by belts, which requires much room, is avoided, and also that by gearing, in the use of which shocks and breakage are likely to occur.

"By this new arrangement room is also saved for still another reason, to wit: Inasmuch as a steam engine acting directly on a pump must be constructed to make a great number of revolutions per minute, one of quite limited dimensions will give the power required. The suction pipe is usually made as short as possible; the most usual arrangement is that adopted in the construction of the pumps constructed in 1875 and 1881 respectively by J. A. Van der Kloes, C. E., at present professor at the Polytechnical University, the one at de Myl at Dordrecht, the other at Delft." (The Pearson district pump follows closely the drawings of these pumping stations. They are contained in the collection of maps above referred to.)

"Barring some small, unimportant modifications due to local conditions, the arrangement of siphon-centrifugal steam pumps is in all essential points always that referred to."

(Prof. Huet wrote his book in 1885.)

"The entire arrangement of the direct acting siphon-centrifugal is a *chef-d'œuvre* in mechanical engineering, which deserves, in many respects, our highest praise; for, by reason of the great piston speed obtained the fast-moving and revolving weights co-operate with the runner filled with water to regularly produce great smoothness of action, all of which is obtained by an arrangement by which advantage can be taken of great steam expansion."

Considering the fact that English, German, French and Italian engineers all seem to agree on one point, to wit: that whenever they have to do anything with water, raising it, fighting it, draining it, or doing anything else with it, they either go to Holland and see how it is done there, or send for a Dutch engineer to do it for them, I think the statements made by Mr. Huet authorized me to write: "That the siphon-centrifugal is now adopted in all large reclamation works in Europe, to the almost entire exclusion of the system formerly applied." It is difficult to take up a Dutch newspaper now which does not state in some way or another that such and such polder is about to construct a siphon-centrifugal instead of its old-fashioned plant. As Mr. Richards wants cases cited, a few are given below; their number can be enlarged at pleasure.

The pumping plant erected at the Stadil fjord; the pumping plant erected at the Stadtpolder, near Dordrecht, in 1881, and that *aan de Myl*, by Dordrecht, in 1875; in addition to the above it may be added that Mr. Huet gives a plan for a direct double-acting, siphon-plunger pump, which he believes could be made to give a higher duty than is yet attained by any siphon centrifugal; the engine and pump are placed above the level of outside water, and the discharge-pipe is projected to gradually widen and to siphon the water to a point below low water; plans and specifications of all of which are at Mr. Richards' disposal. Also, the largest pumping plant in the world, that erected in 1874 by John and Henry Gwynne for the drainage of the Ferrara marshes, discharging 456,000

gallons per minute (see plans in illustrated catalogue of that firm); the 36 siphon-centrifugal, erected by the last-named firm in 1879 for the Sijfoji Inland Water Regulation Company, Hungary (see page 39, catalogue.) I think it will now be in order for that gentleman to come forward and cite us his cases supporting his statement: "that the practice (the siphon action of discharge-pipes) has fallen into 'desuetude' from the face of experience."

III. I confess my ignorance as to the antiquity of "iron pipe," but granting that the idea is as old as say "marriage," that would in itself not prove anything against it; the latter institution is a far from recent innovation and, in most cases at least, it is found to work quite pleasantly; but here again my information does not agree with that of my learned friend, and he will confer a great favor by citing the authority on which the statement, "the idea (of siphon action in discharge-pipes) is as old as iron pipe," is made.

Yours sincerely,  
P. J. VAN LOBEN SELS.

San Francisco, Aug. 6, 1886.

[FROM MINING AND SCIENTIFIC PRESS, JULY 10, 1886.]

### Siphon Action.

EDITORS PRESS:—In your issue of June 5th there is a description of a draining pump made by the San Francisco Tool Co. and some statements respecting such pumps which many of your readers will construe as coming from myself, because of my connection with that company.

This I wish to correct and to add that I am wholly opposed to siphon action in the discharge pipes of any pump unless unavoidable,

ards' letter are reprinted in this number of the Press, and also the reply from Mr. Van Loben Sels. We trust other engineers will come forward and express their opinions on a subject which just now seems to become of paramount interest to the welfare of this State.

[FROM MINING AND SCIENTIFIC PRESS, JUNE 5, 1886.]

### The Siphon Centrifugal Pump.

#### Machinery for Draining Large Tracts.

The San Francisco Tool Company, which has been for some time making a specialty of irrigation and drainage machinery, is now manufacturing a siphon centrifugal pump, combining many advantages over others yet devised for the drainage of large tracts of land. The siphon centrifugal is now adopted in all large reclamation works in Europe, to the almost entire exclusion of the system formerly applied.

Its main features are the connecting of the runner of the pump in a direct manner to the main shaft of the engine, on a level above any possible flood-water; the discharge pipe is conducted over the levee down to a point below the lowest possible low-water mark of the outside stream. No foot or discharge valves of any kind are used, avoiding all friction otherwise inevitably caused by valves. The pump is charged by means of the vacuum created by the condenser. When the pump is stopped, a water-gate, placed at the discharge of the pump, prevents the outside water from siphoning over the levee into the district; the pump, in the meanwhile, remains charged or primed. For the sake of economy of coal, the use of a

given circumstances, which can be increased from a minimum of say 10,000 gallons per minute to a maximum of 60,000 gallons per minute. In practice, of course, actual experience will show which rate of speed will, at a given height, give the most economical results in the consumption of fuel.

This engine has, like all other engines made by this company, received the greatest possible care in its design and workmanship. The working parts are reduced to the fewest number possible without sacrificing its efficiency, and are thoroughly balanced, enabling the makers to guarantee their engines to run at a very high speed. The bearing surfaces are of exceptionally large area, and the lubricating arrangements most perfect. The most of the forged parts are of the best hammered steel, and all the materials used in their construction, as well as the workmanship, are of the best description.

The average of several tests made May 24th and 25th, conducted personally by the agent of the reclamation company, showed its capacity to be 37,907 gallons per minute, at a lift of 11 feet 7 inches, the engine indicating 156-horse power, with a consumption of 4.4 pounds average Sydney coal per actual horse-power of water raised per hour—the most satisfactory and economical showing so far made by any pumping plant.

This plant was constructed for the drainage of the Pearson Reclamation district, in Sacramento county. The order was received on the third day of February, when all plans, patterns, etc., had yet to be made. The entire plant was in running order on the tenth day of April following. The foundation consists of 50 piles, 40 feet long, driven to the hardpan. We are informed that the entire cost of the plant,

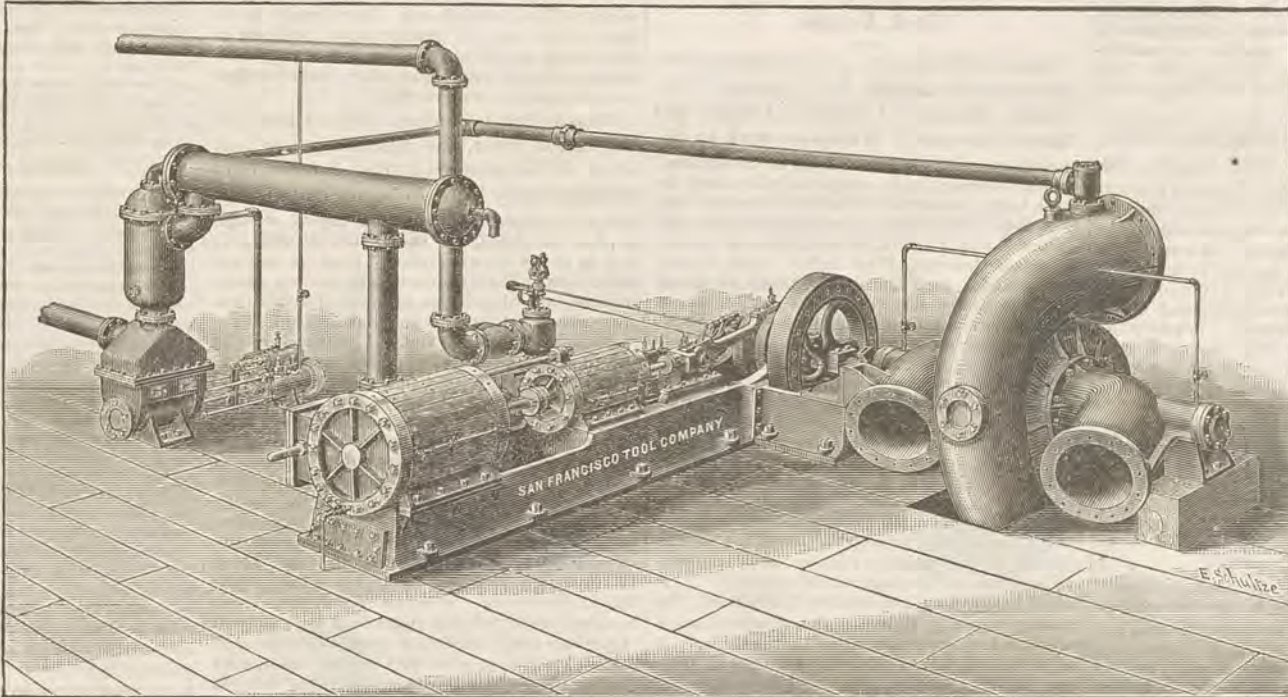
including engine-house, two boilers, 16 feet by 90 inches diameter, and foundation, does not exceed \$20,000, for which sum the Tool Co. thinks it can be duplicated. When such a degree of perfection and such results are now attained by a home company which guarantees all its engines, pumps or tools, and their satisfactory condition, it seems foolish to order from the East from people who are not familiar with local conditions, and whose interest ceases on the delivery of the shipping receipt.

The Pearson Reclamation district is one of the largest and most successful reclamations on this coast. It consists of 8800 acres of very fertile land surrounded by a superb levee of an average height of 18 feet, 15 miles long. During the extraordinary freshets and floods of last winter, the pumping plant, formerly constructed by the San Francisco Tool Company, and consisting of two 15-in. pumps,

constructed for its drainage, proved entirely insufficient to cope with the large body of rain and seepage water. On the 20th of April about 2000 acres were covered with water from 6 to 12 inches deep and 350 acres thereof forming the bed of a lake 5 feet 8 inches deep. Notwithstanding the heavy rains in the latter part of April, and the formidable amount of seepage finding its way through the solid earthen embankments, the 30-inch siphon centrifugal has now drained the entire district, all those lands being now covered with growing crops, even the lake bed being cultivated at the time of this writing.

The pump here illustrated and described is at present pumping the water 14 feet (the difference between the inside and outside water levels), while the inside water is 24 feet lower than the top of the pump. No difficulty whatever is experienced in holding the pump full of water by means of the vacuum, at either a high or low speed of the engine.

Although the San Francisco Tool Company is prepared to construct pumps of every description, and to fill any order which may be given it, we are informed by the company that it believes the siphon centrifugal to combine the greatest advantages, and therefore recommends it to their patrons, by reason of the high duty it insures, the permanency of its construction, the economy of first cost of construction and great saving of running expenses and delays effected. Among the notable advantages insured by this system are the following: 1st. The engine and the pump are above the level of flood-water, avoiding the danger of the inside water, in case of a break in the levee or excessive rain-water ruining the plant or preventing the running of the pump. 2d. The pump being connected directly to the engine, avoids the use of all gearing and belts, at best a nuisance, and the weakest and most expensive part of any plant, causing constant stops, breakage and expense. 3d. The siphon prevents the pump from at any time raising the water higher than the exact difference between the two water levels, even enabling one to take advantage of



THE SAN FRANCISCO TOOL COMPANY'S SIPHON-CENTRIFUGAL PUMP.

as it may have been in the case alluded to.

The statement respecting the arrangement of pumping on this method in Europe "to the exclusion of other methods formerly applied" will be news to those there who erect such machinery. The idea is as old as iron pipes, and the practice has fallen into "desuetude" from the face of experience. No cases being given, I am at a loss to know where the plan has been revived.

The agitation of water in passing through a pump of any kind releases air which lodges in the discharge pipes, and unless continually drawn off by some negative pressure, equal to the difference in the water levels, the siphon action soon ceases.

The employment of a condenser or steam ejector to remove this air takes draining apparatus from the field of simple mechanism so desirable in such cases, and offsets the counterbalancing of advantages.

Instead of such a method coming into use in the Old World, I think no maker of such machinery will, when avoidable, raise water above a discharge level. As before said, I am not aware of the authority on which the statement is made, but must recommend it be taken *cum grano salis*, at least I want no part in its paternity.

J. RICHARDS.  
Pittsburg, Pa., June 25, 1886.

### Large Pumping Plants.

On June 5th we published a description of a large pumping plant lately erected in this State. Its construction deviated widely from the manner heretofore adopted; it called forth some criticisms from a well-known engineer, and our present issue contains a reply from the author of the first article.

In view of the fact of the great importance of the subject, and believing our readers will be pleased to find the various arguments in one issue, both the original article and Mr. Rich-

compound-condensing engine is recommended. Large hand-plates in the sides of the pump facilitate the examination and cleaning of the runner.

The accompanying engraving represents a 30-inch siphon centrifugal pump, connected directly to a compound-condensing engine with variable expansion gear, the latter enabling the engineer, without a moment's loss of time, to change the point in the stroke at which the steam is cut off, and to modify the speed and power of the engine as the change of lift or quantity of water desired to be discharged requires.

This engraving was copied from a photograph taken at the moment the engine was ready to leave the works of the Tool Company for shipment. The gate at the discharge, the suction and discharge pipes, are not shown. The relative positions of the two steam cylinders, the fly-wheel, heater and jet-condenser, clearly appear; also the connection on the top of the pump with the condenser for the purpose of priming the pump and removing any air which might gather there, by reason of possible leaks or from the air always contained in water. The pipe also furnishes the water for the jet condenser, which is supplied to it from a point sufficiently high to relieve the condenser pumps of all work of raising it.

The diameter of the fly-wheel is 58 inches; that of the low and high pressure cylinders 14-inch and 26-inch respectively. In this instance the diameter of the discharge pipe was increased from 30 inches to 40 inches, immediately after leaving the pump, and that of the suction pipes from 23 inches to 28 inches, insuring a small amount of friction (the water running through the pipes at a velocity of 93 feet per second when discharging 38,000 gallons per minute), which arrangement will speedily save in running expenses the slight excess of first cost incurred. The stroke is 18 inches. The number of revolutions is from 130 to 210 per minute, according to the height the water is to be raised or the quantity desired to be discharged under any



the daily changes of the tide-water. 4th. All the working parts of the engine and of the pump are inside the engine-house and above its floor, and within easy reach of the engineer, who can, without disturbing any other part, adjust any part of the engine and remove either manhole plate or side-plate of the pump within two or three minutes. The great delays and expense experienced in cleaning, examining or repairing submerged pumps are thus avoided. 5th. It obviates all earthwork or interference with the levee (always dangerous), and all masonry or bulkheads. 6th. By opening the gate a means for irrigation during the summer months is furnished, as the outside water will at once be siphoned over the levee into the district, a most important feature for reclamations in California.

Mr. P. J. Van Loben Sels, the agent of the reclamation district, is highly pleased with the operation of the pump, and testifies to its efficiency and the results referred to above.

### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

**WHIFFLETREE HOOK.**—Geo. C. Johnson, Fort Bragg, Mendocino Co. No. 346,590. Dated Aug. 3, 1886. This invention relates to a new and useful clip-hook of that class in which a swinging hook overlaps and finds a seat upon a fixed hook, the two forming a ring or link in which the connecting hook, ring or link is confined; and the invention consists in the novel joints formed between the two hooks when engaged and in the peculiar bearing or support for the pivoted end of the swinging hook, together with the general arrangement of parts. The object is to provide a readily-applied connection between a single-tree and the trace, or between a double and single-tree.

**ADJUSTABLE CONNECTION FOR BRAKE-BEAMS.** J. M. Walsh and C. G. Smith, Taylorsville, Plumas Co. No. 346,333. Dated July 27, 1886. In this improvement on wagon-brakes, a connection is made by which the brake-beam may be readily adjusted in order to bring its shoes into proper relation with the wheels. It consists in the adjustable toothed or rack-bar forming one of the system of brake-operating levers and rods, and the pivoted pawl-lever engaging and fixing the adjustment of the rack-bar. Usually the operation of adjusting the brake-beam is long and difficult. The operator has to get under the wagon and with a wrench adjust or relieve the various nuts and bolts in order to change the position of the beam. This difficulty is obviated by this invention, as the work can be easily reached and quickly accomplished.

**WATER FILTER.**—Anthony McLean and Findlay Cumming, S. F. No. 346,304. Dated July 27, 1886. This filter is to be attached to ordinary pipes or faucets for the purpose of cleansing water to be used for household purposes. It consists of an exterior transparent casing and an interior cylindrical column, the sides of which are formed of filtering material, and having a central discharge opening in the bottom. The upper end is screw threaded, and in combination with this is a shank extending upwardly so as to enter the mouth of the faucet, and having connected with it an eccentric, corrugated or other suitable locking device, by which it is held to the faucet, while it is screwed in place, a joint being made by a suitable elastic packing at the top of the outer casing.

**WHIFFLETREE CLIP.**—Geo. C. Johnson, Fort Bragg, Mendocino Co. No. 346,589. Dated August 3, 1886. This clip and swiveled-hook connection consists in a curved clamp or clip for embracing a whiffletree, and having parallel separated jaws; a hollow or tubular bolt passing through the upper jaw and screwed into the lower jaw; a nut seated on top of the bolt, whereby it may be made to tighten up the clamp upon the whiffletree; a block or piece pivoted loosely on the bolt between the jaws; an eye-bolt swiveled in the block or piece, and a hook connected with the eye-bolt. The object of the invention is to provide a simple and effective means for readily attaching and detaching a double-tree to and from any implement without the use of a clevis, and for attaching it to the pole of a vehicle, or for attaching a single-tree to a double-tree.

### Orchards and Vineyards on Debris.

**EDITORS PRESS:**—Having just returned from Amador county, I have to communicate a few facts touching the debris question. I found some of the most flourishing orchards and vineyards on made ground collected by the hard-working Italians from impounded slickens. Such prodigious luxuriance of fruit and foliage, it has seldom been my good fortune to inspect. One and all whom I questioned stated that they did not want hydraulic mining stopped. This is an aspect of the question as agreeable as unexpected.

W. S. KEYES, M. E.  
Member Board of Trustees, S. M. B.

The amount of bullion that comes in from White Pine and Lincoln counties is largely increasing.

### COST OF REFINING 89,394 LBS. RETORTED BULLION.

(See Article on Page 97.)

			Per Cent.	Per pound bullion.	Per pound bluesome.
			Cents.	Cents.	Cents.
Roasting, crushing and sulphurizing.....	(Wages, 575 shifts @ \$3.10..... \$1,629.06 Fuel, 86 cords @ \$7.85..... 676.14 Sulphur..... 60.94)	\$2,365.14	15.1	2.65	0.79
Dissolving.....	(Wages, 586 shifts @ \$3.70..... \$2,166.50 Fuel, 240 cords @ \$7.85..... 1,883.63 Acid, 3,023.65 lbs. @ 1.33 cents..... 4,031.15)	8,083.28	51.7	9.05	2.68
Concentrating.....	(Wages, 27½ shifts @ \$3.50..... \$96.25 Fuel, 77 cords @ \$7.85..... 604.62)	700.87	4.5	0.78	0.23
Crystallizing and packing.....	Wages, 160 shifts @ \$3.58.....	572.09	3.7	0.64	0.20
Cooperage.....	(Wages, 76 shifts @ \$3.61..... \$275.03 Material..... 115.20)	390.23	2.5	0.43	0.14
Repairs.....	(Wages, 76½ shifts @ \$4.17..... \$319.65 Material..... 243.22)	562.87	3.6	0.63	0.20
General.....		2,951.19	18.9	3.30	1.03
Total manufacturing cost.....		\$15,632.57	100.0	17.48	5.27
Copper, 48,039 lbs., paid for @ 15 cents.....		7,205.85		8.06	2.38
Total amounts charged.....		\$22,838.42		25.54	7.65
Wages, 1451 shifts @ \$3.49.....		\$5,059.48	32.4	5.66	1.70
Material.....		7,621.90	48.7	8.52	2.54
General.....		2,961.19	18.9	3.30	1.03
		\$15,632.57	100.0	17.48	5.27

Of the total cost, including copper (\$22,838.42), wages constituted 22 per cent; material, 65 per cent; general, 13 per cent.

### Book Notices.

**RAILWAY OFFICIALS AND DIRECTORS.**—We have received through A. L. Bancroft & Co. "Poor's Directory of Railway Officials and Railway Directors." It is a new work by the publishers of "Poor's Manual of Railroads." A brief summary of its contents will show its value to the industrial interests of the country: 1. A list of the officials of every railroad in the United States, Canada, Mexico, Central America, South America, West Indies, Great Britain and Ireland. 2. A list of the officials of street railroads in the same countries. 3. A list of the directors of all railroad companies in North America, alphabetically arranged, with their addresses. 4. A list of the officials of organizations auxiliary to the railway system, such as fast freight lines and transportation companies, bridge and union depot companies, packet, steamboat and steamship companies, parlor, sleeping-car, equipment, express, and telegraph companies, etc. 5. A list of the officials of industrial establishments dependent on the railway system, such as locomotive, car and bridge works, rail mills, etc. 6. A list of the officials of the leading exchanges and commercial associations throughout the country. 7. A list of the leading contractors throughout the country whose specialty is the construction of railroads and works connected therewith. 8. A list of the officials of new railways now in progress in the country. 9. An alphabetical list of the officials of all the American railways, with a convenient system of reference showing the lines with which they are connected.

This work contains the names of 30,000 persons occupying important official positions, and gives addresses of those permanently associated with the railway interests of the country. The work is neatly printed and bound and is a very useful one for many persons.

**THE TECHNO-CHEMICAL RECIPT BOOK.**—Henry Carey Baird & Co., of Philadelphia, have just issued a very useful hand-book, with the above title, containing several thousand receipts, covering the latest, most important and most useful discoveries in chemical technology, and their practical application in the arts and the industries, edited chiefly from the German of Drs. Winckler, Elsner, Heintze, Mierzinski, Jacobsen, Koller and Heinzerling, with additions by William T. Brannt, graduate of the Royal Agricultural College of Eldena, Prussia, and William H. Wahl, Ph.D. (Heid.), secretary of the Franklin Institute, Philadelphia; author of "Galvanoplastic Manipulations." The work is in one volume of 495 pages 12mo, and is illustrated. The principal aim in preparing "The Techno-chemical Receipt-book" has been to give an accurate and compendious collection of approved receipts and processes of practical application in the industries, and for general purposes. The work is essentially what it claims to be—a receipt book—and all theoretical reasoning and historical detail have been omitted. Popular and simple descriptions have, wherever possible, been preferred to technical and scientific language. The materials have been principally derived from German technical literature, which is especially rich in receipts and processes which are to be relied on, most of them having been practically tested by competent men before being given to the public. In the laborious task of translation and compilation, only the best and latest authorities have been resorted to, and innumerable volumes and journals consulted, and wherever different processes of apparently equal value for attaining the same end have been found, more than one has been introduced. This little work is one

which will be found handy for reference to almost every one, no matter what business or trade they may be engaged in. It is very completely indexed, and covers more branches than we have space to enumerate.

**MODERN STEAM ENGINES.**—Joshua Rose, the well-known writer, has produced a new book which will be much sought for. It is published by Henry Carey Baird & Co., of Philadelphia, and is a treatise on the steam engine, written in plain language, for use in the workshop as well as in the drawing office. It gives full explanations of the construction of modern steam engines, including diagrams showing their actual operation, together with complete and simple explanations of the operations of various kinds of valves, valve motions, and link motions, etc., thereby enabling the ordinary engineer to clearly understand the principles involved in their construction and use, and to plot out their movements on the drawing-board. The work is illustrated by 422 engravings and is sold for \$6. The diagrams explaining the action of each valve motion have been obtained by moving the engine throughout a revolution, and measuring the port openings both for admission and exhaust, at each inch of piston motion. These diagrams, therefore, represent the actual workings of the valves. Where a certain mechanism is to be considered, the engravings first show it as a whole and explain its general action. It is then treated in detail and moved through its various positions, a separate engraving showing each new condition, and a diagram showing the action under each condition. The engravings have been made large, and, in many cases, repeated, so as to render them easy to follow and avoid turning to back pages. The author has endeavored to omit nothing that is essential to those who may begin their studies of the steam engine from the pages of this book. All classes of engines are treated, including portable, marine, fire, pumping, compound, etc. Each subject is complete in itself. The work is full and clear in its treatment and easy to follow. The engravings are of good size, and the typographical appearance of the book excellent. No more complete elementary work of the kind has previously been published, and any one interested in steam engines will find its pages full of valuable material.

### March into Line.

**EDITORS PRESS:**—That the miners of this State should organize is a foregone conclusion, now since the water question has come to the front. The press of the State all talk water for irrigation; the miner and his rights has no consideration, no matter how much money he has expended in ditches or on his mining properties. Since my call for organization I see Plumas county has organized, as is shown in the following item:

The Plumas county miners have formed an association known as the "Feather River Miners' Association." N. Cadwalader is president and treasurer, H. M. Barstow secretary, and Hon. J. D. Goodwin, N. Cadwalader and A. Hall constitute the Finance and Executive Committee. This association has issued a circular to interested parties in Plumas.

If every county of this State has its local organization they will find great good come from it in more ways than one; so organize. There is a coming contest on this water question which is life or death financially to many a miner.

THE OLD MAN OF THE MOUNTAINS.  
Murphys, Calaveras Co., Cal., August, 1886.

### About Obtaining Patents.

#### Patents are Virtually Contracts.

The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, in order that it may afford him complete protection for his invention during the life of his patent.

#### Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which the invention relates. If, by this "preliminary examination," the improvement is found to have been previously invented, our client will receive, for the small sum of \$5 for the examination, a verbal or written report showing definitely wherein his invention has been anticipated, thereby saving him further expense and perhaps much time, anxiety, etc.

To avoid all needless delay, however, and secure patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with \$15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately and forwarded to the inventor for his signature. When he receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of \$20 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give up a case so long as there is a chance of obtaining a patent. The Agency charge, including drawings, rarely exceeds \$40, and for this we do all we can without appealing the case.

#### Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are more satisfactory to the Patent Office than the old cumbersome system of storing up an immense bulk of countless models.

Drawings or sketches, sufficient to illustrate the invention clearly, with a description that will enable us to make a full set of perfect drawings for the Patent Office, is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings often prejudice capitalists and manufacturers against the invention, while in reality it may be of great value, and would meet with ready sale had it been skillfully, completely and artistically portrayed. In all cases prepared by us, the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken to have the invention fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public when the patent is granted.

#### Advantages to Inventors on the Pacific Coast.

The firm of DEWEY & Co. has edited and published the MINING AND SCIENTIFIC PRESS continuously since 1860, a period of 26 years. Few agents, who are still engaged in the business, have had so long-extended practice in patent soliciting. The members of the firm give personal attention to the applications entrusted to their care; and their familiarity with inventions and with local affairs in the Pacific States and Territories, enables them to understand the wants of inventors on this coast more readily and thoroughly, as we believe, than any other agents in America. Thus there is saved a great deal of the time which ordinarily—when distant agents are employed—is wasted in preliminary writing back and forth.

This happy combination of long business experience together, and wide connections, has placed our firm in a position unquestionably most fortunate for affording inventors prompt and reliable advice, and the best facilities for securing their full patent rights with safety and dispatch at uniformly reasonable rates.

Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly-stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording just the circulation best calculated to widely inform the class of readers especially interested in the subject of his invention.

#### Caveats.

A Caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is, that it entitles the caveator to receive notice, for a period of one year, of any application for a patent subsequently filed, which is adjudged to be novel and is likely to interfere with the invention described in the caveat, and the caveator is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from \$10 to \$20. The Government fee is \$10 additional.

To enable us to prepare caveat papers, we require only a sketch and description of the invention.

#### Rejected Applications.

Inventors who have rejected cases (prepared either by themselves or for them by other agents) and desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

Inventors doing business with us will be notified of the state of their application in the Patent Office whenever it is possible for us to furnish such information.

#### DEWEY & CO.,

Patent Solicitors, Office of SCIENTIFIC PRESS, 252 Market St. Elevator entrance, No. 12 Front St., S. F.  
GEO. H. STRONG. W. R. EWER. A. T. DEWEY.



## A Great Repository of Practical and Scientific Information.

One of the Fullest, Freshest, and Most Valuable Hand-books of the Age. Indispensable to every practical man. Just Ready. Price, \$2.00, Free of Postage to any address in the world.

## THE Techno-Chemical Receipt Book:

Containing several thousand Receipts covering the Latest, Most Important, and Most Useful Discoveries in Chemical Technology, and their Practical Application in the Arts and the Industries. Edited chiefly from the German of Drs. Winkler, Elsner, Heintze, Mierzinski, Jacobsen, Koller, and Heinzeling, with additions by William T. Braunt, Graduate of the Royal Agricultural College of Eldena, Prussia, and William H. Wahl, Ph. D. (Heid.), Secretary of the Franklin Institute, Philadelphia; author of "Galvanoplastic Manipulations," illustrated by 78 engravings. One volume, over 500 pages, 12mo., elegantly bound in scarlet cloth, gilt, closely printed, containing an immense amount and a great variety of matter.

Price, \$2.00, free of postage to any address in the world.

**ABSTRACT OF CONTENTS:** Adulterations, Imitations, etc. How to Detect Them; Alloys; Artificial Gems, Pearls, and Turkish Beads; Bitters, Cordials, Elixirs, Liqueurs, Rafadins, and Essences, Extracts, Tinctures, and Waters Used in their Manufacture, and the Manner of Coloring them; Blasting Compounds, Blasting Powder, Dynamite, Gun Cotton, Gunpowder, Nitro-Glycerine, Fulminates, etc.; Bleaching; Boiler Incrustations; Bone, Horn, and Ivory to Bleach and Dye them, and make Imitations and Compositions; Bronzing and Coloring of Metals; Building Materials, Artificial Building Stone, Mortars, etc.; Cocoa and Chocolate; Celluloid, Caoutchouc, Gutta Percha, and Similar Compositions; Cements, Pastes and Putties; Chemical and Techno-Chemical Expedients, Preparations; Cleansing, Polishing, and Renovating Agents; Colored Chalks, Crayons, Pencils, and Inks for Marking Linen, etc.; Confectionery; Copying and Printing; Damaskeening Steel; Decoration, Ornamentation, etc.; Dentifrices and Mouth Washes; Dyeing Woolen and Cotton Goods, and Yarns, Silk, Straw Hats, Felt Hats, Kid Gloves, Horsehair, etc.; Mordants; Electro-Plating, Galvanoplasty, Gilding, Nickeling, Silvering, Tinning, etc.; Enamels and Enameling; Feathers, Ostrich, Marabouts, etc., how to Wash, Restore and Dye; Fire-extinguishing Agents and Means of Making Tissues; Wood, etc. Incombustible; Fireworks; Food and Food Preparations; Freezing Mixtures; Fruit and other Syrups; Fuel and Heating, Heat Insulation (Non-conducting coverings); Fusible Colors used in Porcelain Painting; Glass, Composition of the various kinds of, Colors for, and Processes for Enameling, Engraving, Gilding, Silvering, Pulverizing, Filling, Bending, etc. Glazes for Earthenware; Glass and other Signs; Glue, Manufacture of; Household and Rural Economy; Illuminating Materials; Imitations, Substitutes, etc.; Indigo, Indigotine, and Alizarine; Inks, Lithographic, Printing, and Writing; Jeweler's Foils; Lacquers and Varnishes; Leather, Tanning and Dyeing, including Furs, etc.; Liquors and Beverages: Beer, Brandy, Gin, Whisky, Wines, etc.; Lubricants for Machines, Wagons, etc.; Marine Glue; Matches; Metal Industry; Mustards; Oils and Fats, Animal, Vegetable, and Mineral; Oil Paintings; How to Cleanse, Pack, and Varnish them, and to Restore Gilt Work; Paints and Pigments. Grinding and Mixing Colors, Graining, Imitation of Marbles. Paints and Washes for Various Purposes, etc.; Paper and Paper Materials, Manufacture, Staining, etc.; Glass, Sand and Emery Paper; Perfumery, Aromatic Vinegars, Cosmetics, Extracts, Hair Oils, Pomades, Powders, Washes, Fumigating Articles, etc.; Pharmaceutical preparations; Photography; Plaster of Paris Casts which can be Washed; Preserving Meat, Milk, Vegetables, Vegetable Substances, Wood, etc., and Preservatives; Sealing Wax and Wafers; Sho-Blacking, Dressings, etc.; Sizing and Dressing for Cotton, Wool, Straw, etc.; Soap, Hard and Soft Soaps, Medicated and Toilet Soaps, etc.; Soldering and Solders; Sugars, Glucose, etc.; Textile Fabrics and Tissues; Tobacco, Smoking Tobacco, Snuff, Sternutative Powders, etc.; Vinegar, Manufacture of Ordinary and Fine Table Vinegars; Washing and Scouring, Manufacture of Washing Blue, etc.; Waste and Offal, Utilization of; Water-Glass (Soluble Glass) and its Uses; Water-proofing Compounds; Wax and Wax Preparations; Wood Gilding, Polishing, Staining, etc.; Yeasts, Manufacture of Pressed Yeasts, Bakers' and Brewers' Yeast, etc.; **Addenda.** Alloys; Antiseptic and Preservative Agents; Artificial Eyes, Manufacture of; Asbestos and its Uses; Bleaching; Bookbinding, Gilding, and Ornamenting; Bronzing, Gilding, Silvering, etc.; Building Materials, Celluloid, Imitations, Substitutes, etc.; Cement Work; Cleansing, Polishing, and Renovating Agents; Colors, Enamels, Cements, Glue, Varnishes, Water-proofing Substances, etc.; Copying; Explosive Agents; Glass; Horn Combs, Manufacture of; Lubricants, Blacking, etc.; Metal Industry; Miscellaneous; Oils and Fats; Paper; Straw, Bleaching and Dyeing of; Strength of Materials; Willow-Ware; Index.

A Circular of 32 pages, showing the full Table of Contents of this important book, sent by mail free of postage to any one in any part of the world who will furnish his Address.

**HENRY CAREY BAIRD & CO.,**  
Industrial Publishers, Booksellers & Importers, 810 Walnut Street, Philadelphia, Pennsylvania, U. S. A.



UNCLE Sam has found it at last! A sure remedy for Torpid Liver, Sick Headache, Habitual Constipation, Chills and Fever, and all affections of the Kidneys and Liver. This is a New Compound, and one trial will convince you that it is the Cheapest and Best Remedy in the Market for Diseases of Kidneys, Liver and Stomach. If you want a pure vegetable compound, that is positively guaranteed to contain no mercury, go to your Druggist, and get a Bottle of the Arkansaw Liver and Kidney Remedy. Price, \$1.00 per Bottle.

For Sale by all Druggists.

## ANNUAL MEETING.

The regular Annual Meeting of the Stockholders of the Golconda Mining Company will be held at the office of the company, No. 309 California street, rooms 3 and 4, San Francisco, California, on Monday, the twenty-third (23d) day of August, 1886, at the hour of 2 o'clock P. M., for the purpose of electing a Board of Directors to serve during the ensuing year, and the transaction of such other business as may come before the meeting. Transfer books will close on Friday, August 20, 1886, at 3 o'clock P. M.  
J. M. BUFFINGTON, Sec'y.  
Office—Rooms 3 and 4, No. 309 California Street, San Francisco, California.

**JOHN A. ROEBLING'S SONS CO.**  
**WIRE ROPE**  
GALVANIZED SHIP RIGGING, MINING, TILLER,  
ELEVATOR, TINNED, & COPPER ROPE, SASH CORDS.  
LARGEST WIRE ROPE WORKS IN THE WORLD.  
**IRON & STEEL WIRE OF EVERY KIND.**  
TELEGRAPH WIRE, HARD & SOFT COPPER WIRE  
INSULATED FOR ELECTRIC USE.  
WIRES OF IRON & COPPER, FENCE WIRE,  
SWEDISH IRON WIRE, CRUCIBLE STEEL WIRE.  
TRENTON, N. J. & 14 DRUMM ST. SAN FRANCISCO, CAL.

**CALIFORNIA**  
**ARTIFICIAL STONE PAVING CO.**  
(SCHILLINGER'S PATENT.)  
—FOR—  
**SIDEWALKS, GARDEN WALKS, CORRIDORS, OFFICES, CARRIAGE DRIVES, STABLES and CELLAR FLOORS, KITCHENS, Etc.**

The Courts here and in the East have decided that Artificial Stone Pavements with plastic concrete and in detached blocks, are infringements on the Schillinger Patent; and also, that when the plastic material is blocked off with a trowel and cut through far enough to control the cracking caused by shrinkage, that such pavement is in law the same as if laid in detached blocks, and is an infringement of the patent. All property-owners having such pavements laid without the license of the above Company, will be prosecuted.

**OFFICE, 404 MONTGOMERY STREET, SAN FRANCISCO.**

EGBERT JUDSON, President. ALBERT H. REICHLING, Secretary. G. GOODMAN, Manager.

**Chicago Prices Beaten!**  
ESTABLISHED 1860.  
**S. F. PIONEER SCREEN WORKS,**  
221 & 223 First St., cor. Tehama, S. F.  
**J. W. QUICK, Prop'r.**  
Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Churns, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Out and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 fine.  
Orders Promptly Executed

**PERFECT PULLEYS**  
First Premium Awarded at Mechanics' Fair, 1884.  
**CLOT & MEESSE,**  
Sole Licensed Manufacturers of the  
**Medart Patent Wrought Rim Pulley**  
For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of  
**SHAFTING, HANGERS AND APPURTENANCES.**  
SEND FOR CIRCULAR AND PRICE LIST.  
Nos. 129 & 131 Fremont Street, San Francisco, Cal.

**American Exchange Hotel,**  
SANSOME STREET.

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

**Board and Room, \$1.00, \$1.25 and \$1.50**  
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

**MONTGOMERY BROS., Proprietors.**

**DIVIDEND NOTICE**  
OFFICE OF THE  
**Paradise Valley Mining Company**  
San Francisco, California.

At a meeting of the Board of Directors of the above-named Company, held July 26, 1886, Dividend No. 7, of twenty-five (25) cents per share, was declared, payable immediately at the office of the Company.

W. LETTIS OLIVER, Secretary.

OFFICE—No. 328 Montgomery Street, San Francisco, California.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

## Books on Assaying.

By C. H. AARON.

## PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes thereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

## Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 12mo. pages, with illustrations, well bound in cloth. Price, \$1, postpaid. Sold by DEWEY & Co., Publishers, No. 252 Market street, San Francisco.

## PARTS II AND III.

**Lead, Copper, Tin, Mercury, etc.**

Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

## Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Manipulation, etc.; Lead Ores; Copper Ores; Volumetric Assays; Parting Process; Amalgamation; New Process; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of Zinc Ores, New Method; New Assay of Nickel and Cobalt; Assay of Chromium; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Salt; Appendix to Part I; Notes on Crucible Assays; Weighing by Oscillation; Appendix to Part III; The Assay of Lead; The Assay of Copper.

There are 160 12mo. pages with illustrations in the volume which is bound strongly in cloth. Price postpaid, \$1.75 Sold by DEWEY & Co., Publishers, No. 252 Market St., S. F.

## Testing and Working Silver Ores

An illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride of lime, ammoniac, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroehnke's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel sough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tallies, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

Price, post free, \$2.00. Sold by DEWEY & Co., Publishers, 252 Market St.

## Books on Working Ores.

By GUIDO KUSTEL, M. E.

ROASTING OF GOLD AND SILVER ORES (Second Edition) and the Extraction of their Respective Metals without Quicksilver. By GUIDO KUSTEL, M. E. 1880.

This rare book on the treatment of gold and silver ore without quicksilver is liberally illustrated and crammed full of facts. It gives short and concise descriptions of various processes and apparatus employed in this country and in Europe, and the why and wherefore. It contains 156 pages, embracing illustrations of furnaces, supplements and working apparatus. It is a work of great merit, by an author whose reputation is unsurpassed in his specialty. Price, \$3, coin, postage free. Sold by DEWEY & Co., Publishers, 252 Market St., San Francisco, Cal.

By C. H. AARON.

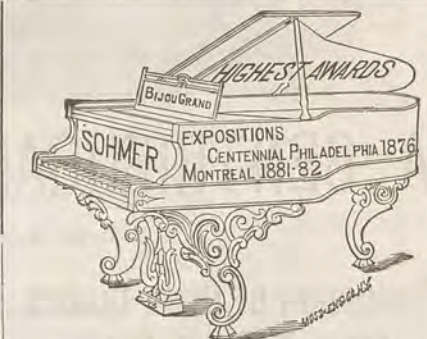
AARON'S LEACHING GOLD AND SILVER ORES, the most complete hand-book on the subject extant; 164 pages octavo. Illustrated by 12 lithographic engravings and four wood cuts. Fully indexed. Plainly written for practical men. In cloth, \$3. Sold by DEWEY & Co., S. F.

## Practical Treatise on Hydraulic Mining.

By AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by DEWEY & Co., Publishers, 252 Market St., San Francisco.

**HEALD'S BUSINESS COLLEGE,**  
24 Post St. S. F.  
Send for Circular.



**SOHMER & CO. PIANOS.**  
**PEEK & SON**  
**BYRON MAUZY,**  
SOLE AGENT,  
922 Market Street, San Francisco, Cal.

SEND FOR CATALOGUE.

## TO MINING MEN.

FOR SALE—2 Triumph Concentrators, good as new; 1 large Rock Breaker, in good order; 1 twelve-inch Heald & Morris Engine, with governor and heater complete, new. Apply at 906 Market St., San Francisco, room 12, from 10 to 4.



WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent

L. R. MEAD, Secretary.

# THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

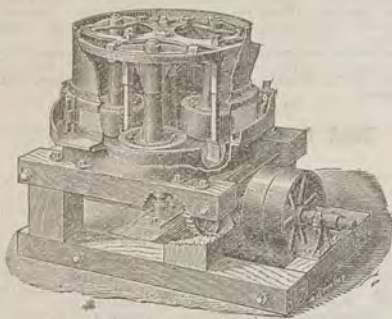
## BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
 AIR COMPRESSORS—Rope Power Transmission.  
 HYDRAULIC PUMPING and Hoisting Machinery.  
 WROUGHT-IRON WATER PIPE a Specialty. *NOTE*—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.  
 SAW-MILL MACHINERY of all kinds.  
 STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
 SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.  
 MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.  
 WILSON'S PATENT GAS-PRODUCER.  
 STEAM BOILERS of all descriptions.  
 SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.  
 STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company

Send for Circular and Price Lists.

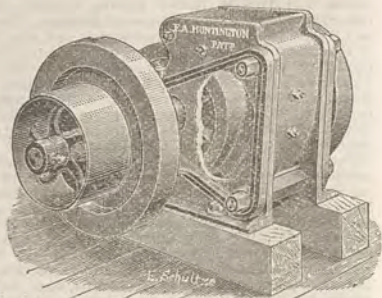


Centrifugal Roller Quartz Mill.

**F. A. HUNTINGTON,**  
 MANUFACTURER OF  
**Centrifugal Roller Quartz Mills,**  
**CONCENTRATORS AND ORE CRUSHERS,**  
 Mining Machinery of Every Description,  
**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.



SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

BEST SOFT LAKE SUPERIOR COPPER USED.

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 &amp; 655 Mission St., San Francisco.

E. G. DENNISTON, Proprietor.

These Plates can also be procured of JOHN TAYLOR &amp; CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

**MACHINE TOOLS,**  
 PRESSES AND DIES,  
**PUNCHING and SHEARING**  
**MACHINERY.**

**F. A. ROBBINS,**

...MANUFACTURER OF...

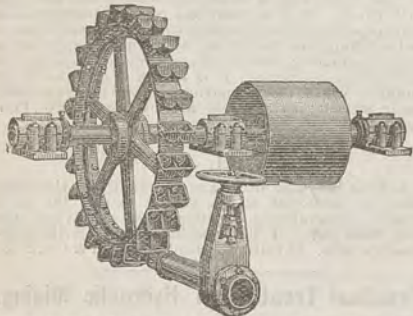
Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

**PELTON'S WATER WHEEL.**

THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent, distancing all competitors. Send for circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

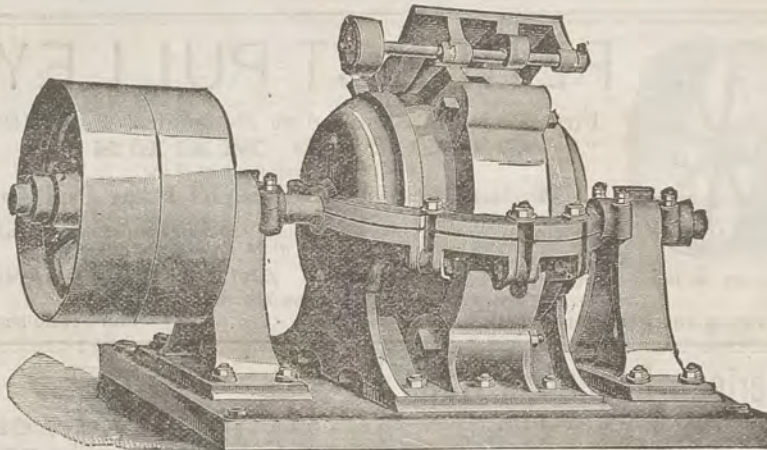
AGENTS—PARKE &amp; LACY, 21 and 23 Fremont Street San Francisco, Cal.

**A Good Opportunity for a Mechanic.**

A variety of good Tools, Patterns, etc., with business for sale cheap by a party retiring from business. A splendid opportunity for an enterprising mechanic.

Address A. B. C., care of this paper.

## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.

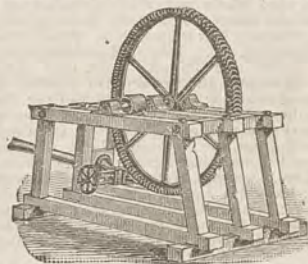
Certificates as to performance of the Mills, and any information required, furnished on application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 &amp; 106 Washington St., NEW YORK.

OR PACIFIC IRON WORKS, SAN FRANCISCO.

## KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.

SEND FOR CIRCULAR.

EDWARD A. RIX &amp; CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco.

## N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

**NATIONAL ASSURANCE CO.,**  
 OF IRELAND.

**ATLAS ASSURANCE COMPY.,**  
 OF LONDON.

**BOYLSTON INSURANCE COMPANY,**  
 OF BOSTON, MASS.

H. M. NEWHALL &amp; CO.,

GENERAL AGENTS,

309 &amp; 311 Sansome St., San Francisco, Cal.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

**MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.**

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

UTAH OFFICE—SALT LAKE CITY, UTAH.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

Huntington Centrifugal

QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,

JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

**Metallurgy and Ores.**

**SELBY**

**SMELTING and LEAD CO.,**

416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY**  
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

**Standard Shot-Gun Cartridges,**  
Under Chamberlin Patent.

C. H. AARON,

**ASSAYER and METALLURGIST,**

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

**WM. D. JOHNSTON,**

**ASSAYER and ANALYTICAL CHEMIST.**

515 California Street,

Between Montgomery and Kearny, SAN FRANCISCO.

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

**JOHN TAYLOR & CO.,**

IMPORTERS and DEALERS IN

**ASSAYERS' MATERIALS, MINE**  
AND MILL SUPPLIES,

CHEMICAL APPARATUS and CHEMICALS, DRUG  
GISTS' GLASSWARE and SUNDRIES, ETC.

114-118 Pine Street, - San Francisco.

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

**Nevada Metallurgical Works.**

NO. 28 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED 1869.

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

J. KUSTEL.

H. KUSTEL.



**METALLURGICAL WORKS,**

318 Pine St. (Basement),

Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.



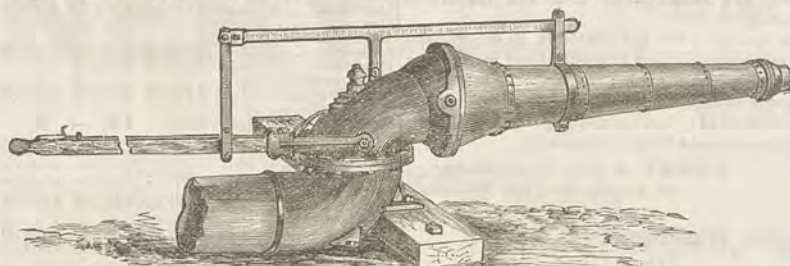
**The California**  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

**FLOUR and OTHER MILLS.**

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco

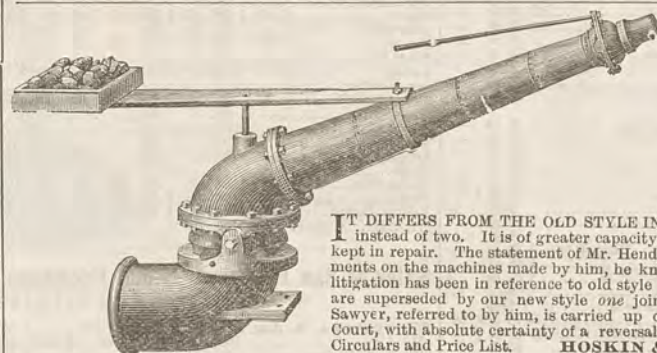
**IMPROVED FORM OF HYDRAULIC GIANTS.**

The above cut illustrates the **IMPROVED FORM OF HYDRAULIC GIANTS**, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. K. Hoskin et als.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco, Cal.



This cut represents our

**IMPROVED**  
**HYDRAULIC**  
**MACHINE.**

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.

HOSKIN & CO., Marysville, Cal.

**THE SCIENTIFIC PORTABLE FORGE**

—AND—

**BLACKSMITH HAND BLOWERS.**

**GUARANTEED**

**The Lightest Running! The Strongest Blast!**  
**The Most Durable!**

**ADAPTED TO ALL KINDS OF WORK,**  
Send for Catalogue! **AND MADE IN STYLES AND SIZES TO SUIT.**

**THE FOOS MANUFACTURING CO., - - Springfield, Ohio**

**Field Seminary for Young Ladies,**

1825 Telegraph Avenue,  
Oakland, - - California.

Address MRS. R. G. KNOX, Proprietor, or MISS FRANCES A. DEAN, Principal.

THE FIFTEENTH YEAR WILL BEGIN  
Wednesday.....July 28, 1886

**QUARTZ BREAKERS!**

—AND—

**Pulverizers Combined.**

To Run by Hand or Power.

Mining Machinery of Every Description; Drawings, Plans and Specifications.

E. I. NICHOLS, 316 Mission Street, S. F.

**THE RUSSELL PROCESS COMP'Y.**

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorey, 529 Commercial St., S. F.

**Engraving**

Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.



## Miscellaneous.

The chlorides of Jefferson, Nev., are taking out good ore.

A COMPANY in Stockton is about to bore wells in that city for natural gas.

QUICKSILVER is higher in price now than it has been for several years.

STOCKS of pig lead in New York July 1st amounted to 3,599,380 pounds.

It requires from two to four per cent more fuel to run furnaces in Leadville than in the valley.

LARGE deposits of oxide of antimony and silver are said to exist in Woodside Canyon, Nevada.

THE shipments from Silverton, Colorado, between January 1st and July 17th, numbered 6900 tons. The *Democrat* says the shipments for the balance of the year will average 100 tons per day.

THE River and Harbor bill has again been changed, the last change being a clause which directs the Secretary of War to bring suit against hydraulic miners to compel them to cease depositing tailings in navigable streams.

THE Copper Queen, the largest copper producer in Arizona, and a mine which has considerable influence on the price of copper in the United States, closed down on the 2d inst. on account of the very low price of copper. The closing is not permanent.

THE V-flume case is on trial in this city. The suit is for damages by the alleged infringement of a patent on the so-called V-flume, which is in use in several portions of California and Nevada. It is a test suit and affects a number of flume companies. The matter has been in litigation for years.

JAMES L. DE FREMERY, son of the banker of this city, has taken the highest honors at the University of Heidelberg. This university, which has just celebrated its 300th anniversary, is confounded by many with the Freiberg mining school, which is an entirely separate and distinct institution.

THE Gold Hill Company's 25-stamp mill, and the hoisting works at the company's mine—the Pioneer (in Idaho), have been destroyed by fire. The hoisting works at the Pioneer mine are not what is known as the Gold Hill hoisting works, being much lighter than the latter. The works will probably be rebuilt at once.

THE Los Angeles *Herald* says: There are many who do not know that the Calico district, in San Bernardino county, got its name from the variety of colors observed on the rocks. They are very pinto, as the Spanish has it. Perhaps a few years ago the place would have been called the "Dolly Varden."

THE Reno *Gazette* learns that the difficulties encountered by S. Wenban in establishing the new leaching works on his mine at Cortez have been overcome and he is now turning out large quantities of bullion. He shipped 50 bars last month weighing about 100 pounds apiece, and over 500 fine. He had to ship them by express instead of freight, which speaks well for their quality.

THE Flagstaff (A. T.) *Champion* says: A vein of free gold, six feet wide, has been struck in the Ruby mine, on the east slope of the Magdalena ridge in Socorro county, New Mexico, which has caused a rush of prospectors to that section, and claims have been taken up for miles around the mine in every direction. There is quite an excitement throughout that country, and rich finds are expected as the result of prospecting.

## Mining Share Market.

Very little is doing now in stocks, the course of mining development being rather slow on the Comstock just now. The 600-level of the Savage is showing better and more extensively in good ore, and the crosscuts on the 3200-level are cutting the vein of good ore found in the west face of the 3200 station of the Combination shaft, and which evidently extends northward. Yet the stock market shows a decline. It would seem that the better the prospect the worse are stocks.

Owing to work in the Crown Point and Belcher mines being suspended for repairs, etc., the payroll of the Comstock on the first of this month was a few thousand dollars less than usual, but that will be all right again in the course of a couple of weeks, when the repairs will be concluded and active mining work resumed as usual. The Yellow Jacket had a spur-wheel broken the first of the week, but a new one was promptly substituted and the work goes right straight along again as usual.

## Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their *SCIENTIFIC PRESS* Patent Agency (S. F.) from week to week and year to year.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.									
COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Bodie Con M Co.....	California.....	5.	50.	June 21.	July 26.	Aug 16.	G. W. Sessions.....	309	Montgomery St.
Con Amador M Co.....	California.....	13.	15.	July 15.	Aug 16.	Aug 31.	F. B. Latham.....	337	Pine St.
Con Imperial M Co.....	Nevada.....	23.	10.	Aug 5.	Sept 8.	Sept 23.	C. L. McCoy.....	329	Pine St.
Dudley M Co.....	California.....	12.	25.	June 21.	July 27.	Aug 16.	J. Stoddard Jr.....	419	California St.
Elmer's Gravel M Co.....	California.....	22.	05.	June 5.	July 23.	Aug 21.	H. Kunz.....	209	Sansome St.
Eureka Con M Co.....	Nevada.....	10.	10.	July 28.	Sept 6.	Sept 25.	E. H. Wilson.....	328	Montgomery St.
Forty-Nine M Co.....	California.....	3.	05.	July 8.	Aug 9.	Aug 30.	A. L. Perkins.....	310	Pine St.
Golden Fleece G M Co.....	California.....	5.	20.	May 23.	July 31.	Aug 21.	W. J. Gleason.....		Pheasant Block
Gould & Curry S M Co.....	Nevada.....	53.	50.	June 21.	July 26.	Aug 17.	A. K. Durbrow.....	309	Montgomery St.
Hale & Norcross M Co.....	Nevada.....	91.	50.	July 16.	Aug 18.	Sept 8.	J. F. Lightner.....	309	Montgomery St.
Indian Spring Drift M Co.....	California.....	6.	03.	July 26.	Aug 30.	Sept 30.	L. H. Sharp.....	213	Sansome St.
Loreto M & M Co.....	Mexico.....	9.	40.	Aug 5.	Sept 6.	Sept 29.	G. T. Bridge.....	224	California St.
Mount Como M Co.....	Nevada.....	1.	10.	July 7.	Aug 14.	Sept 8.	M. Horvowski.....	331	Montgomery St.
Mayflower Gravel M Co.....	California.....	31.	25.	July 1.	Aug 9.	Aug 31.	J. Morizo.....	328	Montgomery St.
New Oso M Co.....	California.....	19.	20.	July 13.	Aug 27.	Sept 13.	J. L. Hunt.....	5	Pioneer Place
Occidental M Co.....	Nevada.....	7.	30.	Aug 9.	Sept 13.	Oct 4.	A. K. Durbrow.....	309	Montgomery St.
Potosi M Co.....	Nevada.....	24.	30.	June 25.	July 25.	Aug 19.	C. E. Elliott.....	309	Montgomery St.
Panaleta M Co.....	Mexico.....	2.	30.	July 14.	Aug 20.	Sept 10.	M. Hergstein.....	330	Sutter St.

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Alta S. M. Co.	Nevada.	W. H. Watson.	302 Montgomery St.	Annual.	Aug 19
Goconda M. Co.	Nevada.	J. M. Bullington.	329 California St.	Annual.	Aug 23
Martin White M. Co.	Nevada.	J. J. Scoville.	300 Montgomery St.	Annual.	Aug 23

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Holmes M. Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	25.	Mar 20
Mono M. Co.	California.	G. W. Sessions.	359 Montgomery St.	25.	Mar 10
Paradise Valley M. Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	25.	July 26
Silver King M. Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Aug 16
Young America M. Co.	California.			40.	May 20

## Mining and Scientific Press.

THE BEST PRACTICAL MINING JOURNAL IN THE WORLD.

Established in 1860, this paper has been eminently successful as a popular and useful mining and mechanical journal. Relative to precious metals especially, it is the leading mining paper of the world.

It is largely patronized by the leading Miners, Mine Owners, Superintendents, Engineers, Metallurgists, Chemists, Manufacturers, Mechanics, Scientific, Professional and Industrial "Men of Progress" on the Pacific Coast and many leading Mining Men throughout the mining fields of the world.

It is by far the best advertising medium in the Pacific States and Territories for Mining, Mechanical, Engineering, Building and Manufacturing Tools and Implements Goods, Supplies, etc.

Being thoroughly able and reliable in its editorial and business management, and long established in the most progressive industrial portion of the Union, at present, its power as an advertising medium is unsurpassed.

Subscription, \$3 a year. Advertising rates, moderate. Send for samples and further information.

DEWEY & CO., Publishers,  
252 Market Street, San Francisco.

## San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Aug. 12, 1886.

ANTIMONY—French Star.	9 1/2 @	—
BORAX—San Bernardino.	— @	8
Armstrong.	— @	6 1/2
IRON—Glengarnock ton.	— @	25 50
Eglington ton.	— @	21 50
American Soft.	23 00 @	24 00
Oregon Pig.	21 00 @	23 00
Clippert Cap. No. 1 & 2.	22 00 @	23 00
Clay Lane White.	22 50 @	—
Shotts, No. 1.	23 50 @	—
STEEL—English, lb.	16 @	25
Black Diamond, ordinary sizes.	10 @	—
Plow.	4 @	5
Machinery.	5 @	6
Sanderson Bros.	10 @	—
COPPER—		
Braziers' sizes.	20 @	—
Fire-box sheets.	20 @	—
Bolt.	19 @	—
Sheeting.	18 @	—
Ingot.	12 @	13
LEAD—Pig.	4 65 @	4 75
Bar.	7 @	—
Pipe.	7 @	—
Sheet.	8 @	—
Shot, discount 10% on 500 bag.	Drop, 1/2 bag.	1 65 @
Buck, 1/2 bag.	1 85 @	—
Chilled, do.	2 05 @	—
ZINC—German.	9 @	10
Sheet, 7 1/2 ft. 7 to 10 lb. less the cask.	7 1/2 @	—
QUICKSILVER—By the flask.	35 75 @	36 00
Flasks, new.	1 05 @	—
Flasks, old.	85 @	—
TINPLATE—Coke.	5 85 @	—
Charcoal.	6 75 @	—

## New York Metal Market.

Telegraphic advices dated August 11th give the following New York prices:

BORAX—6 1/2 @ 7 1/4 c.  
BAR SILVER—9 1/4 per oz.  
COPPER-LAKE—\$10.12 1/2 @ 10.25.  
IRON—No. 1, \$17.00 @ 18.00; No. 2, \$15.00 @ 16.00.  
LEAD—\$4.85 @ 4.95.  
QUICKSILVER—43 @ 43 1/2 c. per lb.

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Quiet but steady; Lake offered at 10.20c. Transferable Notices (Lake) offered at 10.20; Transferable Notices (Chili Bars) offered at 4.39.

LEAD—Nominal at 4.80c. Transferable Notices (Domestic) issued at 4.80.

TIN—Steady, closing at \$21.65 @ 21.70. Transferable Notices issued at \$21.75c.

SILVER—New York, 91 1/4 per oz. London, 42d. MAKER'S PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge, \$15.00 @ 16.00. Hudson River, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge, \$15.00 @ 16.00. Southern, Grade No. 1, \$18.00 @ 18.50; No. 2, \$17 @ 17.50; Grey Forge, \$15 @ 16.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$21.80 @ 22.00; Billiton Tin, \$21.90 @ 22.50; Banca Tin, \$22.40 @ 22.80; Baltimore Copper, \$9.25 @ 9.40; Orford Copper, \$9.25 @ 9.40; P. S. C. Copper, \$9.25 @ 9.40; Foreign Lead, \$4.80 @ 4.90; Foreign Spelter, \$4.80 @ 4.85.

ALL misfits, ocularly demonstrated errors of refraction, carefully diagnosed. C. Muller, the leading optician, 135 Montgomery street. x

## Inducements to Subscribers.

To favor subscribers to this paper, and to induce new patrons to try our publication, we will furnish, to those who pay fully one year in advance of date, if requested, the following articles (while this notice continues) at the very greatly reduced figures named at the right:

- 2.—World's Encyclopedia, 794 pages, 1200 illustrations (exceedingly valuable).....\$0.50
- 3.—Dewey's Patent Elastic Binder (cloth cover), name of this paper stamped in gilt..... .50
- 6.—To New Subscribers, 12 select back Nos. of this paper.....Free
- 7.—Any of Harper's, Frank Leslie's and most other first-class U. S. periodicals, 15 per ct. off regular rates.
- 9.—Pacific Coast and Eastern Bibles, Books and Periodicals, except special publications, we can usually give 10 to 15 per cent off advertised retail rates.
- 10.—Picturesque Arizona, 380 pages, in cloth and gilt. .25
- 11.—Californian, 100 pages, Magazine, 1880 to 1882 (3 Vols.) single Nos..... .03
- Per volume, unbound, 5 Vols..... .20
- Per volume, bound, cloth back and stiff paper sides, about 600 pages. (Send two-cent stamp for sample)..... .40
- 14.—Dewey's Pat. Newspaper Fileholder (18 to 36 in.) .25
- 15.—Life among the Apaches, 322 pages, stiff cloth. .25
- 17.—Architecture Simplified, 60 pages..... .15
- Webster's Dictionary, 634 pages, with 1500 illustrations; very handy and reliable..... .50
- De Groot's History of Mining in California, 16 pages. .05
- Beautiful Poetic Review, entertaining and instructive, 35 pages (a handsome and pleasing present)..... .25

NOTE.—The cash must accompany all orders. Address this office, No. 252 Market St., S. F.

Send for any further information desired. Inform your neighbors about our offers and paper. Sample copies of this paper mailed free to persons thought likely to subscribe.

## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING AUGUST 3, 1886.

- 346,716.—ANTI-FRICTION BEARING—L. W. Boyer, S. F.  
346,473.—WASHING MACHINE—Gooch & Olsen, Bellingham, W. I.  
346,547.—PORTABLE BOOK-HOLDER—Mary J. Holt, S. F.  
346,589.—WHIFFLETREE CLIP—G. C. Johnson, Fort Bragg, Cal.  
346,590.—WHIFFLETREE HOOK—G. C. Johnson, Fort Bragg, Cal.  
346,766.—GANG-PLOW—E. H. Nicholson, Santa Maria, Cal.  
346,682.—BOOT-JACK—Wm. Quinlan, Punta Arenas, Cal.  
346,776.—BOOT-PROTECTOR—L. C. Rodenberger, Medford, Ogn.  
346,624.—VEHICLE SHAFT—W. L. Walker, Brooks, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

## Practical Hydraulics.

By P. M. RANDALL.

A Book for Civil Engineers, Miners, Millmen, Hydraulicians, Mining Engineers, and Irrigators.

This new work is by one of the most experienced hydraulicians of the country. It abounds with useful tables for ready reference, in which the results of abstruse calculations are all placed in a form so that one can find what he wants in a moment. For the engineer the principles, formulae, coefficients, etc., are given; and for those not familiar with higher mathematics, examples, rules, and tables are prepared. Thus the needs of the scientist and the practical miner or millman are each met. It is the most complete work on the subject yet published, and is specially applicable to the Pacific Coast.

## Table of Contents.

The following brief abstract of the contents will give an idea of the branches of the subject treated:  
General Plan; Discussion of the Principles of Hydraulics; Rules Deduced from Formulas Obtained; Examples and Calculations; Extensive Tables for Ready Reference; Fundamental Laws of Hydraulics Demonstrated, and Expressed in Formula and Rules; Flow of Water through Openings; Weir Coefficients; Triangular Weirs; Flow of Water Over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow Through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water Through Short Tubes and Compound Tubes; Flow of Water Through Pipes; Tables of Velocities and Cubic Feet Flows for Given Fall per Mile and Diameter of Pipe; Coefficient for Bend—Circular and Angular; Flow Through Nozzles; Inverted Siphons; Flow of Water in Open Channels; Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

Price, \$2.00, post-paid. Sold by DEWEY & Co., Publishers, 252 Market St., San Francisco.

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

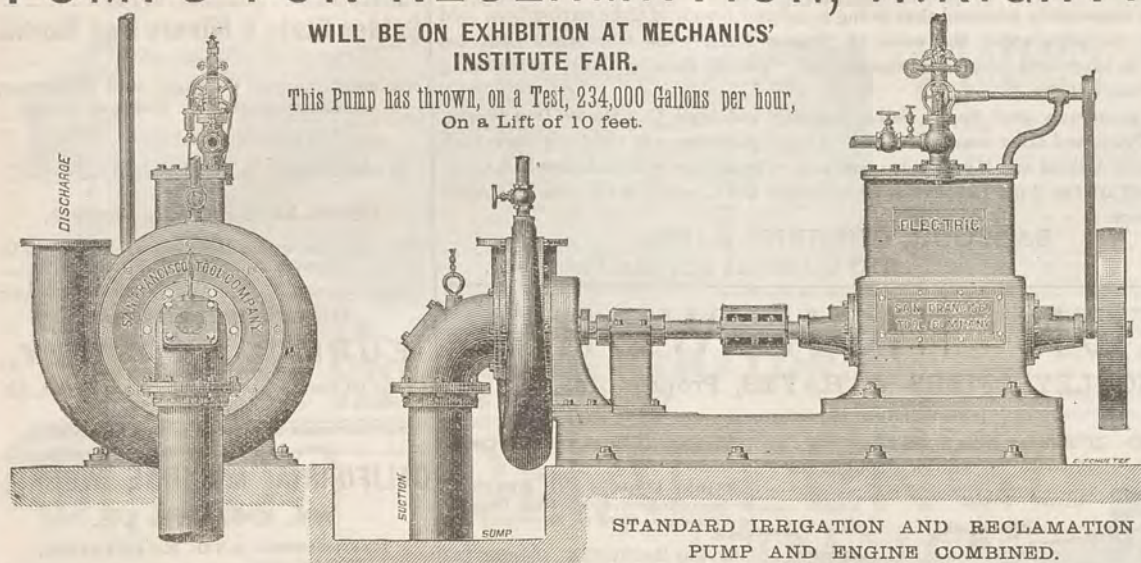
NAME OF COMPANY.	WEEK ENDING July 22.	WEEK ENDING July 29.	WEEK ENDING Aug. 5.	WEEK ENDING Aug. 12.
Alpha.....	.75	.90	.85	.90
Alta.....	.60	.75	.70	.75
Andes.....	.35	.40	.40	.40
Argentina.....	1.20	1.25	1.25	1.25
Belcher.....	1.60	1.80	1.60	1.65
Best & Belcher.....	1.60	1.80	1.60	1.65
Bullion.....	.40	.40	.40	.40
Bonanza King.....	.10	.10	.10	.10
Belle Isle.....	.10	.10	.10	.10
Bodie Con.....	1.45	1.75	2.70	2.85
Bodie Tunnel.....	.10	.10	.10	.10
Bulwer.....	.75	.95	.85	.90
California.....	1.40	1.75	1.65	1.60
Challenge.....	.15	.25	.25	.25
Champion.....	1.4	2.25	2.10	2.35
Chollar.....	1.4	2.25	2.10	2.35
Confidence.....	2.60	3.00	2.75	2.90
Con. Imperial.....	.15	.15	.15	.15
Con. Virginia.....	1.40	1.75	1.65	1.60
Con. Pacific.....	.10	.10	.10	.10
Crown Point.....	1.10	1.15	1.15	.85
Day.....	.35	.35	.35	.35
Eureka Con.....	3.05	3.25	2.75	2.25
Eureka Tunnel.....	.20	.20	.20	.20
Exchequer.....	.20	.20	.20	.20
Grand Prize.....	1.15	1.30	1.55	1.55
Gould & Curry.....	1.15	1.30	1.55	1.55
Goodshaw.....	2.55	2.80	2.80	3.05
Hale & Norcross.....	2.50	2.50	2.15	2.50
Holmes.....	2.50	2.50	2.15	2.50
Independence.....	.30	.45	.45	.35
Julia.....	.30	.45	.45	.35
Justice.....	.30	.45	.45	.35
Martin White.....	1.95	2.10	2.35	2.35
Mono.....	.60	.95	.85	1.00
Mexican.....	.60	.95	.85	1.00
Mt. Diablo.....	.60	.95	.85	1.00
Northern Belle.....	.85	1.15	.75	.90
Navajo.....	.50	.50	.60	.65
North Belle Isle.....	.85	1.15	.75	.90
Occidental.....	.10	.10	.10	.10
Ophir.....	1.40	1.60	1.35	1.45
Overman.....	.25	.25	.30	.15
Potosi.....	.65	.85	.80	1.20
Pinal Con.....	2.75	4.20	3.10	3.45
Savage.....	2.75	4.20	3.10	3.45
Seg. Belcher.....	.85	.95	.85	.95
Sierra Nevada.....	.85	.95	.85	.95
Silver Hill.....	.75	.75	.75	.75
Silver King.....	.75	.75	.75	.75
Scorpion.....	.10	.10	.10	.10
Syndicate.....	.20	.20	.20	.20
Toga.....	.55	.70	.65	.75
Union Con.....	.55	.70	.65	.75
Utah.....	.85	.90	.90	1.35
Yellow Jacket.....	1.25	1.40	1.25	1.40

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., Aug.
----------------------



## PUMPS FOR RECLAMATION, IRRIGATION, AND DREDGING.



WILL BE ON EXHIBITION AT MECHANICS' INSTITUTE FAIR.  
This Pump has thrown, on a Test, 234,000 Gallons per hour,  
On a Lift of 10 feet.

PIT. VERTICAL,  
BULKHEAD, TURBINE,  
CENTRIFUGAL AND  
LOW-LIFT PUMPS.

WE MANUFACTURE ALL KINDS OF  
Machine Tools, Including Engine  
Lathes, Drilling Machines, etc.  
Horizontal, Single Acting, Compound Condensing, and  
Automatic Steam Engines.

Cast Iron Sectional Boilers, Horizontal and Vertical  
Tubular Boilers, Water Valves, Water and Steam Fittings,  
Hydraulic Jacks, etc.

Mill Rolls Ground and Corrugated. SEND FOR CIRCULAR.

**SAN FRANCISCO TOOL CO.**

Works, First and Stevenson Sts., San Francisco, Cal.

## H. P. GREGORY &amp; CO.

Nos. 2 and 4 California St., - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

## MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING  
MACHINERY.

FRANK & CO.'S WOODWORKING  
MACHINERY.

NEW HAVEN MANUF'G CO.'S MA-  
CHINISTS' TOOLS.

BEMENT & SON'S MACHINISTS  
TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM  
PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND  
EXHAUSTS.

SHIMER MATCHER HEADS.

BRAINARD MILLING MACHINES.

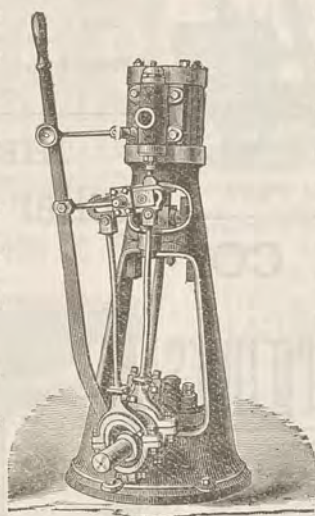
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISH-  
ERS.



YACHT ENGINES.

WILLIAMSON BROS' HOISTING  
ENGINES.

ATLAS ENGINE WORKS ENGINES  
AND BOILERS.

PAYNE'S VERTICAL AND HORI-  
ZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS  
AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECT-  
ORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACK-  
ING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACK-  
ING, PAINT, ETC.

## FRESNO COUNTY.

## BRIGGS' SELMA TRACT.

## THIS COLONY

Has been subdivided into 20-acre lots with convenient **ROADS AND DITCHES** on the land.

Situated 1½ miles N. W. of **SELMA** (a fast-growing Railroad town 15 miles S. W. of Fresno and the second in the County) and 2 miles S. of Fowler, also a Railroad town.

IT IS FIRST-CLASS

**Fruit,  
Vine, and  
Alfalfa  
Land,**

Some of it being specially adapted to Gardening. It has

## SUPERIOR WATER PRIVILEGES,

Having a main Canal 60 feet on the bottom, running through the land and all necessary main distributing ditches, making it a very desirable location for a Colony, as its

## WATER AND RAILROAD FACILITIES

Cannot be surpassed in the County.

**TO BE SOLD CHEAP,  
AND ON EXTREMELY EASY TERMS TO ACTUAL SETTLERS.**

## HOME SEEKERS!

DON'T MISS THIS OPPORTUNITY!

Correspondence solicited and lands shown free of charge.

L. SHARPE, Selma, Cal., or O. J. WOODWARD, Fresno, Cal.

## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

## GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and  
GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

## JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast-  
ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and  
saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

## BANDMANN, NIELSEN &amp; CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

A. T. DEWEY. } Dewey & Co.'s Scientific Press Patent Agency { ESTABLISHED  
W. B. EWER. }  
GEO. H. STRONG. } 1860.

INVENTORS on the Pacific Coast will find it greatly to their advantage to consult this old, experienced, first-class  
Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal  
nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original  
cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies.  
The information accumulated through long and careful practice before the Office, and the frequent examination of  
Patents already granted, for the purpose of determining the patentability of inventions brought before us, enabled  
us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not  
few. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

THE CONSUMERS' COMPANY.  
VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.  
SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank  
Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**

213 California Street, San Francisco, Cal.

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of ref-  
erences. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.



NOTICE TO  
**MINING MEN,**  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.

Engineers' Tables of Progress

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, etc., address:

**INGERSOLL ROCK DRILL CO.,**

REPRESENTED BY

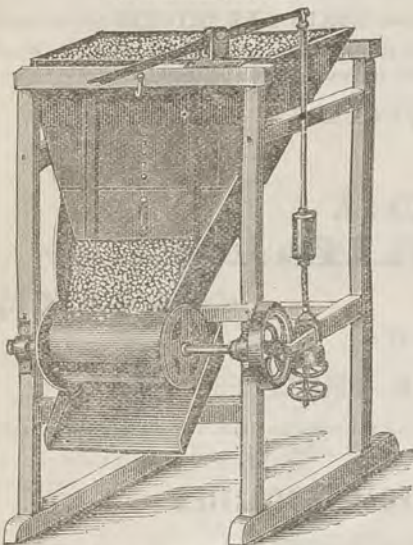
**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

## THE ROLLER ORE FEEDER

[Patented May 28, 1882.]

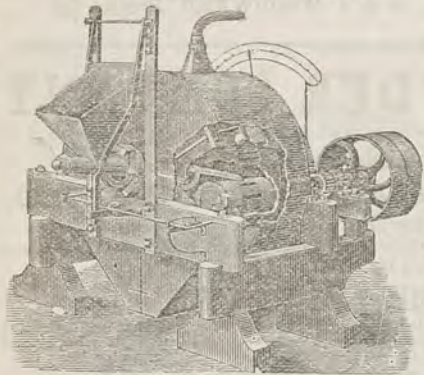


This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required. In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.  
Sole Manufacturers,  
237 First Street, San Francisco, Cal.

**Tustin's Pulverizer**  
WORKS ORE WET OR DRY

FULTON IRON WORKS, S. F.



MANUFACTURED BY

**HINCKLEY, SPIERS & HAYES,**

**San Francisco Cordage Factory.**

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.  
Extra sizes and lengths made to order on short notice.

**TUBBS & CO.**

611 and 613 Front St., San Francisco

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**

316 California St., San Francisco.

## FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

## ENGINES AND BOILERS

OF ALL KINDS,  
Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

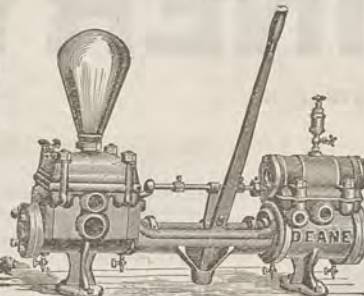
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**

**FRASER & CHALMERS.**

CHICAGO, ILL.  
U. S. A.

General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.

Mexico Office:  
No. 11  
Calle de San Juan  
de los Rios  
Mexico

UTAH OFFICE—SALT LAKE CITY, UTAH.

PERFORATED METALS FOR  
REVOLVING and SHAKING-SCREENS,  
JIGS & STAMP BATTERIES.

Denver Office:  
No. 248  
15th Street,  
Denver,  
Colo.

## Iron and Machine Works.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery  
of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

**EUREKA FOUNDRY,**

139 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

BUILDER OF

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines

Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. **ORDERS SOLICITED.**

### UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

### STEAM ENGINES, BOILERS AND ALL

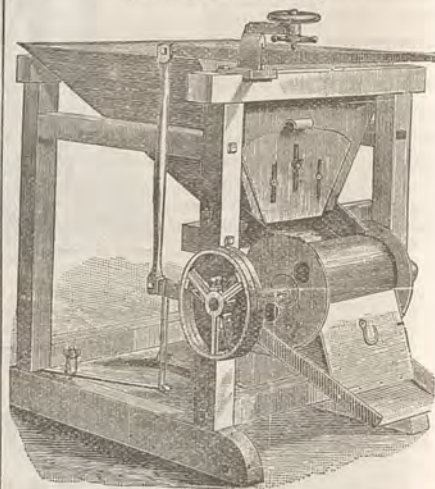
Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front Street, Between N and O Streets,  
SACRAMENTO, CAL.

## THE ORIGINAL Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Challenge" Ore Feeders for any character of ores; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ores.

Prices furnished upon application to

**JOSHUA HENDY MACHINE WORKS,**  
39 to 51 Fremont St., San Francisco.

**RICHARD C. REMMEY, Agent,**  
**Philadelphia Chemical Stoneware Manufactory,**  
1100 East Cumberland St., PHILADELPHIA, PA.

Manufacturer of  
all kinds of  
Chemical Stoneware  
—FOR—  
Manufacturing  
Chemists.  
Also Chemical Brick  
for Glover Tower.

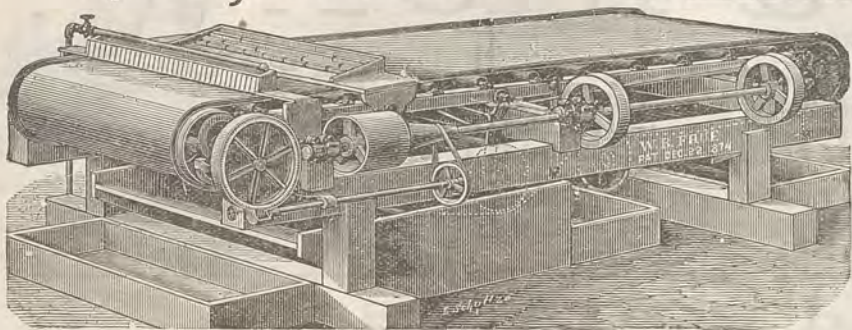
### INVENTORS, TAKE NOTICE

**L. PETERSON, MODEL MAKER,**

258 Market St., N. E. cor. Front (up stairs), San Francisco  
Experimental machinery and all kinds of metal, tin  
and Brasswork.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS**  
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

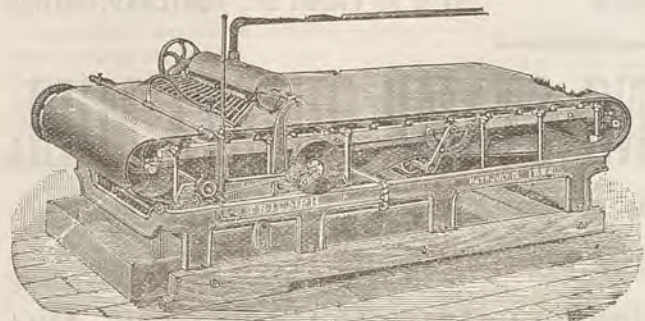
ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street.

SAN FRANCISCO, CAL.

# \$1,000 CHALLENGE ACCEPTED, PRICE, FIVE HUNDRED AND FIFTY DOLLARS

(\$550.00).



**THE  
"TRIUMPH" ORE CONCENTRATOR.**

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

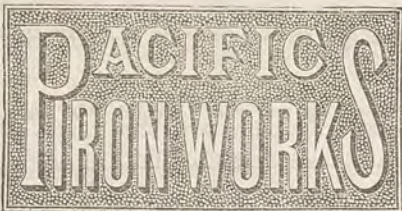
They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE, placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.



1850. 1835.  
**RANKIN, BRAYTON & CO.,**  
BUILDERS OF  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING and REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

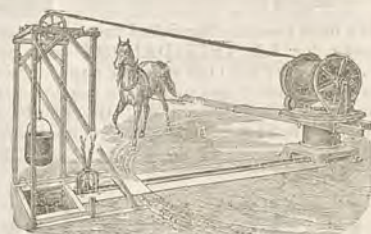
## WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



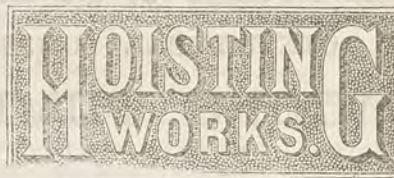
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves ALL THE AMALGAM GOLD and SILVER that ESCAPES THE BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



## BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700-pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE OF CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.  
J. O. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

## STEAM, AIR, AND HYDRAULIC MACHINERY.

**Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

## UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

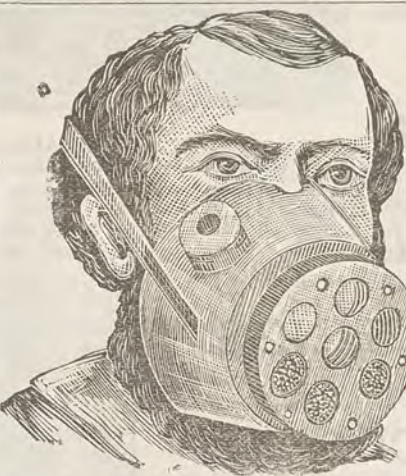
## CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

**STEIGER & KERR, Occidental Foundry,**

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.



## PATENT LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning  
and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, Threshing and Stock-driving, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. B. JEWELL, Sole Agent,  
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.

## THE JENKINS STANDARD PACKING



IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the Jenkins Standard Packing can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing," and is for sale by the Trade generally.

Manufactured only by

For Sale by  
DUNHAM, CARRIGAN & CO., San Francisco, Cal.

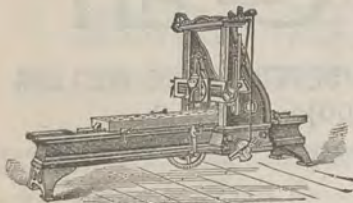
JENKINS BROS. 71 John St., New York



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



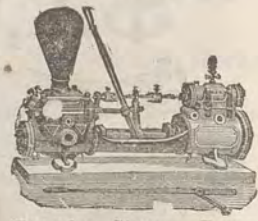
Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

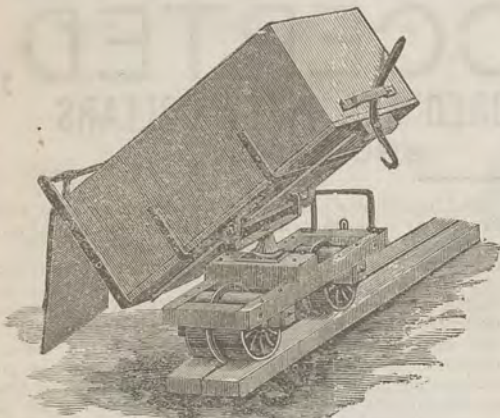
Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.



Knowles Steam Pump  
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.



JAMES' PATENT ORE CAR.

This Car has two double Tread Wheels that carry it on two pieces of scantling laid side by side, two inches apart, making a track ten inches wide for the car driver to walk upon, and only requires a narrow space in the tunnels or drifts for the track. **PRICE, \$35.00.**

We have recently furnished the contractors the machinery for LA TRINIDAD (300 tons per day) and SILVER QUEEN (100 tons per day). These mines are located in Mexico and owned in London. The Process is the Wet Concentration and the plants are, without doubt, the most substantial and complete ever built.

# TATUM & BOWEN,

34 & 36 FREMONT ST., Donahue Building, SAN FRANCISCO.

91 & 93 FRONT ST., PORTLAND, OREGON.

## JAMES' PATENT ROCKING STAMP QUARTZ MILL.

**PRICE, \$850.00.**

CAN BE SEEN IN OPERATION AT OUR WORKS.

It is the **CHEAPEST, SIMPLEST, MOST DURABLE** and **EFFECTIVE MILL** for the Reduction and Amalgamation of Gold Ores.

**NO WEAR EXCEPT ON SHOES AND DIES.**

Combined weight of Boss and Shoes (1400 lbs.) is alternately imparted to EACH Shoe with any requisite degree of rapidity.

It saves a higher percentage than any other machine, and requires no skilled labor to set up and run. Weight, 3000 pounds. Capacity, 6 tons in 24 hours through No. 40 Screen. Requires 4 H. P.

# JOSHUA HENDY MACHINE WORKS.

(INCORPORATED SEPTEMBER 29, 1882.)

Nos. 39 to 51 Fremont Street,

San Francisco, Cal.

**MANUFACTURERS OF**

**NEW and Dealers in SECOND-HAND BOILERS, ENGINES and MACHINERY OF EVERY VARIETY.**

Steam Pumps of all Makes,

CENTRIFUGAL PUMPS,

MINING PUMPS.

BLOWERS AND EXHAUST FANS.

LEATHER and RUBBER

**BELTING.**

LUBRICATING COMPOUNDS and OILS

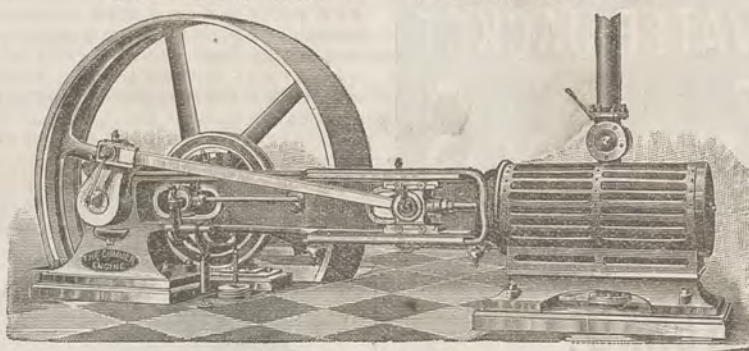
OF THE BEST MAKES.

PIPE and PIPE FITTINGS.

Brass Goods

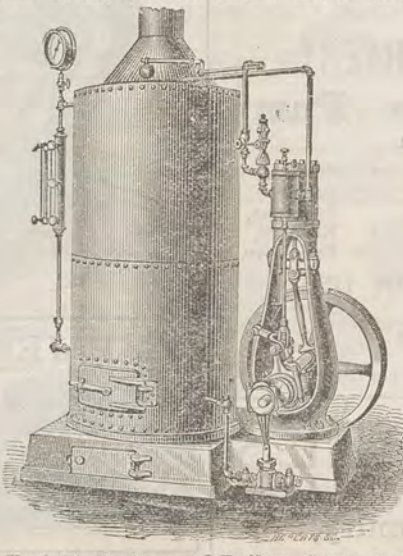
AND  
FITTINGS.

Hydraulic Mining, Quartz, and Saw-Mill Machinery, Hydraulic Gravel Elevators, Hydraulic Giants, "Triumph" Ore Concentrators, Automatic Ore Feeders.



SPECIAL AUTOMATIC ENGINES.

[Manufactured by the Cummer Engine Co., of Cleveland, Ohio.]



Upright Engines and Boilers Connected.

Stationary, Portable, and Hoisting

**ENGINES and BOILERS.**

Shafting,

Pulleys,

Boxes,

Hangers.

**WOODWORKING MACHINERY,**

—COMPRISING—

BAND SAWS, STICKERS, PLANERS, SHAPERS, SHINGLE MILLS, Etc.

**IMPROVED**

**Single and Double Circular Saw-Mills.**

AGENTS FOR THE SALE OF

"Cummer" Engines, from Cleveland, Ohio,  
Porter Manufacturing Co.'s Engines and Boilers.

"Baker" Rotary Pressure Blowers.

"Wilbraham" Rotary Piston Pumps

"Boggs & Clarke" Centrifugal Pumps.

The Volker & Felthousen M'fg Co.'s

Buffalo Duplex Steam Pumps.

P. Blaisdell & Co.'s Machinists' Tools.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, AUGUST 21, 1886.

VOLUME LIII.  
Number 8.

## Head Waters of the Snake.

In a recent interview our traveling representative gleaned the following items, of a prospecting trip in Wyoming to the head waters of Snake river, from K. P. Plowman, one of Idaho City's "placer kings." "Yes, I have been up to the head waters of the Snake, and I think it the finest country that ever laid out-doors," said Mr. P. in answer to a question. "In July, 1885," he continued, "a party of seven of us from Boise county, fully equipped for prospecting with a two months' supply of grub, started to investigate that country, leaving the Utah Northern at Market lake. Traveling through the Teton basin, a quasi-valley fairly timbered extending along Perry's river and covering a scope of country about 14x60 miles, we crossed the Teton mountains by the only available pass (during the summer months) into a valley and foothill country on the south fork of the Snake, known as the Jackson basin. The source of the Snake is a beautiful lake at the upper or northern end of the basin, known as Jackson lake. This body of water is a superb one, and for sublimity and picturesque beauty cannot be excelled. It is about 15 miles wide by 30 miles long, and as clear and placid as a polished cut-glass mirror. The background of shrubbery, towering pines and snow-capped peaks extending from the water's edge toward and against the scattering clouds, and reflected in its crystal depths, makes a scene worthy of the painter's brush, and worth a season's cleanup. The 'Reptile,' as some designate the Snake, is nearly 600 feet wide at its source, the lake, and its course toward the Columbia entitles it to a name that would indicate a serpentine course. The formation is cement gravel until the lake is reached. The river bars prospected well; some went 30 colors to the shovel. Above Lake Jackson no prospects were found worth noting. Twenty miles below the head of the Snake we prospected a distance up on the Grosventre river, which resulted in our locating several claims. This river has considerable fall, and water can easily be made to cover the bars. Owing to having no lumber, nor machinery with which to cut any, we were unable to do any sluicing. No quartz float was noticeable on the entire trip. We prospected the Snake a distance of nearly 200 miles. The advantages enjoyed by mining men in that region are unsurpassed. Why that great basin of good agricultural, stock-grazing and mineral lands has not been settled up ere this I cannot imagine. Some of us will more than likely go back this season and look after our placers. Should matters shape themselves so as to demonstrate the mining interests to be worthy of mention, the MINING AND SCIENTIFIC PRESS will hear from us." The best route for prospectors reaching this new field is via the Oregon Short Line and Utah Northern.

IF TWO persons agree with the third to furnish necessary supplies to the latter, as the same shall be required, for discovering and locating lodes for the joint benefit of all, the latter may treat this a condition precedent, and upon failure to furnish the supplies he may abandon the enterprise, or he may proceed to discover and locate lodes in his own right, without regard to the contract.

SILVER.—On Wednesday 100,000 ounces of crude silver sold in this city at 90½ cents per ounce; and 100,000 ounces of refined at 90¼ to 90½ cents.

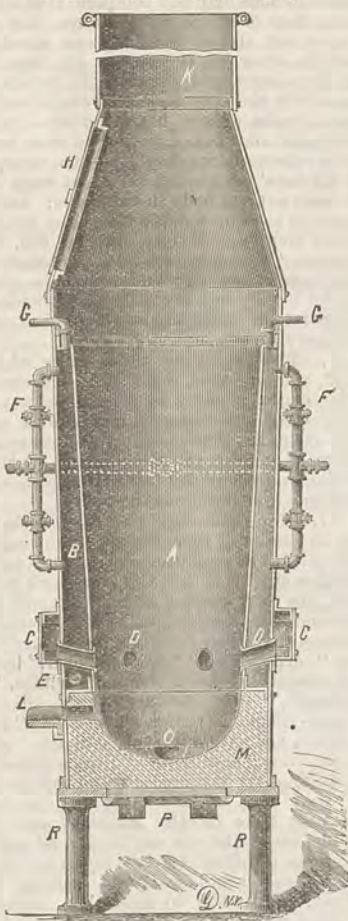
## Foundry Notes.

The Risdon Iron Works have shipped two large air-compressors to the Empire mine, Grass Valley.

The Fulton Iron Works have about completed the large dredger to be used by the Government in dredging the mines. They will shortly commence work on the engines and boilers for the ferry steamer of the South Pacific Coast R. R. Co.

The difficulties between the strikers and the

Vertical Section Through Slag-lip.



WATER JACKET COPPER FURNACE.

Union Iron Works have not yet been settled.

The Pacific Rolling Mills are now very busy on orders, keeping employed a full force of men. The roadbed of the Broadway cable road, Oakland, is completed. The Mill Co. now make a specialty of cable railroad construction.

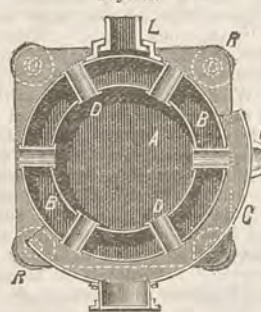
The Pacific Iron Works have been turning out the usual amount of work. Among the recent shipments may be mentioned: Another 40-ton smelting plant for the Selby Smelting Works; a 10 stamp silver mill for the San Antonio Company in Mexico; a 40-ton gold mill, with six Duncan concentrators, for the Golden Eagle Company; a 100-ton gold mill for the Quartz Hill Company; a set of hoisting works for the North Star mine, together with an equipment of Duncan concentrators for the mill; a concentrating plant for the Gypsy Queen Company of New Mexico; several Duncan concentrators have also been recently shipped to various mines in Central and South America, as well as the various Australian colonies, Japan, etc.

It is said that electricity is going to be used in the process for working Meadow Lake ore.

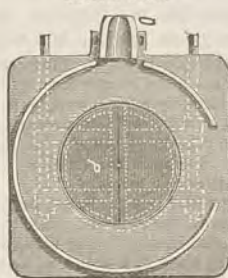
## Water-jacket Furnaces.

The engravings on this page show the construction of the water-jacket furnaces used on this coast for the smelting of oxidized and other copper ores. They consist simply of a casing, B, with an outer and inner shell of iron, between which water freely circulates. Some 25 to 30 gallons of water are required per minute for this purpose. The inlet of the water is through the pipes F; the outlet is through G. Hand-holes, E, in the bottom of

Horizontal Section Through Tuyeres.



Bottom Plate.



this space, are arranged to permit ready access for cleaning. Most western water contains lime, and the water-space of the water-jacket scales almost as rapidly as a boiler, thus making these hand-holes imperative.

The blast is carried around the furnace in the circular casing C, and enters through the tuyeres D. Opposite each tuyere there is a hand-hole (and an eye-hole) in this casing which permits ready access to the interior of the furnace. The outer shell of the furnace is continued down some distance below the water-jacket and there forms the casing of the crucible.

The interior of the crucibles is lined with fire-brick and clay, M. This clay bottom of the crucible rests on the hinged iron doors, P, which can be dropped at any moment, when the furnace is blown out, to remove accretions in the crucible, or for any other purpose. The slag lip L, attached to the shell of the furnace, carries off the cinder. The tapping-notch, O, is used for tapping the metal produced. The whole furnace stands on four iron pillars, R, and is covered by the hood, H, leading to the stack, K. The hood, H, has a charging-door

cut in it. The level of the charge is generally kept a foot below the bottom of this charging-door.

A furnace of this class, 42 inches in diameter at the tuyeres, and 9 feet high, driven by a No. 4½ Baker blower, run 100 to 120 revolutions per minute, will readily smelt 40 tons of ore per day. With an increased amount of blast, an average of 50 tons has been smelted in these furnaces, and even 60 tons have been put through; but the experience at Globe and elsewhere has proved that this forced rate of smelting leads to an increased loss of copper in the slag and is not economical. Excellent smelting can be done in these furnaces when the rate of smelting is not pushed much above 40 tons per day. The charging of these furnaces is done, like that of an iron furnace, in horizontal layers, charges of coke, ore, and the necessary fluxes alternating in regular order.

## Our Sunstrokes.

The occurrence of three cases of sunstroke on a single day in July in California, where such unfortunate phenomena are exceedingly rare, has given rise to much discussion among meteorologists and physicians. The ingenious in matters of theory have done their best to explain this singular outcropping. According to the monthly circular of Dr. Tyrrell, Secretary of the State Board of Health, there was one death from "thermic fever" in Sacramento, in the person of a man who, in the army, had had a sunstroke years before. The second case occurred in Oroville, in the practice of Dr. J. H. M. Karsner, who reports that the man, aged 36 years, had walked a mile in the sun, and on returning home lay down in the cellar, complained of great heat and thirst, became unconscious, and died in two hours after seizure.

The third case is reported by Dr. A. P. Tartar, of Tehama, in the person of a man aged 72 years, of temperate habits. He was a bridge-tender, and obliged every morning to inspect the bridge as the trains passed over. As he was making this inspection he was stricken down on the bridge, and when found conveyed to his home, where he soon became unconscious and died in about two hours. Dr. Tartar is of the opinion that the unusual moisture in the ground from the abundant and late rains of winter had produced that degree of humidity in the atmosphere which makes sunstroke possible. He remarks that sloughs and ponds usually dry at this season are still holding water, and their evaporation must add something to the cause.

This idea seems reasonable enough, for the most obvious difference between our conditions and those at the East is that we have dry-heated air and they humid. It would seem, however, that if the air be so changed by heavy rainfall in winter, or large supply in sloughs, etc., it could also be thus affected by evaporation from extensive irrigated areas. Such does not, however, appear to be the case, for there are regions where the ground has become so overcharged with water that tule grows in low places, and water can be had in wells at a depth of four feet or so, and yet no case of sunstroke has been reported. In short, though there is the strongest testimony that drainage must be had to take off the surplus water or else much of the country would be swamped, there is still no dangerous humidity in the air. It seems to us that the matter must be further investigated.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eps.

## Can Lode Mining be Studied as a Business?

[Written for the Press.]

The query which I use as a heading is suggested by the well-known fact that Eastern capitalists who invest in mining claims on the Pacific Coast regard it as a matter of no importance whether their local manager is or is not possessed of mining experience. Under the evident belief that any man can "run" a mine, they send out incompetent light-weight creatures as their superintendents, and when these fail in returning dividends, the blame is laid on the mining ground and not on the management. So common have failures become from that cause, and the unskillful selection of properties to be handled, that Western mining is now regarded in Eastern cities as a sort of lottery, in which little else than blanks are drawn. The farmer who, without suitable training, embarks heavily in commercial city business, soon descends to his own level, and goes back to the country a wiser and poorer man. The court practice of the lawyer does not give him instruction in the growing of pumpkins, nor does the using of chisels teach a carpenter how to shoe mules. The large dry-goods merchant does not want a farm laborer as a clerk, and yet he has often by his vote aided in selecting mining superintendents on no more tangible grounds. I believe the query which forms the caption to this letter can be answered in the affirmative. As a business, mining requires close observation of "indications," patient investigation of natural laws by which it is affected, great administrative ability, and persevering, vigorous application on established and approved lines of action. The skillful miner must be ready to meet changes in his surroundings at any moment. If, with increased depth, his decomposed surface ores become refractory sulphurets, he ought to know what to do in order to extract their metal. A "tender-foot" superintendent is puzzled in such a case, and the property under his care is depreciated, if not even abandoned.

## What Old Miners Have Learned.

Thirty years ago very few men on the Pacific Coast possessed practical mining skill. All were learners, and, when the Comstock was discovered, that became the great training school for the whole country. So late as 1863 it was only necessary to concentrate a little of the muddy water below the Gold Hill quartz mills to understand how much there was still to learn ere mining and milling would go hand in hand in saving the precious metals.

The sulphurets running to waste daily were worth thousands of dollars, and at the mines a lack of assortment, and a general belief that the available ores were inexhaustible, led to careless management. The streets of Virginia City were at one point made solid and smooth by quartz which now would pay well at the mills. Out of these crude mining and milling practices has come the skillful treatment of all kinds of ores for which our Western States and Territories are justly acquiring fame over the whole world.

We are practically only at the beginning of our career in that direction, and a vast unknown field has still to be brought under control. The prospectors who branched out from the Comstock in early times and found new mineral belts and qualities of ore, forced our foundry and ore-reduction men into new lines of investigation. Such pioneers going from one camp to another, and if they found nothing to suit them, traveling for years through States and Territories, learned a great deal in their progress. If they failed to learn it was because they did not possess discriminating ability.

If they were observant they discovered the fact that paying, valuable mines had always certain geological environments. Either they were contact veins between two favorable formations, or were in a kindly primitive or metamorphic rock, in which ore bodies could live. On the other hand they learned, often by costly experience, that deposits of ore in hard limestone apart from any other formation, were not to be depended upon. They found that streaks of ore resembling veins in trachytic porphyry, or in slates where they followed the cleavage, would prove uncertain in depth. With years of observation and much labor, those of them who read while they pondered came after a time to be able to recognize a mine when they saw it, even if unopened. If they examined a quartzite reef, such as a California millionaire paid a large price for, because it showed rich surface ore, they were able to laugh at his "greenness" and decide that his reputation as a miner was anything but sustained by that stupid investment. The intelligent explorer and mine-owner is still prosecuting his educational researches. If he is stationary he falls behind his compeers in a very discouraging way. If he is not aware of this he is in no condition to keep in the van of his calling. In 10 years from now even the silly investors in mining claims from Eastern States may be led to admit that the miner, as well as the grocer, can

learn some things in his business that other persons could not be expected to know.

## The Science of Metallurgy

Must advance, side by side, with the practice of mining, if we, as a mining community, are to make the greatest possible progress. If the successful lode miner does not himself possess scientific knowledge, he ought to welcome it from afar as his coadjutor, and pay for it with a liberal hand. This, no doubt, will come to be a general custom in the future, and hence pre-eminent scientific ability and knowledge will everywhere deservedly command an encouraging premium.

There is a wider field for the scientist, who is ambitious to unlock Nature's secrets, than for the miner; but the latter has still a wide enough domain to more than exhaust his capacity for patient research, if he will but enter upon it with discretion and zeal.

## What Miners Learn by Blunders.

A good many years ago a silver lode reputed to be of great promise was offered to a mining man at \$10,000. He sent a half-educated expert to examine it, and later on his old foreman, and both reported favorably. He saw it himself, and could not fail to admit that for several hundred feet along its course it showed rich ore three to four feet wide. He wanted to do some work on it, but that privilege was denied. He finally bought it and after spending \$14,000 in labor, got out 40 tons of ore that assayed about \$40 per ton.

Away back in the long departed ages, nature painted a mineral lode that in the 19th century was to bamboozle and financially cripple a particular man.

It was a trap so skillfully baited that its real nature could only be detected, without labor, by the aid of previously acquired experience. The bait, in the form of ore, was neatly plastered along the surface about half an inch in thickness, and all beneath was nothing but a barren flinty quartzite. The deception was complete, but never again can the victim be lured into a similar blunder. Too little mining knowledge in his case was found to be a "dangerous thing." With his failure came the sneering insinuations from local newspapers which were common in such cases—"We knew it would end in this way," "Just as might have been expected from the man." Only a few months before these same newspapers had praised the buyer of the painted ledge for his far-seeing wisdom in securing the property ere it became widely known. In those early days small mining communities who singly and in groups had traveled hundreds of miles over sandy deserts to make "a raise" were naturally more liable to blame persons than mines if failure came to a camp.

Fortunately, in our better-informed times, editors of local newspapers display wisdom and judgment such as our pioneer journalists did not possess. The trans-desert adventurers of our day have learned by experience, too, that it is only in rare instances that mountains surrender their mineral treasures without a long and vigorous siege in which brains, money and hands must unitedly engage.

CENDA.

## The Lower Springs Mines.

EDITORS PRESS:—Please give space in your valuable columns for a few remarks relative to this forsaken but not forgotten camp. There are now very few miners, but those that are left are striving hard to show to the public that there are good mines here. There appears to be considerable excitement in the surrounding mining camps, but few people care anything about Lower Springs mines because so many different parties have failed to accomplish anything in milling or mining.

The Elizabeth Longly mine, better known as the Muchmore mine, is the most promising one yet discovered in this part of California. It has a tunnel run upon the ledge a distance of 150 feet, showing excellent ore all the way, and a well-defined large ledge with talc-slate formation on the hanging wall. This ledge runs east and west, pitching north at angle of 40 degrees. They also have an incline down 70 feet upon the ledge, 30 feet of which is below the tunnel level. This gives them a large body of stopping ground. The pay shoot of the richest rock is 100 feet wide, extending to the depth obtained, and is, I believe, the grandest prospect for a big mine in Northern California.

The Muchmore mine was condemned by two different parties, and was sold by the second party to Muchmore for \$20. The Muchmore Bros. possess great energy and faith in their mines and the camp in general. They are great workers, honest to themselves and their fellow-miners. All this makes them good men for building up a lost camp.

Mr. White, of the White Oak and Eastern Star mines, is laboring earnestly toward holding on to his three claims, hoping for better times.

## Rockford and Hargrave Mines.

The Rockford, better known as the Jones mine, is having an incline sunk upon the ledge just west of the old workings which was done many years ago, and is panning out very fine prospects. This mine was famous among the rich prospects of early days.

The Hargrave mine has a shaft upon the ledge 35 feet, shows some very fine milling ore, and is a very large ledge.

J. C. F.

Lower Springs, Shasta Co., Cal., Aug. 10th.

## The Miner's Ten Commandments.

Looking through an old scrap-book a few days since, says the *Cœur d'Alene Record*, we found an illustrated copy on blue paper of the "Miner's Ten Commandments," sent from California 36 years ago by Hiram Aikens to his family in Vermont. Even in these days they will well repay perusal. It is possible that there are old-timers who read them in 1849 or '50. The reader's imagination must supply the illustrations.

I. Thou shalt have no other claim than one.  
II. Thou shalt not make unto thyself any false claim, nor any likeness to a mean man by jumping one; whatever thou findest on the top above, or on the rock beneath, or in a crevice underneath the rock—or I will visit the miners around to invite them on my side; and when they decide against thee, thou shalt take thy pick and thy pan, thy shovel and thy blankets, with all that thou hast, and "go prospecting" to seek good diggings; but thou shalt find none. Then, when thou hast returned in sorrow shalt thou find that thine old claim is worked out, and yet no pile made thee to hide in the ground or in an old boot beneath thy bunk, or in buckskin or bottle underneath thy cabin, but hast paid all that was in thy purse away, worn out thy boots and thy garments, so that there is nothing good about them but the pockets; and at last thou shalt hire thy body out to make thy board and save thy bacon.

III. Thou shalt not go prospecting before thy claim gives out. Neither shalt thou take thy money, nor thy gold dust, nor thy good name, to the gaming table in vain; for 21, faro, poker, etc., will prove to thee that the more thou puttest down the less thou shalt take up; and when thou thinkest of the wife and children, thou shalt not hold thyself guiltless, but—insane.

IV. Thou shalt not remember what thy friends do at home on the Sabbath day, lest the remembrance may not compare favorably with what thou doest here. Six days thou mayest dig or pick all that thy body can stand under, but the other day is Sunday; yet thou wastest all thy dirty shirts, darrest all thy stockings, mend thy clothing, chop thy whole week's firewood, make up and bake thy bread, and boil thy pork and beans, that thou wait not when thou returnest from thy long-tom, weary. For in six days' labor canst thou not work enough to wear out thy body in two years; but if thou workest hard on Sunday also, thou canst do it in six months, and thou, and thy son, and thy daughter, thy male friend and thy female friend, thy morals and thy conscience, be none the better for it, but reproach thee, shouldst thou ever return with thy worn-out body to thy mother's fireside.

V. Thou shalt not think more of all thy gold, and how thou canst make it fastest, than how thou wilt enjoy it after thou hast ridden rough-shod over thy good old parents' precepts and examples, that thou mayest have nothing to reproach and sting thee when thou art left alone in the land where thy father's blessing and thy mother's love hath sent thee.

VI. Thou shalt not kill thy body by working in the rain, even though thou shalt make enough to buy physic and attendance with. Neither shalt thou kill thy neighbor's body in a duel, for by "keeping cool" thou canst save his life and thy conscience. Neither shalt thou destroy thyself by getting "tight," nor "high," nor "corned," nor "half-seas-over," by drinking smoothly down "brandy slings," "gin cocktails," etc. Neither shalt thou suck "mint-juleps" nor "sherry cobbles" through a straw, nor gurgle from a bottle the "raw material," nor "take it neat" from a decanter, for while thou art swallowing down thy purse, and thy coat from off thy back, thou art burning the coat from off thy stomach, and if thou couldst see the houses and lands, and gold-dust, and home comforts clearly lying there—"a huge pile"—thou shouldst feel a choking in thy throat; and when to that thou addest thy crooked walkings, and hiccuping talkings, of lodgings in the gutter and broilings in the sun, of prospect holes half full of water, and of shafts and ditches, from which thou hast emerged like a drowning rat, thou wilt feel disgusted with thyself and inquire: "Is thy servant a dog that he will do these things?" Verily I will say, Farewell, old bottle; I will kiss thy gurgling lips no more. And thou, slings, cocktails, punches, toddies and juleps, forever farewell. Thy remembrance shames me; henceforth "I cut thy acquaintance," and headaches, tremblings, heart-burnings, blue-devils, and all the unholy catalogue of evils that follow in thy train.

VII. Thou shalt not grow discouraged, nor think of going home before thou hast made thy "pile," because thou hast not "struck a lead," nor found a "rich crevice," nor sunk a hole upon a "pocket," lest in going home thou shalt leave four dollars a day, and go to work, ashamed, at 50 cents, and serve thee right; for thou knowest by staying here thou mightest strike a lead and \$50 a day, and keep thy manly self-respect, and then go home with enough to make thyself and others happy.

VIII. Thou shalt not steal a pick, or a shovel, or a pan, from thy fellow-miner; nor take away his tools without his leave; nor borrow those he cannot spare, nor return them broken, nor trouble him to fetch them back again; nor talk with him while his water rent is running on; nor remove his stake to enlarge thy claim; nor undermine his bank in following

a lead, nor pan out gold from his "rifle-box," nor wash the "tailings" from his sluice's mouth. Neither shalt thou pick out specimens from the company's pan to put them in thy mouth, or in thy purse; nor cheat thy partner of his share; nor steal from thy cabin-mate his gold-dust to add to thine.

IX. Thou shalt not tell any false tales about "gold diggings in the mountains" to thy neighbor, that thou mayest benefit a friend who hath mules, and provisions, and tools, and blankets he cannot sell—lest in deceiving thy neighbor, when he returneth through the snow, with naught save his rifle, he present thee with the contents thereof.

X. Thou shalt not commit unsuitable matrimony, nor covet "single-blessedness" nor forget absent maidens, nor neglect thy "first love;" but thou shalt consider how faithfully and patiently she awaiteth thy return; yea, and covereth each epistle that thou sendest with kisses of kindly welcome—until she hath thyself. Neither shalt thou covet thy neighbor's wife, nor trifle with the affections of his daughter; yet if thy heart be free, and thou love and covet each other, thou shalt "pop the question" like a man, lest another more manly than thou art should step in before thee, and thou love her in vain, and in the anguish of thy heart's disappointment thou shalt quote the language of the great, and say, "such is life," and thy future lot be that of a poor, lonely, despised and comfortless bachelor.

A new Commandment give I unto thee—if thou hast a wife and little ones that thou lovest dearer than thy life—that thou keep them continually before thee, to cheer and urge thee onward until thou canst say, "I have enough—God bless them—I will return." Then, as thou journeyest toward thy much-loved home, with open arms shall they come forth to welcome thee, and falling upon thy neck, weep tears of unutterable joy that thou art come; then, in the fullness of thy heart's gratitude, thou shalt kneel before thy Heavenly Father together to thank Him for thy safe return. Amen—so mote it be!

## Oseola District, Nevada.

This district is situated on the western slope of the Snake range of mountains, in White Pine county, Nevada, at the northern base of Jeff. Davis peak, which rises 13,300 feet above the ocean, and is 120 miles southeast of Eureka, the terminus of the Eureka & Palisade Railroad, and 93 miles west of Frisco, the terminus of the Utah Southern Railroad. It is connected with both railroads by a good wagon road, over which the heaviest machinery can be transported at all seasons of the year. With Eureka the district has a tri-weekly connection via the White Pine Stage Co.'s coaches, carrying the U. S. mails and Wells, Fargo & Co.'s express, and with Frisco it has a semi-weekly connection via Beers' Stage Line, carrying Pacific express. The altitude of the district is 7400 feet above sea level.

The geographical situation of the district renders it a "competitive point" as between the different railroads, and freights are cheaper than to any other point in Nevada. Snake valley, 18 miles to the east, and Spring valley, lying immediately under the district, two of the most prolific valleys in the State, produce an overabundance of hay, grain and all kinds of vegetables and small fruits, which are sold at cheaper rates than the same products command in California.

The geological formation is slate, quartzite and limestone, the slate lying near the base of the mountain, quartzite overlying the slate, and limestone capping the whole. The district is deeply indented by a bold gulch or ravine, which heads near the center of the mineral belt and flows thence three-fourths of a mile in a northerly direction; thence making a short curve it flows westerly for a distance of three miles and discharges into Spring valley. Along the bed and bars of this gulch and its short tributaries are immense deposits of auriferous gravel, varying in depth from 10 to 200 feet. From these gravel beds and deposits there has been taken, during the last ten years, by the most simple process (that of the common '49 rocker), over one-half million dollars in gold-dust. The gold-dust thus obtained is what might justly be termed coarse gold, the grains or nuggets varying in value from a few cents to as many thousands of dollars. One nugget found in the sand near the surface of the gulch contained over \$6000, and with it is connected a very romantic history. All the grains or nuggets of gold have more or less quartz adhering to them, and this quartz is identical with that found in the ledges and veins on the hillsides above.

Four miles from the above mines, on the edge of Spring valley, is an abundance of water for milling purposes by steam power. The water will have to be raised with pumps to a height of 20 feet. Wood can be obtained in abundance delivered at the mill for \$3 per cord.—*White Pine News*.

OIL YIELD OF SOUTHERN CALIFORNIA.—The production of oil in the Adams and Santa Paula canyons aggregates 250 barrels per day, and the Sespe 50 barrels. The production in La Puente and Petrolia amounts to 160 barrels daily. San Fernando turns out about 650 barrels per day. The aggregate, 1110 barrels per day in this part of the State, is a good beginning, but is a small affair compared with the 10,000 barrels that will be obtained in a short time.—*Los Angeles Herald*.



### The Great Question of the Day.

The country still continues in the throes of the great question of labor. There is no other theme before the people of such magnitude—none which involves such varied and important interests. But the really dangerous feature of violence, with which the issue was first inaugurated, has passed comparatively out of sight, and has been relegated to the place where it belongs—to a few banded and imported anarchists—men who have no interests in common with labor; men who are the enemies of all labor and all progress save that upon the downward way to desolation and ruin. The honest and intelligent workmen of this country know that violence is not an American remedy. They know that here the workingman may become the employer of next year, and they know that such advancement can be brought about only by industry, sobriety and peace.

Since our last issue strikes have become more emphatic in this city, and it is to be regretted that one instance was accompanied with some acts of violence; but we are gratified to be able to state that there is no evidence that any of the strikers were either participants or abettors in any such acts. The rioters were of that miserable, useless class of beings who are commonly known as "hoodlums," and who are seldom known to be guilty of seeking for or doing an honest day's work.

#### There Are Three Parties

To this movement as it now stands—the organized and combined societies or labor unions, the unorganized workmen, and the capitalists and employers. The first, though very small in number, as compared with the unorganized workers, are nevertheless strong by virtue of combination. The second comprises "the silent many," who are ever ready to enjoy any substantial gain which may be fairly won by the few who are organized. These comprise the great bulk of the conservative masses, who will never become a party to any undue aggressive measures which may be instituted by their more aggressive friends in the labor organizations. The labor unions cannot succeed in any measures which do not meet with the indorsement of "the silent many." Should any such attempt be made and persisted in, the unions will fall to pieces like a rope of sand, and the leaders in any such attempt will, as a general thing, be ostracized from labor privileges.

#### There is a Universal Law

Which pervades every department of industry, and which governs, with an iron hand, all things connected with human operations, whether industrial or professional. This law is as unchangeable as the law of gravitation. The law of supply and demand governs every trade, every profession, every industry of every nation. No human organization or power can change it. When there is an over-supply of any commodity, that commodity will fall in value. When the world's crop of wheat is short, wheat is dear, and vice versa. When there is a scarcity of help in any particular industry, that class of help will be high. When more men than are needed are seeking for work in any particular line of business, wages in that line will be low. Organizations may modify the law to a certain extent, but they cannot annul it or even suppress it beyond a certain limited degree.

#### There is a Lesson in all This

Well worth learning—a lesson which may be valuable to many at the present time. There are "Unions" among laborers in which the individual gives up his freedom to a majority of his associates—some even to secret committees. There may be cases, in fact there have been, where these unions have been ruled by men who are lacking in judgment, who are too inconsiderate in their demands, who have gone beyond the wishes and wills of their associates. Several instances have occurred during the present labor troubles in which such officers have been compelled to take the back track and modify their demands. There have been symptoms of this kind among some of the strikers in this city. Men without families, or men who care nothing for their families, are inclined to risk more in their demands than those who have families and who recognize the duties they owe them. A lamentable example of this kind has been manifested in the great elevated railroad strike in New York, where wages and hours—the essentials of labor—were made to give way to a trifling matter of punctiliousness as to certain men whose discharge was required of the company. The consequence has been the cost of not less than a million of dollars to the workmen of that city, and the loss, to all the striking employees, of their positions, to which has been added a "boycott" on the part of the railroad managers which effectually keeps them off from any other road. To all this may be added a terrible amount of suffering and destitution among the strikers; and the end is not yet.

What reasonable man is there who will not say that the point hoped to be gained was not worth the merest moiety of the loss incurred? A small number, who had nothing to lose, took from a thousand men their means of livelihood and hope for the support of their families for an indefinite time. The men in whose hands such power is placed should carefully consider the consequences of their acts. The men who delegate such power should see that they do not

place themselves in the hands of those who lack experience or wisdom in the ordinary affairs of life—they should recollect that their first duty is to be free men and not slaves, to the end that they may properly provide for themselves and families.

#### The Unorganized Workers

Comprise the great majority of the working people of the country, probably 90 per cent of the whole number. As we have already said, so long as the 10 per cent which constitutes the organized forces of the workmen keep their demands within due bounds, secure fair wages and reasonable hours of labor, their efforts will be approved of and heartily indorsed by the unorganized ones and the public at large. But when they overstep that mark there is danger. The fact should always be borne in mind that when any difficulty arises which leads to a strike, the number of unorganized workers thrown out of employment is often many times as large as the organized strikers. In such cases care should be taken that good cause exists for the strike. A few repetitions of unnecessary strikes will be sure to bring a fire from the rear. The labor unions of the country would have very little influence without the moral support and indorsement of the masses. The great masses of the people hold as a most sacred right the freedom of the worker to work when and where he will. Hence, the rule set up that "none but union men shall be employed" should be made as elastic as possible. A rigid adherence to that rule has already cost the workmen much trouble, and may cost infinitely more. It is perfectly evident that such a rule cannot be made applicable in all cases and in all localities. We intend, by these hints, to convey the idea that judgment and moderation should be used in enforcing such a rule. The few who have surrendered their right to exercise their own judgment in such matters have done much good in the interest of labor, but they should not allow success in what was reasonable to so becloud their judgment as to lead them into unreasonable demands. So surely as they do they will find an unorganized crowd at their heels, and a thoroughly organized army of employees in their front. Between the two they will be utterly crushed. This brings us to the consideration of the third party, which must be considered in the settlement of this great question between labor and capital. This third party, which comprises

#### Capitalists and Their Associated Employees,

Have not been idle during the events of the last few months. It is one of the most natural things to expect that they also should organize on the same basis and for the same purpose that the employees have organized. The New England cotton manufacturers were the first to take active steps in this direction. Their organization is now so complete that any effectual strike for anything which the great masses of workmen would not approve of would hardly be possible. Indeed, the knowledge of this fact has already stopped one important contemplated strike before it had reached any considerable headway.

The manufacturers of brass and iron steam and water fittings were the next to organize. A strike for anything unreasonable among those workers would now be met with a general lock-out all through the Eastern States.

The shoemakers at the East have also effected quite a general and thorough organization, such a one as now pretty well commands the situation. This work of counter-organization is now being perfected all through the States east of the Rocky mountains, and the same work is also being inaugurated in this city. One of the good results which will inevitably follow from these counter-organizations will be that when both labor and capital are represented by strong organizations they will regard each other with far more respect than now, and the interests of both will be more likely to be protected by calm, judicious action. Under such dual organization arbitration will be more likely to be effective, and both sides will have less reason to dread hasty or unwise action or acrimonious conflict. The writer is not opposed to the organization of labor or trades unions. He holds that such organizations are an essential element in enabling labor to secure its just rights. Our only fear is that the management of such organizations may, to a certain extent, fall into the hands of those who may lack judgment and intelligence to use them discreetly and for the true interests of the laborers. Such organizations, conducted with intelligence and good judgment, are indispensable to the present condition of the industrial interests of the world. The public has already regarded with admiration most of the movements of the labor organizations throughout the country. The admirable lessons inculcated by Mr. Arthur, the president of the organization known as that of the Locomotive Engineers, and by Mr. Powderly, the head of the Knights of Labor, have done much to dignify labor and command respect for its representatives from all classes of society. They are really the two representative men of the labor interests of the country, and their utterances by word of mouth and through the press in regard to strikes, boycotts and the means in general which should be adopted to bring about a permanent settlement of all differences between labor and capital are worthy of all respect, and meet with most hearty approval from all intelligent, well-meaning laborers, and from most capitalists and employers as well. Their utterances are most

fully indorsed by the masses of the people, and all labor organizations which make them the basis for their demands and efforts will be most triumphantly sustained.

#### Words of Gold.

Mr. Arthur speaks wisely and truthfully when he says:

There should be no antagonism between capital and labor. There is no occasion for it. And, though I want every laboring man to hold up his head and look his employer squarely in the face, I want him to remember that capital, as well as labor, has rights which we must respect. We should strive to bring them closer together. We have no business to say that any employer shall employ or shall not employ this man. We have no right to go to the company and say: You must not employ that man. We oppose this way of doing things on principle.

Mr. Powderly, in speaking of his associates in the Trades Unions and Knights of Labor, says:

We are no more the salt of the earth than the millions of unknown toilers who do the work of the world. In our dealings with laborers and capitalists, we must deal justly and fairly by them. If we would have justice done to us, we in turn must do equally to others. This is the aim of the Knights of Labor and must not be lost sight of in the future.

Regarding boycotting, Mr. Powderly says: I find that wherever a strike occurs, appeals for aid are scattered broadcast among the assemblies. Do not pay one cent for such purposes in future unless the appeal comes from your own District Assembly or the General Assembly. If boycott notices are sent to you, burn them.

Men who own capital are not our enemies. If that theory held good, the workman of to-day would be the enemy of his fellow-toiler on the morrow; for, after all, it is how to acquire capital and how to use it properly that we are endeavoring to learn. No—the man of capital is not necessarily the enemy of labor; on the contrary, they must be brought closer together.

Mr. Powderly's plan is stated as follows:

I believe in combining all the scattered battalions of labor's mighty host in one grand whole. Labor-saving inventions, steam and electricity have forever broken the power of one trade or division of labor to stand and legislate for itself alone; and with the craft that selfishly legislates for itself alone, I have no sympathy.

#### Natural Gas in California.

The San Luis Obispo Republic says: The public has been aware that for some months past Dr. Nichols, Judge Adams and Mr. Walker have been engaged in boring for oil on the Doctor's tract of land near Miles Station, on the Pacific Coast Railway, and early in the week we paid the works a visit of inspection. A flow of oil has not yet been found, but there is a fountain of warm white-sulphur water from which rises a column of gas burning in a flame a yard in height. The locality is the base of the hill lying between San Luis creek and Cave Landing, fronting northeasterly, the hillside being covered with live oak trees and brush, while in the valley large sycamores, oaks, and willows are growing. The surface rock is generally serpentine, with occasional croppings of dark sandstone. In one of these sandstone croppings an exudation of oil had been observed, and it was determined to investigate and determine what the formation might bring forth. An excavation was made, and the rock blasted away was found permeated with petroleum, and when placed in the fire burned fiercely. With this slight prospect it was decided to bore in the usual manner for an oil well. Accordingly, a derrick was erected and machinery for working the artesian borers was devised and constructed by Mr. Walker; an engine of 16-horse power was then procured and operations commenced. At the time of our visit, a depth of 470 feet had been reached. Mr. Walker, who manages the work, has kept a record of the different formations penetrated, which, upon comparison, correspond very closely with the formations found in boring for oil wells in Pennsylvania. There, it is understood, three strata of sandrock must be passed before the flowing oil is reached. Here, two such layers have been penetrated, and now the auger is in the third. Before reaching the last stratum a flow of warm sulphur water was struck, and from the lower sandrock comes a large volume of gas. These now come up together, the water flowing at the rate of about 400 barrels a day, being heavily impregnated with white sulphur, and having a temperature of 85 degrees. The gas bubbles out of the water, and being lighted, sends up a flame about three feet in height, burning continuously. The boring will be continued until the sandrock is passed through in the expectation of striking oil. Should oil not be obtained, the well as it now stands must be considered of great value.

GLASS IN MELTING BRASS.—It is said that if brass founders will stir powdered glass into melted brass when in the crucibles, sound, nice castings will be the result. The claim is that the glass flux will collect all impurities, which rise to the top, and can be skimmed off, while otherwise the same impurities would be poured into the mold with the metal.

#### Copper Mine Litigation in Arizona.

The Tombstone Democrat of July 31st says: Judge J. S. Robinson, on Tuesday evening, informed a reporter of the Democrat that he had just received information from Tucson stating that the Supreme Court had sustained the decision of the lower court in the case of the Copper Queen Mining Company vs. Copper Prince Mining Company. The case, it will be remembered, was first tried in the District Court about three years ago, resulting in a complete victory for the Prince. In February last the case was again adjudicated in the County Court. In both trials the point at issue was virtually the same, although in the first trial the Prince was plaintiff, and in the latter trial that role was assumed by the Queen. The question was which company possessed within its boundaries the apex of the vein. As before stated, at the first trial this point was decided in favor of the Prince. The second trial was obtained on the ground of new evidence, the Queen Company claiming that developments made subsequent to the first trial would show that they (the Queen) had the true apex. The trial lasted more than two weeks. A cloud of witnesses on both sides were sworn and examined, including some of the most noted mining experts of the country. The jury found a verdict which was regarded as the result of a compromise, and was acceptable to neither party. By this verdict the Queen people were allowed about one-half of the ground in dispute. The decision of the Supreme Court, Judge Robinson informs the reporter, substantially affirms the result of the first trial, and is consequently regarded as a sweeping victory for the Prince. The judge also thinks this decision may be regarded as a final settlement of the case, and its results, he says, are destined to be of the utmost importance to Bisbee. The Prince Company will immediately proceed to work their property on an extensive scale. They will put on all the men that can be worked to advantage, and the extraction of ore and production of bullion will be pushed vigorously. Inasmuch as the Copper Queen will close down in a few days, the increased activity of the Prince will prove most fortunate for Bisbee. It is stated that the Prince will employ at least as many extra men as will be "let out" by the closing of the Queen. It is further stated that the low price of copper, which is the cause of the suspension of operations by the Queen, will not influence the Prince, their ore being of so high grade (running from 35 to 40 per cent) that it can be worked at a handsome profit, even at the present price of copper.

WHY SUNSTROKE IS RARE.—Sunstroke is extremely rare in California. The dry atmosphere prevents it. The rapid evaporation of perspiration from the skin keeps the whole body cool, just as water is cooled in a porous filter. Experiments that have been made show that the blood of a man working in the California harvest field, with the air at a temperature of 100 degrees or over, is little hotter than that of a man working in the cool air of the sea-coast. In the East, when the temperature is 90 or 95 degrees, men working exposed to the sun are frequently sunstruck. The moisture in the air there prevents the evaporation of perspiration, and the whole body becomes heated until something gives way. In California there are hundreds of men working in the sun where the temperature is above 100 degrees in the shade, and yet they are rarely disabled. Examinations were made a short time ago in the East as to the effect of trees on temperature. It was found that the shade of trees was cooler than that of any other object. In streets where the temperature was 90 degrees in the shade of houses, it was nearly 20 degrees lower under the trees. If people in California would plant more trees they would be cooler. Even if sunstroke is not to be feared, a temperature of 100 degrees is unbearable.—S. F. Report.

A STEEL-WIRE MAT.—The Hartman Steel Company, Limited, Beaver Falls, Pa., make a patent steel-wire door-mat which is meeting with much favor. It is made from steel wire, with steel frame and steel braces, all perfectly galvanized. They are wear and weather proof. Snow, ice, mud, clay and water are wiped out of sight by the slightest scrape. These mats are self-cleaning and require no shaking, and are adapted for any place where a mat or matting is needed. They are especially adapted for railway and street car floors, steamboats, hotels, offices, stores, residences, elevator floors, etc.

TO REMOVE OLD PAINT FROM GLASS.—Ten cents' worth of oxalic acid dissolved in a pint of hot water will remove paint spots from the windows. Pour a little into a cup and apply to the spots with a swab, but be sure not to allow the acid to touch the hands. Brasses may be quickly cleaned with it. Great care must be exercised in labeling the bottle and putting it out of the reach of children, as it is a deadly poison.

A SOUTH AMERICAN CONTINENTAL RAILROAD.—Mr. Clark, the great railroad man on the east side of the Andes, has given out that in two years the line from Buenos Ayres to Chili will be concluded, and thus direct communication by rail will exist uninterruptedly from the Atlantic to the Pacific ocean.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER, SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.  
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Aug. 21, 1886.

## TABLE OF CONTENTS.

**EDITORIALS.**—Water Jacket Furnaces; Foundry Notes; Mining Accidents; Headwaters of the Snake, 117. Passing Events; Silver and the Mines; Liquid Fuel; Wood River Gold Mines, 120. School of Mines Laboratory, 121.

**ILLUSTRATIONS.**—Section Through Water Jacket Furnace; Horizontal Section Through Tuyeres; Bottom Plate Water Jacket Furnace, 117. New Laboratory of School of Mines of Missouri; Plan of Chemical Laboratory of School of Mines; Section of Hood, Main Stack, etc., 121.

**CORRESPONDENCE.**—Can Lode Mining be Studied as a Business; The Lower Springs Mine, 118.

**MECHANICAL PROGRESS.**—Petroleum as a Boiler Scale Resolvent and Preventive; Curiosities of Metal-working; Casting Glass; Tempering Brass—How it is Done; Air Blast in Puddling; American-made Anchors; A Mechanical Puzzle; Wire Nails in Coils; Steel Rivets; Hard or Soft Steel for Beams and Girders; Sawing and Thrashing Machinery from Vermont, 122.

**SCIENTIFIC PROGRESS.**—Force, Power and Work; A Scientific Work of Art; Strange if True; Formation of Fog; Echoes at Sea; Microscopic Examination of Iron and Steel; Cellular Structure of Cast Steel; Seven Colors for Staining Marble; The Power of Running Water, 122.

**ENGINEERING NOTES.**—Coal as Petroleum; The Niagara Bridge; Electric Motors for New York and Philadelphia Railroads; A Gas Street Railway Motor; Eile Driving by Dynamite; A Cable to Brazil, 123.

**USEFUL INFORMATION.**—How to Arrange a Bouquet; Stilling Troubled Waters; Substitute for Tea; Peach Vinegar; In Chipping Iron; To Restore Injured Meat; A Transparent Enamel; Cremation; To Remove Clinkers; To Keep Insects Out of Bird Cages, 123.

**GOOD HEALTH.**—Sleep Habits of Children; Various Remedies for Sea-sickness; Increase of Hydrophobia; Remedy for Cold Feet; To Cure Redness of the Nose; Aniline Oil as an Aesthetic, 123.

**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 124-25.

**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 128.

## Business Announcements.

Pumps—Dow Steam Pump Works.  
Gold Mines—C. F. Blackburn, Blackburn Mine, Idaho.

See Advertising Columns

## Passing Events.

The mining regions of Idaho are showing considerable advancement of late, as the accounts given by our traveling correspondent, in other columns of the PRESS, prove. Some of the districts there are making a remarkable showing.

The shutting down of one of the prominent mines at Tombstone, Arizona, is bad for that camp, though the citizens there still continue hopeful.

The shutting down of several large Montana mines, owing to low prices of silver, will doubtless be followed by other mines elsewhere if the price of silver continues as low as at present for a much longer time. The discount on silver is very detrimental in many camps, and already in some places miners' wages have been reduced in consequence. Where the ores are of low grade, the discount takes off all the profit of silver mining, so the mines will either have to lose money or stop work until better prices are realized for their products.

At the Meadow Lake mine 17 men are engaged in erecting the mill, and four or five men are employed in the woods. There is about 15,000 tons of rock on the dump, which, it is claimed, will net \$16 to the ton.

## Silver and the Mines.

Silver has evidently reached bedrock in price and commenced slowly to rise again; but the low prices have had a very bad effect on mining operations. At Tombstone, Arizona, the Tombstone Mill and Mining Company has had to shut down, leaving about 200 miners out of work. At Candelaria, Nev., miners have been discharged owing to low silver prices. The Sheridan mine, Tellurium, Colorado, has reduced wages from \$4 to \$3.50 per day for the same cause. The mine is idle, as the men would not accept the reduction. At Leadville, Colorado, mine-owners are discussing the situation and debating the best policy to pursue. No solution of the problem has so far, however, been discovered, and the only effect of the recent decline has been to stimulate work and offset the decreased value of the metal by larger productions. If it were certain that silver will soon advance, a large number of mines would unquestionably suspend their output temporarily, but as there is no assurance of an advance at an early day, few are seriously thinking of closing down.

Butte, Montana, has been in a state of alarm for some time on the subject and it has been feared that many mines would have to close down. It was thought that some 12,000 men would be thrown out of work this month. Latest advices from there, however, as will be seen by a paragraph in our mining summary, are to the effect that as silver has commenced to advance, the mines will not close down as expected. The depreciation of value represented the profit of the mines in that camp.

One solution of the present difficulty is that which some mines have already adopted, namely: to increase the output in proportion to the decline in the price of silver, until this and other countries shall adopt a bi-metallic currency in which silver will receive proper recognition. All companies are not, however, in a position to do this. Still, the gradual rise, now apparent, brings rejoicing to the miners. It is not a sudden jump but a gradual reviving, and all are hopeful that the price will go back to the standard of last year.

## Liquid Fuel.

The use of petroleum fuel is gradually but surely being extended. For a year or more past the Southern Pacific Company have been using it on some of the ferryboats with success. The *Thoroughfare* and *Piedmont*, among the large ones, have demonstrated the success of the fuel. The *Julia*, running between South Vallejo and Vallejo Junction, has been burning oil for some time. A move of the hand regulates the flow of petroleum, which is kept at a burning temperature by a pipe of hot steam running within the oil-conducting pipe. The oil reaching the furnace is thrown into spray and burns with great fierceness. The oil is a refuse from the refinery, thick and black, not ignitable until heated to a high temperature. It is brought from Alameda to South Vallejo, and the steamer receives enough in five minutes to last all day. From 500 to 600 gallons are used each day.

The large ferry-steamer *Oakland*, which is running between this city and the Oakland mole, on the Southern Pacific Company route, is to be laid up soon for about six weeks to have new machinery put in so as to burn petroleum instead of coal. This kind of fuel saves the wages of several firemen, as one or two men are, with it, all that are necessary in the fire-room. The oil is more easily handled than the coal, as it requires less time and a smaller gang of men to put it into the vessel. Passengers like to travel upon boats burning the oil, also, for it is cleaner than coal, as no cinders or soot are emitted from the smokestack.

The owners of the Oakland Cotton Mills are investigating the subject with a view of burning oil there instead of coal.

The use of this fuel necessitates, however, a change in the furnaces, where coal has previously been used, the same arrangement not answering well.

California is now producing oil very largely and the supply is increasing. The oil is being used in places in the southern part of the State under boilers, and every month adds to the number who utilize this convenient fuel. Coal is so high here that the liquid fuel saves a great deal of money, to say nothing of the convenience in handling.

## Wood River Gold Mines.

The Camas and Donavan Bonanzas—A Rich Gold Field Neglected.

[Written for the PRESS by FRANK W. SMITH, our Traveling Representative.]

Every Wood River newspaper, as well as every correspondence from this much-talked of great mineral field, gives glowing, and in many instances truthful, accounts of the vast silver and lead deposits of the Wood River country. Seldom do we see anything of her gold mines; so seldom, in fact, that the public are led to believe that gold-bearing formations do not exist within the borders of this celebrated district. This district, like all others, runs to extremes in working for the first mineral that was discovered. Had a gold mine been discovered here first, there is no doubt but that many of the producing silver bonanzas of Wood River would to-day be run over by prospectors in search of gold and silver mines, and would receive the go-by until gold mines would begin to require capital and work to produce dividends. Be this as it may, yet it is an indisputable fact that to-day in this (Alturas) county there are hundreds of thousands invested in silver and lead mines and costly plants and reduction works to run them, while lying almost alongside of them are great deposits of gold-bearing, free-milling quartz of a high grade, miserably equipped and half worked, or, what is worse, mismanaged or kept idle by "working assessments" only. If California, with all her fabulous deposits of yellow metal, could boast of a showing on and below the surface, in quantity and quality, considering the development done, that the writer witnessed to-day, her "oldest timer" would be astonished.

The properties visited are owned by two sets of individuals, and the first described, the Camas No. 2, I don't believe could be bought for \$500,000, if any one was fool enough to give that much for it. The Donavan group ought to be bought by some Western mining men and developed in a manner in keeping with its merits, but as to securing it the writer can give no information. It is enough to make a mining man want a writ of mandamus to force men to sell a property, with the showing these mines make, who would permit the "dibble dabble" development that is in progress in this group.

## Mineral Hill Gold District.

Eight miles a little southwest of Hailey, the metropolis of Wood River, the eastern line of the gold belt joins the western edge of the silver-bearing formations. The formations of the gold belt are granite on the east and granite and porphyry further west on the belt. This belt is about five miles in width, and traceable from 20 miles east, west to Atlanta, 60 miles and miles beyond. With the exception of the mines hereinafter described, little, if any, development has been made. The majority of the prospect owners are not only "poor as Job's turkey" but ignorant of the difference between a prospect and a mine. I judge their ignorance from some prices given on "indications" and "croppings." Every mother's son of them that has locations on the extensions of the mines mentioned below is waiting in hopes that these properties will develop extensively, and thereby enhance their "ground." As will be seen by the account below, mines in this district pay under the most adverse circumstances.

## Parallel Veins.

Two large ledges—they are "too big" to be called veins—extend from east to west, about one mile apart, across the entire length of the belt, the only difference being that the north or Donavan ledge appears to be a fissure lying in a granite formation, while the south or Camas ledge is a contact lying between granite and porphyry. The character, dip and grade of the ores of the two are almost identical, save that the Camas carries a trace of copper; the Donavan being entirely free of any base metals. Both groups of mines are directly opposite and about one mile apart.

## The Camas No. 2.

This claim is a full one, being 1500x600 feet. Course of ledge northwest and southeast; dip about 50°. The ore body is a mixture of white, reddish and decomposed porous or honeycombed quartz, with here and there great chimneys of quartzitic porphyry or granite. The firm quartz is the lowest in grade and least in quantity. The management gave me the average to be \$25 per ton, but the shipments of bullion during the past few months figured with the capacity of the 20-stamp mill would indicate that \$40 would come nearer—the fact that they are saving only 30 per cent to the contrary notwithstanding. The ledge has been developed by an adit tunnel 400 feet all in on ore, commencing five feet in width, and widening to 20, and in some places to over 60. At the breast of the 400-foot tunnel, which has gone in on the hanging wall, a 60-foot crosscut has been driven south to reach the footwall, and as yet is still in ore and no indications of the wall sought for. The ore body cut by this crosscut is more or less mixed with mineralized quartzitic granite, but of a grade that will pay handsomely if worked

in large quantities. Mining the ores here is accomplished at a trifling cost. The richest ore lies next to the hanging wall, that toward the footwall being more firm and flinty in character; 160 feet in depth from the surface has been made by the 400-foot tunnel. At the mouth of the tunnel a 70-foot incline has been sunk, the last 30 feet being in ore, no drifts having been made at the bottom to ascertain the width of the vein. Some 500 feet in stopes and levels have been made over the 400-foot tunnel, in a number of places reaching the surface, where there are a number of open cuts, out of which tons of high-grade ore have been taken. The mine is dry as a match and easily worked. It has some 1500 feet of development work and the vast ore body now exposed demonstrates the stability of the property. Ore is run 800 feet in two-ton cars on a track to the mill for treatment.

## The Camas Mill.

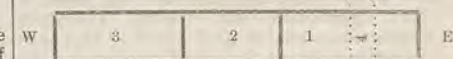
Situated at the head of a sloping flat at the mountain's edge, and almost a stone's throw above an abundance of fine water, high, and if not dry nearly so, stands the 20-stamp wet-process mill of the Camas No. 2. Spring water barely sufficient to supply the boiler is obtained by pumping. The theory that

"The mill will never grind  
With the water that has passed,"

is knocked higher than Gilderey's kite here, as the waters secured here are pumped back into elevated tanks and used until they look like molasses coming from a milk-pan on a cold day. The mill was built partly by the Colorado Iron Works and Fraser & Chalmers, the Daisy engine and boiler being put in by the former. The plant is an excellent one, and if given any decent amount of clean water would save at least 70 instead of 30 per cent of the gold run through. No plates nor screens can do good work with slum where water is needed.

## The Donavan Group.

One mile east, directly opposite to and parallel with the Camas No. 2 and its extensions, lie the Donavan group and extensions. This vein is similar in character and quality to the Camas, and will probably rival it in quantity when equally developed. The course is almost due east and west, with a dip that is less than 30 degrees until a depth of 70 feet is reached, when the ledge appears to straighten up almost perpendicular. If there is any virtue in regularity of course, size and grade, this group is more favored than the Camas. The following diagram will give the reader an idea of the relative positions of the mines of the group:



The following explains the diagram: 1, the Donavan, 1500x600; 2, Rustler Fraction, 520x600; 3, Donavan, No. 3, 1500x600; 4, canyon, 250 feet deep, crossing the Donavan.

The formation is granite. So far as developed the ore body has shown a greater portion to be from four to six feet wide, with chimneys that make chamber-like ore deposits 20 feet or more in width and many feet in length. The canyon, 250 feet deep, cutting through the center of the Donavan, has acted as nature's workman in demonstrating the depth of and the regularity of the vein as it goes down. Development is progressing on the group, the principal work being done on the Rustler and the Donavan. In the canyon, on both sides, two tunnels—one 90 feet west and one 70 feet east—have been driven in on ore; the breast of these tunnels, when continued 150 feet further, will be under 250 feet of ore, between that and the surface. About 140 feet above the lower or 80-foot tunnel in west from the bed of the canyon is a 40-foot tunnel in on a decomposed quartz that is honeycombed in appearance and blended with a quartzite granite of a reddish color and a semi-decomposed nature that pans like a placer claim and mines like a piece of corn bread. The higher up the hill on a level with the Rustler, which covers the crown of the hill on the west side of the canyon, this soft quartz increases in quantity, and raises in grade exactly as the ore of the Rustler proved to do. The vein across the face of the Donavan where opened and gone in on averages four feet, and mills from \$20 to \$40 per ton. The vein is exposed more or less in five different places on the Donavan. On the Rustler more work has been done and a fine showing of high-grade ore in quantities that would cause any set of men, with less "irons in the fire" than the owners of this group, to "whoop up" development and treatment of the big output the group is capable of producing. An adit tunnel in ore 135 feet shows a large vein of porous quartz, that varies in width from 5 to 20 feet near the surface and runs from \$20 to hundreds per ton. I took a number of samples from different parts of the mine, and it horned like virgin placer ground, only it was finer gold. In some of the chimneys or chambers of ore a body of mineralized quartzitic granite often swells the ledge to an enormous size and reduces the grade of the ore according to the extent the less mineralized matter predominates. A depth of nearly 150 feet and some 400 feet in tunnels, inclines and stopes has been made on the Rustler near the west end line of the Donavan. All this work has been in ore and of a grade that will aver-



age from \$25 to \$60 all through. The Donavan No. 3 has but little development, but enough has been done to know they have the vein "all same" as the more developed of the group. This group is owned by a practical miner of limited means, who has a few non-resident associates interested with him, who have already more mining investments than they can do justice to, and, in consequence, they fail to assist the development in proportion to their interest and ability. Not because they have no faith in the property, but simply because they started in on silver mines and one or two of them are not ready to push gold properties. O. Rorem, a well-known mining man of Colorado, is superintendent and part owner, and he will more than likely get some California or Colorado capital to join him and open up this excellent property as it deserves to be handled. Wood and water are plenty. Every advantage for all season working is to be had here cheap. A 40-stamp mill on this group would produce more bullion every month than the whole Wood River district, with the exception of some of the large-producing bonanzas like the Minnie Moore and like properties, does in that time. If Superintendent Rorem had charge of this group for a company with money to put in a mill, instead of being interested with disinclined and elsewhere-engaged associates, Wood River's gold mines would soon be nearly as much talked of as her boasted silver and lead properties.

#### District "Pannings."

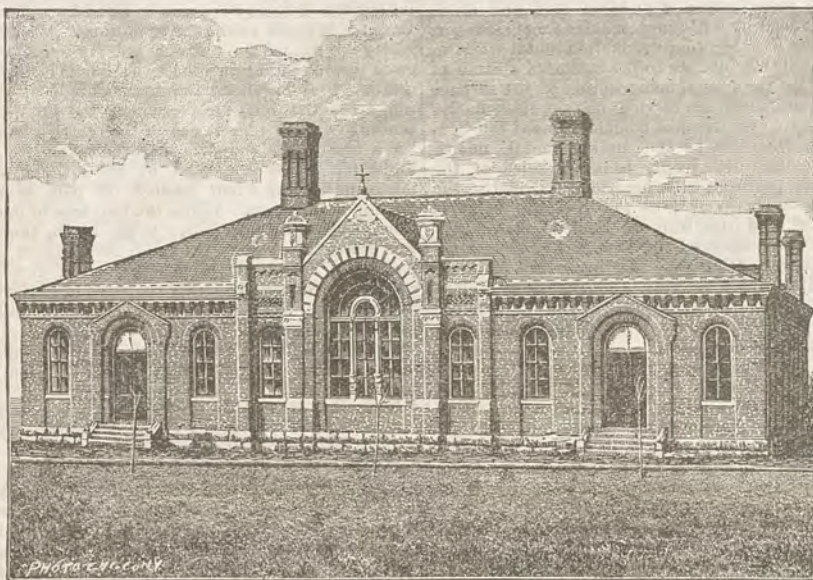
Good—the roads.  
Fine—the climate.  
Plenty—prospects.  
The Camas mill cleaned up \$5000 in July.  
Wanted—capital, and men who know how to invest it.  
Mineral Hill district gold is worth from \$15 to \$17 per ounce.  
Only six men are at work on the Donavan group at present.  
No work to speak of has been done on any of the extensions of the Camas No. 2.  
The Camas No. 2 is owned by James Doniphan and brother and a few St. Joseph, Mo., capitalists.  
The tailings of the Camas 20-stamp mill, now run with thrice used water, will assay higher than the ore.  
Over 6000 tons of tailings are saved up below the Camas mill that will pay better to work than the ore out of the mine.  
The district boasts of a Wiswell mill that was put in under a guarantee to work the ores

#### School of Mines Laboratory.

A few points in the construction and equipment of the new chemical laboratory of the Missouri School of Mines may prove of interest to those who contemplate erecting buildings for such work, especially where they are limited as to funds.

In this laboratory every room is well lighted; all rooms used by students are well ventilated and are provided with closed hoods for acid evaporations, etc. The ceilings in the qualita-

tory, and spacious hoods, which work well and do all that is claimed for them. Each of the main hoods is 12 feet long by 26 inches deep, and has three easily-sliding windows. The height of the hood is 10 feet, and that of the table three feet three inches. Some of the hoods are provided with basins and water; all are provided with gas. They are made tight above, so that all the air exhausted by the flues must enter the hoods under the windows. Each hood is ventilated by a flue 9x18 inches, which is a special compartment, built in the main stacks



NEW LABORATORY OF SCHOOL OF MINES OF MISSOURI.

tive and quantitative laboratories are high, being 16 feet at the walls and 19½ feet at the center of the rooms, where they take the form of a large panel. These high ceilings are very pleasant, and we find no difficulty in keeping the laboratories warm in the coldest weather.

The laboratory is a one-story building, as is

solely to ventilate the hood. At the bottom of the flue a gas-jet may be used, if necessary.

These hood-flues terminate at the top of the heavy 12 inch iron smoke-pipes, which are used in connection with the heating furnaces. These pipes terminate about 12 feet below the top of the stacks, which are 52 feet high. In the

the operation of the hoods has been thoroughly satisfactory.

Fig. 3 represents a section showing one of the hoods, main stack, ventilating-flues, etc.

In cold weather, thorough ventilation is secured by very large ventilators, two at the floor and two at the ceiling, in each laboratory, connecting with the air-chambers in the stacks. In the wall between the two laboratories, at the height of the ceiling, are two very large transoms, each 4x8 feet, which may be opened and shut at pleasure. These transoms, in connection with the windows in the two laboratories, furnish a system of ventilation, in the summer time, which is highly satisfactory.

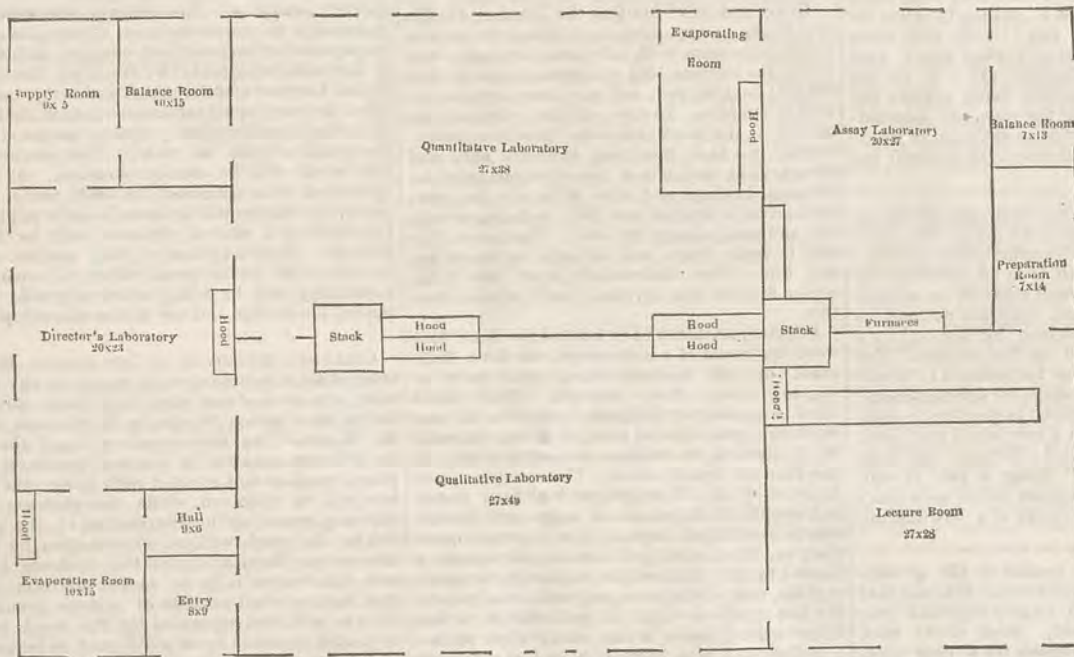
For valuable suggestions which aided Prof. Wait very much in the planning and subsequent equipping of this building, he is indebted to Dr. J. W. Mallett and Professor Dunnington, University of Virginia; Professor Ira Remsen, Johns Hopkins University; Dr. Chas. Doremus, New York; Dr. Eugene A. Smith, University of Alabama, and others.

#### Mining Accidents.

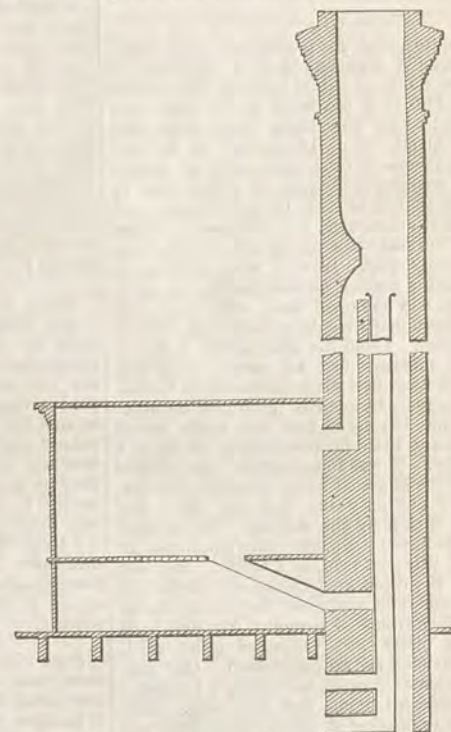
Frederick Hoffman, aged about 30 years and a native of Wurtemberg, Germany, went "on shift" at 7 o'clock Saturday night in the Derbec drift mine, Nevada county. He had not been using his pick more than three minutes when a miner working near him heard a groan, and looking around saw him lying on the ground. The young man had been struck in the back and on the right side by a large boulder which had become detached from the roof of the drift. His ribs on that side were mashed in, his liver crushed, and one of the broken ribs had apparently punctured a lung. He was taken to the surface and lived two hours.

Two miners—Fleming and O'Brien—were injured by a powder explosion last week in the Prince George mine, Stockton Hill, Arizona.

Nicholas Wilcox, of Garden valley, accidentally fell into a shaft at the Hart mine, near



PLAN OF CHEMICAL LABORATORY OF SCHOOL OF MINES.



SECTION OF HOOD, MAIN STACK, ETC.

satisfactorily. It has proved a failure, I am told.

Only \$500,000 is asked for the Camas No. 2. Any man who has that much money to buy a mine with—don't want any mine.

This district is reached from Ogden via the Utah Northern and Oregon Short Line to Hailey, thence by regular stages eight miles west to the gold belt.

The ores of the Big Camas, which is the second western extension of the Camas No. 2, run higher than the No. 2. This can also be said of the Donavan group.

Doniphan is the name of the new postoffice at the Camas mine. A town-site has been taken up, but owing to the scarcity of water the place has not been advertised much yet.

A fine mill site, with an abundant supply of water the year round, is owned by the Donavan group people. It is located below, and about the same distance from each other.

Only 10 stamps of the Camas No. 2 are run, owing to the scarcity of water. By moving the mill a few hundred yards lower down, water for a hundred stamps could be had.

The work being done on the Donavan group

(Continued on page 128.)

shown in elevation and plan, Figs. 1 and 2. It has a commodious basement under the quantitative laboratory, in which are located the large anthracite furnaces used in heating the building; provision is also made in this basement for locating large furnaces for metallurgical work, if necessary. Assaying is not done in the basement.

Suitable arrangements are made for that work in a properly-equipped assay-laboratory on the main floor. Ample provision is made for gas and water. The latter is delivered to heavy porcelain basins with small perforations in the bottom, no metal being placed below the lead ring and flashing which make a finish for the top of the table.

The prejudice against hoods for acid and other objectionable work induced Prof. Wait to look with no little interest into the matter. Some chemists, as is well known, prefer evaporating-rooms. He has, in this instance, provided both evaporating-rooms, one for each lab-

lecture-room and in the quantitative laboratory the hoods have not only the flue just mentioned, which ventilates the hoods from above, but a downward draft commencing at the top of the table, and passing into the main air-chamber, 2½x3 feet, in the stack, through which passes the smoke-pipe. In this way they secure in these hoods not only an upward current, but at the same time a downward draft. This system (described in a "Note on the New Chemical Laboratory of the Missouri School of Mines," by Prof. Chas. E. Wait, before the American Institute of Mining Engineers) is found to be all that could be desired.

In cold weather sufficient draft in the hoods is secured by the fire in the heating furnaces and by the movement of air outside, the building being isolated; while in warm weather, if necessary, gas is burned in the flues, or fire in a wind-furnace built in the basement for this purpose. To the latter expedients, however, they have not yet had to resort. In a word,

Georgetown, El Dorado county, breaking one of his legs between the ankle and knee.

NO PLACE FOR POOR MEN.—A number of prospectors and miners have returned to Juneau from the lower coast of Alaska, having been unable to obtain employment. Not having the means to support themselves, they are seeking transportation to more profitable shores. The *Alaskan*, published at Juncaw, says: "No man should come to this country without the means to sustain himself for some time. There is work here to do, and a good deal of it, but there is no great demand for labor, outside of that which is already employed. The companies and individuals doing business are generally supplied with all the help they need, and in most cases have supernumeraries from whom to draw their extra labor when required. Prospecting is laborious and expensive, and a man should come with a sure situation, or the means to invest in something that will pay."



## MECHANICAL PROGRESS.

## Petroleum as a Boiler Scale Resolvent and Preventive.

The use of crude petroleum in steam boilers for the purpose of preventing scale formations has prevailed for many years, with more or less success. The fact that 85 per cent of the material used vaporizes at a lower temperature than that of the boiler (350° F.), leaving little less than the tar or residuum behind, has been the greatest drawback to its complete success.

The possibility of the tar going over with the steam and obstructing valves has been a further objection to its use.

A heavy natural oil, free from tar, reduced by distillation until a fire test of 600° F. is reached, and compounded with elements having valuable solvent properties, has received the highest commendation by the leading steam engineers of Pittsburgh.

The insignificant cost of from seven to ten cents per week for the largest-sized boilers is a great item in its favor.

A quart per week, placed in the boiler after washing out and before filling, is all that is required. The action of the oil is more of a mechanical than chemical nature.

As the water rises the oil coats the shell of the boiler, as also the flues or tubes, and the impurities in the water, whether they consist of sulphates, carbonates or mud, make a greasy emulsion that will not cake or crystallize on the iron.

In from three to eight weeks after using, all old scale will disintegrate and pass away, leaving the iron in perfect condition, and no new scale will form, no matter what the character of the water. After a few weeks' use the mud drums, legs and parts of the boiler not subjected to the greatest heat will be found literally smeared with oil, while such parts of the boilers as receive the greatest heat will be as clear and bright as new iron. As petroleum is proof against acids, this coating of oil is absolute proof against sulphurous water.

A large establishment in Pittsburgh has been using petroleum solvent in their boilers for three years without spending a cent for repairs, while previously the boiler-makers' gang were at work on them every Saturday night in the year.

Worse scale could scarcely be found before the use of the solvent, while now their condition is pronounced by the inspectors as the cleanest boilers in the county.—*Am. Manufacturer.*

**CURIOSITIES OF METAL-WORKING.**—Recently, at a meeting of scientific men in England, a speaker produced an anklet worn by East Indian women. This is a flat curb chain about one inch broad, with the links very close, and weighing about 10 or 12 ounces. It is composed of a species of brass composed of copper and lead, without any trace of silver, zinc or tin. Such anklets are sold for a few pence, and they are cast all at once, complete as an endless chain. The links show no sign of having been united in any way. How it was possible to produce such a casting as this passed his comprehension, and he hoped that some one who had seen them made would explain the nature of the process. From the East much that was curious in metallurgical art came. Cast iron was, he believed, first made purposely in China. It was, however, frequently produced unintentionally when wrought iron was made direct from the ore in little furnaces about as big as a chimney-pot. It was found among the cinders and ash of the charcoal fire in grain or globules, which were not only like shot but were actually used as shot by the natives. He showed what he believed was the only specimen in England of this cast iron, in a bottle. He next referred to the celebrated Damascus blades of Indian swords, and explained that these blades were an intermixture of wrought iron and hard steel, which must have required great skill, time and patience for its production. One pattern in particular, known as "Mary's Ladder," showed wonderful finish and accuracy. Concerning the tempering of these blades little was known, but it was stated that it was effected by a long-continued hammering, or rather tapping, of the blade while cold.

**CASTING GLASS.**—It is reported that M. F. Siemens has perfected the process for casting glass as if it were a metal, and that in a short time an experiment will be made with the material to ascertain how far it will serve for railway sleepers. In addition to its toughness and endurance, the glass cannot be affected by the atmosphere, like other materials. The process is said to resemble the one in use for producing cast iron; but, instead of sand, finely-pulverized porcelain is used for the molds. The material is obtained by depositing molten glass on plates of metal, and causing the mass to cool quickly. The quality will depend on the character of the metal employed for the plates. When iron plates are used the glass produced is about three times as strong as ordinary glass; but with copper, which cools quickly, the standard of strength rises to eight times. Cast glass will not be more expensive than cast iron.

**TEMPERING BRASS—HOW IT IS DONE.**—Some considerable discussion has been carried on as to whether brass can be tempered. One of the writers, in affirming that it is capable of this

treatment, has thus expressed himself: "Brass, not hard by mixture, but by compression, either by rolling, hammering, wire-drawing, or any other process which compresses the particles of metal, can be, and is, tempered regularly, just as easy and in the same manner as an equal-sized piece of hardened steel would be tempered, viz.: by heat. By placing a small piece of polished steel on the brass object to be tempered, and applying the heat so as to affect equally the brass and steel, the color of the steel will indicate the temper of the brass, and by this process the brass may be tempered in exact proportion to every shade of color of the steel."

**AIR BLAST IN PUDDLING.**—An improvement in the manufacture of puddled iron and steel, introduced by a Monmouthshire forge manager, consists in subjecting the molten metal while in the puddling furnace to the action of a blast of air. By the special construction of the furnace these processes are carried on simultaneously. In place of the tuyeres commonly used for conveying the blast to the molten metal, one or more holes in the front, back, or sides of the furnace perform this function. Directly the metal begins to sink to the bed the blast is shut off, and the iron or steel is made into balls and conveyed to hammers or squeezers, as the case requires. The inventor's claim is: Simultaneously refining and puddling molten metal by submitting the said metal to the action of a blast of air in a puddling furnace substantially as described.

**AMERICAN-MADE ANCHORS.**—It is said that chains and anchors of American manufacture have not the standing and reputation they deserve, especially abroad, only because there can be no guarantee given the purchaser as to quality of iron and workmanship, such as would be given by public supervision and compulsory testing. Foreign vessels in American ports buy foreign anchors and chains, and vessels supplied by American manufacturers are refused insurance abroad. In order to remedy this defect, Mr. Morrow, of this State, recently introduced a bill into the House providing for the designation of a board of naval officers to test American-made chains and anchors, and thus place them on a par with those of foreign make which are tested, and hence may be guaranteed.

**A MECHANICAL PUZZLE** has been propounded which bids fair to enlist as much speculation as did the late problem of the movement of the carriage wheel. A pair of car-wheels and axle are resting on a piece of level track. A rope made fast to the axle and so wound round it that when the rope is pulled the tendency of the wheel is to come toward you; while at the same time if the wheels must revolve they must move from you. If the rope is pulled, in what direction will the wheels run? Will they move away from the spectator or toward him? Further, if the track is inclined, say 1 in 10, the highest part of the incline being nearest the spectator and the end of the rope, and a considerable strain being exerted on the rope, in which direction will the wheels move, up or down the incline?

**WIRE NAILS IN COILS.**—Perhaps, according to the *Pittsburg Dispatch*, we are to have wire nails by the yard. Henceforth this youthful antagonist of the cut nail is to be marketed by the coil, attached to each other by an attenuated thread of steel, and they are not only to be sold but are to be driven by the coil by a patent machine devised for the purpose. But how will these nails be for straight? Won't they be in an excellent shape for driving around corners? And how are the carpenters to separate these nails, as even a very small steel wire is a tough thing to break? Perhaps they may bite them off, or "tote" along a pair of nail-plate shears. Somehow, these coiled nails don't appear to carry the ear-marks of a bewildering success.

**STEEL RIVETS.**—The results of the government tests upon steel rivets would indicate that this metal is destined to largely supplant iron in another important field. Steel rivets have been used for special purposes for a long time, but their use up to the present time, in boilers, has been limited. The great amount of ductility, and capacity for local distortion without fracture, taken in connection with its high resistance to shearing, seems to us to render this metal peculiarly adapted for rivets.—*The Locomotive.*

**HARD OR SOFT STEEL FOR BEAMS AND GIRDERS.**—The Germans have been making experiments with a view to ascertaining the relative strength of hard and soft steel and iron beams or girders. The results show that the soft steel girders were 22 per cent and the hard steel girders 66 per cent stronger than the iron girders, and the strength of steel girders was found substantially the same for the two flanges when similar in section.

**SAWING AND THRASHING MACHINERY FROM VERMONT.**—The Foundry Shops, St. Albans, have been working 14 hours a day, and recently shipped a large order for thrashing and circular sawing machines to California.

**TO FROST BRASS WORK** and give it an ornamental finish, boil the article in caustic potash, rinse in clean water and dip in nitric acid till all oxide is removed; then wash quickly, dry in boxwood sawdust, and lacquer while warm.

## SCIENTIFIC PROGRESS.

## Force, Power and Work.

There exists in the minds of many but a very vague conception of the meaning attached to these three little words. Not so much does the difficulty appear to be in getting at a general sense or meaning for the words, as to separate the general idea conveyed into its factors, and to discern clearly just what portion of this whole is meant by force, by power and by work. Let us therefore consider each in its order and study their composition and relation.

We all have a pretty good idea of what force is; but the difficulty appears to be to disconnect the idea of force with that of motion. We can easily appreciate the force of gravity when we see a weight falling to the earth; but it is more difficult to comprehend the force as still existing, after the body has reached the ground, tending ever to draw it nearer the earth's center whenever its supports shall be taken from under it. Force is exerted by the magnet as much in holding a nail against its pole as in moving it up there. When the nail was in motion, or the body was falling to the earth, there was power developed. Power is the product of force and space. If a magnet could lift a weight of one pound against the force of gravity through one foot, it would develop one foot-pound of power. If the force of a cylinder full of steam can push a piston against 110 pounds through three feet, it will develop 330 foot-pounds of power.

Now what is the difference between power and work? Work takes account of the time in which power is exerted. If the engine mentioned was 18 inches in stroke, it would have to make one revolution to move the load through three feet as above. Now, suppose the engine to run 100 revolutions per minute, we should have 110 pounds move through 300 feet in a minute, which would equal one horse-power of work. If the engine runs at 50 revolutions per minute, we should have only 150 feet per minute. Work is the consumption of power, and the horse-power—the measure of work—is the measure of the rate of its consumption of power. It is evident, therefore, that a machine, the resistance of which it requires a certain force to overcome, will require twice the horse-power to overcome its resistance twice the number of times in a given time, and that it is not the pounds of force which a machine is capable of exerting which qualify its consumption of power, unless we take into account the distance through which this force is exerted.

## A Scientific Work of Art.

Under the above heading the Dresden *Anzeiger* refers to an apparatus for dividing circles into minute divisions with automatic accuracy—the work of a German long employed in the United States Coast Survey, and now once more a resident of Dresden. To mark off the division in the circles of the most elaborate "precision instruments" is a task requiring immense skill and accuracy, as each one of the divisions must be identical in shape and size with all the rest; each circle is divided into 360°, each degree into 60', and each minute into 60". This gives 129,600' in each circle, and delicate astronomical and some other instruments must have their circles divided into divisions much smaller than this.

Copying machines have heretofore done this work by means of a microscope, the lines indicated by the machine being gone over to engrave them deep enough. This hand labor is excessively fatiguing and arduous, and requires a great deal of time, it being impossible to divide a two-minute arc in this way in less than 36 hours' work. The machine constructed by Mr. Wurdemann has been tested and applied in all manner of ways until its success is established beyond the slightest question, and the accuracy of its work has become a marvel to all. It is set in motion by a small turbine, and works on calmly and evenly until the last stroke is cut. It performs in a few hours what it takes a man many days to accomplish, and with practically perfect accuracy. The machine is valued at \$12,000, and if no purchaser is found for it in Germany it will be brought to this country, and the United States may add another scientific laurel to their crown, and Germany and other nations will be obliged to send their precision instruments to this country to be divided.

**STRANGE IF TRUE.**—The African traveler, Dr. Giovanni Succi, who is at present in his native town, Forli, claims to have discovered a liquor which renders the human body independent of food and drink. In order to prove his assertion he placed himself under a medical committee who were to see that he took no nourishment for ten days, after having drank a few glasses of his liquor. At the end of that time the physicians pronounced his pulse perfectly normal, and in order to show that his strength had not suffered, Succi, before breaking his fast, walked from Forli to Forlinopoli, a distance of four miles, in 47 minutes. He then placed himself at the disposal of the medical faculty of Bologna, whose opinion in the matter is not yet known.

**FORMATION OF FOG.**—It has recently been demonstrated that in a perfectly moist air no formation of fog is possible, however much the temperature is lowered, so long as the air is

absolutely free from dust, and that the more air, sufficiently moist, is charged with such foreign particles, the more intense is the formation of fog. If filtered and completely moist air in a glass ball have its pressure diminished, only a few particles of fog will reveal themselves to the most careful inspection. But if a few cubic millimeters of ordinary house air be now admitted into this filtered air, a very fine, silvery, transparent fog at once forms itself, of such slight density that even in the case of a considerable area of it the transparency of the atmosphere would be but very slightly affected. At the first moment of its formation, if a reflected image of the sun, or the reflected light of an electric lamp, be viewed through it, the image will be seen surrounded by an intensely luminous blue or greenish light.

**ECHOES AT SEA.**—A new method of determining the near presence of icebergs on high shore lands, and even ships in a fog, has been devised by Mr. Frank Della Torre, of Baltimore. The device is based upon echoes, and has been thoroughly tested at Fort Carroll, by order of the Navy Department. This apparatus consists of a single-barrel breech-loading rifle, provided with a large funnel or speaking-trumpet on the muzzle, a box of cartridges and a tripod. The first experiment was made from a tug at a distance of half a mile from the fort. With the discharge of the rifle a distant echo was heard by those on board the tug, without the use of any receiving apparatus other than the unassisted ear. When a boat intervened between the tug and the fort, two echoes were heard, the fainter one coming from the vessel. In favorable weather the echo has been heard four miles. The steam whistle of the tug was also tried, but gave less distinct echoes than the sharp report of a rifle. A passing steamer about a mile from the tug gave a very distinct echo. Mr. Della Torre's signal was intended primarily to prevent collisions with icebergs in heavy weather, when it was impossible to be aware of their presence except by means of an echo, but is equally applicable in advising a ship's officer of the neighborhood of another vessel or other obstruction to navigation.

**MICROSCOPIC EXAMINATION OF IRON AND STEEL.**—The growing importance of microscopic examination of iron and steel is more and more recognized in Germany. In the May number of *Stahl und Eisen*, we notice that arrangements have been made at the government testing establishment at Berlin to render very valuable assistance to manufacturers, engineers, and others who may desire to make microscopic examinations of their materials. The cutting and preparation of the necessary sections is an operation requiring special skill and special apparatus. The testing establishment undertakes to prepare sections of samples sent, on payment of certain fixed charges, and, what is far more important, Dr. Wedding, the celebrated German metallurgical authority, undertakes to examine all sections so cut, if desired, and to see that they are properly prepared for the special objects in view. The charge for this work will be merely nominal. If the specimens to be examined are sent ready prepared, the charge will be from 75 cents to \$1.25. If a drawing is wanted, the cost will be from \$5 to \$7. Such a system, if fully carried out, cannot fail to be of great value to scientific metallurgy, and to bring about a greatly extended knowledge and use of the microscope.

**CELLULAR STRUCTURE OF CAST STEEL.**—Some interesting experiments with regard to the cellular structure of cast steel have been carried out at the Creusot Works, by M. Osmond and M. Worth. The experimenters found that if the thinnest conceivable sheets of the metal are placed on glass and covered with nitric acid the iron will be dissolved, while the skeleton remaining, revealing the distribution of the carbon in the steel, will, on examination by the microscope, furnish undoubted evidence that such distribution is by no means uniform, and that the cast steel consists of minute granulations in soft iron, separated for the most part by partitions made up of a different substance, a carburet of iron. In other words, cast steel is cellular in structure, the iron constituting the kernel, and the carburet of iron the shell. The elementary or simple cells thus constituted come together in composite cells or separate agglomerations in the thin sheets which are thus rendered transparent by empty lines.

**SEVEN COLORS FOR STAINING MARBLE.**—It is necessary to heat the marble hot, but not so as to injure it, the proper heat being that at which the colors nearly boil. Blue—alkaline indigo dye, or turnsole with alkali. Red—dragon's blood in spirits of wine. Yellow—gamboge in spirits of wine. Gold color—sal ammoniac, sulphate of zinc and verdigris, equal parts. Green—sap green, in spirits with potash. Brown—tincture of logwood. Crimson—alkanet root in turpentine. Marble may be veined according to taste. To stain marble well is a difficult operation.

**THE POWER OF RUNNING WATER.**—The power which flowing water possesses for transporting or moving stones and gravel over which it runs is very largely augmented by the speed of its flow. This power increases as the sixth power of the velocity; so that a stream flowing six times faster than another will be able to transport 46,656 times more matter.



## ENGINEERING NOTES.

**COAL AS PETROLEUM.**—Experience in the use of oil as a substitute for coal in making steam seems to be varied. With some it appears to be a perfect success; with others, a complete failure. Some scientific expert commission should be appointed to make exhaustive experiments under various conditions and with different oils, and make a full report upon the same for the benefit of the public. While newspaper reports generally agree that oil is a success, we occasionally notice adverse reports, as per the following, which we clip from a late issue of the *Shipping World*: "From Glasgow comes evidence of an unmistakable character that oil has been tried and found wanting. The managers of the Laird line, after a long trial of oil on board of one of their steamers, have decided, on purely economic grounds, to abandon it altogether as a fuel, having ascertained from practical tests, extending over a considerable period, that coal is the cheaper fuel of the two. Accordingly, they have had the oil tanks taken out of their vessel and have returned to the use of coal, notwithstanding the fact that the oil tanks and the apparatus for accomplishing complete combustion of the oil cost a considerable sum of money."

**THE NIAGARA BRIDGE.**—It seems that the Niagara bridge is fast becoming dangerous from the disintegration of the stone of which the suspension towers are constructed. So far has this deterioration progressed that it has been determined to replace the present stone towers with iron ones. It is intended that this work shall be done without disturbing the traffic, a work which will be not only a very difficult but also a somewhat dangerous piece of engineering. The work has already been commenced and every precaution to avoid an accident has been taken by Mr. Buck, the engineer in charge. Workmen are now making room on the sides of the towers for the preliminary iron work, and the stone is being chipped away with care by experienced men, who know just which ones to remove. On the tops of the towers men, who look like pigmies from below, are drilling in the caps so that when the time comes the hydraulic jacks may be applied and the great cables safely cradled from the stone supports which have held them up so long, and placed on strong iron towers which will replace the stone ones.

**ELECTRIC MOTORS FOR NEW YORK AND PHILADELPHIA RAILROADS.**—At a meeting of the New York Electrical Society, on the evening of June 23d, Mr. John M. Pendleton read an interesting paper on electrical railways, accompanied by a diagram of the proposed motor for street railways. Mr. Brackon, the attorney and agent in the United States for the celebrated electrician, Edmund Julien, was introduced and gave a brief explanation of Mr. Julien's system, as used on the Rue de Loure, at Brussels. A contract, according to Mr. Brackon, has already been made with Mr. Julien to have his cars, with their electrical accumulators, placed upon roads in both Philadelphia and New York, probably within the next five weeks. The particular road in New York has not as yet been decided upon, but will, no doubt, be the Broadway line.

**A GAS STREET RAILWAY MOTOR.**—A St. Louis man has invented a new motor for street cars. It is an engine receiving power from gas from coal oil. The oil is in a tank in the roof of the car, the gas being generated as used. The flash of the explosion as it passes into the cylinder heats the air, producing expansion. The only difficulty so far has appeared to be the nervousness of the general public in riding on or near a car carrying oil; but it is claimed that there would be absolutely no danger whatever. The inventor claims that he can furnish power for a 10-horse engine, which would pull three or four cars, at a cost of one dollar a day, the engine working noiselessly. The engine would occupy no more space than the lever in a grip car.

**PILE DRIVING BY DYNAMITE.**—An engineer of Pesth has lately used dynamite for driving piles. A circular cast-iron plate, 15 inches in diameter and 3½ inches thick, is fixed on the pile to be driven in a perfectly horizontal position. A dynamite cartridge made in the form of a disk, six inches in diameter and three-fourths of an inch thick, and containing 17½ ounces of dynamite, is placed upon the cast-iron plate and exploded by electricity. It is stated that the depth to which the pile is driven by each explosion is equal to five blows of an ordinary pile engine weighing 14½ Vienna cwt. falling 9 feet 10 inches. A cast-iron plate, on an average, resists 25 explosions.

**A CABLE TO BRAZIL.**—In view of the lack of interest manifested at Washington in building up our South American trade, a few enterprising Eastern merchants have determined to lay an ocean cable from New York to Brazil. What the railroad and telegraph are upon the land, the cable and the steamship are upon the sea—they must go together. The projected cable will be in operation in January next, and it is to be hoped that a steamship line will also be established at an early day.

## USEFUL INFORMATION.

**HOW TO ARRANGE A BOUQUET.**—There is much skill and taste to be used in arranging a bouquet, which any one may learn by attending to a few simple rules which may be given as follows: Arrangement of color is the principal item of success in a bouquet. The best known primary colors are red, blue and yellow, and among the compounds are orange, green and violet. To combine all these well we must turn to the artist, and he will tell us that good contrasts are orange and blue, yellow and green, yellow and purple, red and blue, red and violet, red and green, etc. White may be termed a dead color, and can come in almost anywhere, except between a very dark and bright color, where gray is better. Black does well to divide conspicuous colors like red and orange, for it does not produce such a violent contrast as white would do. If the bouquet is to be entirely shades of one color, red is valuable; commencing with deep scarlet in the center, and putting round it rings of brick-red, deep carmine, pink, pale red, rose, and a boundary of white or green. Care has to be taken to choose flowers that will keep their petals, and for this, flowers in bud or just opened are the best. It is bad to see a bouquet of flowers like full-blown geraniums or primulas, for in a very short time the bouquet will be a mass of vacancies. In putting the flowers together, it is better to start with a substantial central flower, like a rose or camellia, and bind the others round it, keeping the size, shape and arrangement well in view. If the stalks are short, lengthen them with wire, and never put on a fresh flower till the last is well secured, or often, just as the bouquet is finished, the center will fall out.

**STILLING TROUBLED WATERS.**—Experiments with the use of oil for controlling sea waves in a storm are continually being reported, and almost or quite universally with the most marked success. The wonder is, that any one, with the evidence now accumulated, should ever think of going to sea in any kind of a craft without every needed appliance for this mode of protection; and still very few sea captains avail themselves of it. The latest report of the kind is given as follows: Captain Sawyer, of the barkentine *Vidette*, of Millbridge, says that he has never found anything better than porpoise oil to calm the angry seas. He is accustomed to make bags about the size of buckets out of gunny cloth, stuff them full of oakum and saturate them with the oil. The captain says that from one to three gallons will run a vessel through most any gale till the sea gets regular. Speaking of a voyage from Bangor to Bowling, Scotland, Captain Sawyer says: "While hove to in a westerly gale, I tried the experiment of taking in the forward oil bag, and in less than 10 minutes the sea boarded us forward and lifted the deck-load and flooded the whole fore part of the ship, while previously, and after putting the bag forward, we shipped no water. These combers of the sea would come down toward us turning over like the surf on the beach, just with the same noise attending breakers, but just as soon as they reached the oil all was hushed up; we rose on the top of it all, while ahead and astern of us it would go coming by in perfect fury."—*Lewiston, Me., Journal*.

**SUBSTITUTES FOR TEA.**—The dangerous adulterations of teas in China and in this country have induced much experiment in search of a substitute for the tea leaf from some of our native leaves. Each of the following is said to possess the merit of being cheaper and more healthy than common tea, while the appearance is nearly the same. The young leaves of the pea plant, or the young leaves and flowers of the strawberry, or the first leaves of the currant bush, or the herd spring grass (*anthoxanthum odoratum*), or the leaves of speedwell, wild germander, syringia or mock orange, purple spiked willow herb, sweet brier, cherry tree, sloe, etc. The above should be dried on tin in the shade, and afterward rounced up with a little calcined magnesia to impart a bloom. Black currant leaves similarly treated make a good tea.

**PEACH VINEGAR.**—A correspondent of the *Home and Farm* says a good, healthy vinegar, made from peaches, can always be kept on hand for table use. Procure a large stone jar, which must be kept for that purpose alone. During the peach season fill it with good clingstone peaches; do not peel them, but wash thoroughly. Make up sweetened water (rain-water is best) of good molasses or brown sugar and pour over the peaches till they are well covered; tie a single thickness of cloth over the jar, and soon it will be vinegar. Draw off, and fill again with sweetened water, as before, which will be ready by the time the first is used up, and so on until the next peach season, when fresh peaches may be put up for another year.

**IN CHIPPING IRON.**—To chip smooth after the chip has been started, the chisel should always be held at the same angle at which the chip was started, and every blow of the hammer should be as near alike as possible; then, with common sense and practice, a person can chip nearly as smooth as he can file.

**EBONY CAN BE IMITATED** on wood by first painting with a 1-per-cent solution of sulphate

of copper. When perfectly dry the wood is painted over with a liquid consisting of equal weights of aniline, hydro-chloride and spirits of wine. The blue vitriol acts on the aniline and forms nigrosin, a black which cannot be affected by acids or alkalis. A luster can be added by coating with simple copal varnish.

**TO RESTORE INJURED MEAT.**—When the brine sours or taints the meat, pour it off, boil it, skim it well, then pour it back again on the meat, boiling hot; this will restore it even when much injured. If tainted meat is immersed in the solution of chloride of lime prescribed for rancid butter, it will restore it. Flyblown meat can be completely restored by immersing it a few hours in a vessel containing a small quantity of beer, but it will taint and impart a putrid smell to the liquor. Fresh meat, hams, fish, etc., can be preserved for an indefinite length of time without salt, by a light application of pyroligneous acid applied with a brush; it imparts a fine, smoky flavor to the meat, and is an effectual preservative against its loss.

**A TRANSPARENT ENAMEL.**—It is said that the Hartford Silver Plate Company have discovered a transparent enamel, which they are applying to their hollow ware, which seems to offer complete protection against the tarnishing that has been such a perplexing element in the silverware business.

**CREMATION.**—In recent experiments in Paris, it was shown that a human body, of average size, could be entirely burned in a common stove in 40 hours, without a disagreeable smell. This is taken as an argument in favor of cremation, as it shows that the process need not be expensive.

**TO REMOVE CLINKERS.**—To remove clinkers from the stove, sprinkle common table salt on the linings when the stove is cold. Use plenty of it. Build a moderate fire—wood and coal—and in a day or two the clinkers will be gone.

**TO KEEP INSECTS OUT OF BIRD-CAGES,** tie up a little sulphur in a bag and suspend it in the cage. Red ants, it is said, will never be found in a closet or drawer if a small bag of sulphur be kept in these places.

**SPOTS IN VARNISHED FURNITURE** are often removed by rubbing them with essence of peppermint or spirits of camphor, and afterward using furniture polish or cold linseed oil.

## GOOD HEALTH.

### Sleep Habits of Children.

Many habits and customs, the deleterious effects of which are recognized, would become things of the past if a practical and simple remedy could be devised. I have never met with any plainly written advisory articles on the training of children in proper sleep habits, except as to time. A recent experience has led me to "study up" on the subject, in the most practical way, by asking questions of mothers and nurses. My little patient, whose habits and conditions led to this investigation, is 10 years old. A serious and chronic affection of the kidneys has resulted from excessive use of sweets, and consequently lack of appetite for, and assimilation of, nutritious food. She persistently sleeps prone on the back with the arms flexed above her head. Watching results in seeing her turn on one side from eight to ten times every night, but, of course, a further result is diminished sleep, although it is not more restless than usual. Whether the habit can be permanently broken up is difficult to say. From her birth she exhibited a preference for that position, and had been indulged in it, with the inevitable results of catarrhal affections, dry throat, enervating, restless sleep, and aggravation of the kidney difficulty, as the spine was unduly heated by constant contact with the bed.

From the hour of birth a babe should be laid down to sleep with great care; never should it be permitted to lie on the back while sleeping. After it begins to play, the restless limbs are very beneficially exercised while lying so; but so soon as sleep comes the little one should be gently lifted and placed on the side, with the head raised only sufficiently to insure the spine from any curvature, seeing that there are no folds in the clothing to torture the tender flesh, especial care being taken to lay the ear smoothly back. Alternate the sides, or there will be an unnecessary unevenness of contour when the child is grown. Do not permit the knees to be so flexed as to crowd the viscera. Lying on the stomach occasionally is not injurious if the arms lie at the side and the face is free to the air. Frequently that proves to be a very restful position to a play-weary child.

It is not a difficult matter to teach a child to sleep with the mouth closed and without snoring or "gritting the teeth." A lady of 35, who had habitually gritted her teeth from their first possession, was cured of the habit in a fortnight by persistent waking at the first indication of the sound. The habit has not been resumed during the five years since passed.

If mothers could realize how many people suffer from bad sleep habits contracted in childhood, they would pay a little attention to their children at night-time, beyond the "hustling

off to bed, out of the way," and the "keeping covered," which is a sort of "dim religious duty" kept sight of out of fear of the doctor's bill rather than of any other consideration.—*Exchange*.

### Various Remedies for Seasickness.

A very good remedy for seasickness is chloral, but whether it acts by simply benumbing the nerves of the stomach, or by reducing the susceptibility of the whole nervous system, we do not know. At all events, a passenger may take 30 grains of chloral at Dover, fall into a drowsy, half-conscious state, and find himself at Calais free from sickness. Sometimes one or two drops of pure chloroform taken in a wine-glass of water will prove efficacious. Hypodermic injections of morphia are occasionally resorted to, but their use is not justifiable until other remedies have been tried and failed. The substance known as petroleum, mineral naphtha or rock oil, enjoys a high reputation in the treatment of seasickness. It should be taken on going on board, a drop or two on a small piece of sugar, and repeated every two or three hours. A pill containing three drops of creosote is another good remedy. Ipecacuanha wine, in drop doses, which proves so successful in the treatment of many kinds of vomiting, would probably succeed in seasickness, although we are not acquainted with the records of any cases in which it has been tried. Recent experiments seem to show that cocaine is a promising and harmless remedy against seasickness. An authority on the subject recommends that the drug be administered in doses of ¼ to ½ of a grain, dissolved in water (1 in 10) three times a day, with a small piece of ice. A surgeon on board one of the vessels of the White Star line recently informed us that in obstinate cases he had often obtained relief by the use of iced dry champagne. It is essential, he says, that the wine should be dry, for sweet champagne only makes matters worse. In the Levant the daily internal use of iron is a very common cure for seasickness. Sailors, when suffering from this complaint, obtain their iron in a very primitive manner, for they scrape off a portion of the rust adhering to the anchor and anchor-chain, and then swallow it in a little water.—*Family Physician*.

**INCREASE OF HYDROPHOBIA.**—It is a most curious fact, says the *Herald of Health*, that there has been nearly twice as much so-called hydrophobia in France since Pasteur came into the field with his remedy as before. The cause, no doubt, is the fear of the disease, arising from the constant discussion of it in the papers. The effect of this on weak minds is very great. Who will ever know how many people die of fear every day? The physician who can allay fear will often succeed better than any other. In the same connection the *Herald* remarks that many persons who have been bitten by dogs have a sort of terrorphobia and die of it. It is not hydrophobia at all, but the result of fear. One man who had this terrorphobia, and who by powerful efforts of will lived through it, describes his sensations as being horrible in the extreme. He kept possession of his reason, however, but declared it was all he could do to keep from going mad. It may be pretty surely believed that any case of so-called hydrophobia occurring three or four months after the biting is spurious. There are genuine cases of this disease, no doubt; how many, nobody knows.

**REMEDY FOR COLD FEET.**—The following remedy for cold feet is recommended for sedentary sufferers, as well as policemen, car-drivers and others who are exposed to the cold: All that is necessary is to stand erect and very gradually lift one's self up upon the tips of the toes, so as to pull all the tendons of the foot at full strain. This is not to hop or jump up and down, but simply to rise—the slower the better—upon tiptoe, and to remain standing on the point of the toes as long as possible, then gradually coming to the natural position. Repeat this several times, and, by the amount of the work the tips of the toes are made to do in sustaining the body's weight, a sufficient and lively circulation is set up. A heavy pair of woolen stockings drawn over thin cotton ones is also recommended for keeping the feet warm.

**TO CURE REDNESS OF THE NOSE.**—A correspondent sends to the editor of the *Boston Globe* the following recipe to cure redness of the nose: "Sulphuret of potash two drams, tincture of benzine one-half ounce, glycerine one ounce, rose-water one and one-fourth pints. Dissolve the potash with a third of the rose-water, then add the benzine and gradually stir in the remainder of the rose-water." How this is to be used the writer does not explain. As a general thing a red nose will be most easily cured by changing the potatoes at the bar from whatever it may previously have been to lemonade.

**ANILINE OIL AS AN ANÆSTHETIC.**—Physicians are now using aniline oil as a local anæsthetic when simple operations, such as the opening of a felon, are to be performed. The finger, in such a case, is dipped for a short time in the oil, and although the flesh may subsequently be cut to the bone, it is said there is absolutely no pain.

The *Medical World* tells of a patient whose prematurely gray hair is returning to its natural color under the internal administration of phosphorized cod-liver oil.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Alameda.

**COAL.**—Livermore Herald, August 14: Jenkins Richards is about to make an effort to organize a company to continue the work he has been prosecuting for some time past at the Livermore coal mine. He is now in 460 feet and within about 140 feet of the vein. He has been working across the fault, following the loose and broken masses of coal. He is now, however, at a financial standstill, and must have assistance in order to go on. As soon as the vein is reached he will have an immense wall of coal to draw upon above the level of his tunnel, which can be taken out at a very small expense. There will be no hoisting, everything being on a level. There is certainly a fortune in this mine, and somebody will realize it while we are standing still. The vein is five feet in width and the coal of excellent quality. At some points the vein will reach from 400 to 600 feet above the tunnel.

## Amador.

**LOYAL LEAD.**—Amador Ledger, Aug. 11: This promising mine near Drytown continues to turn out handsomely. The last two or three crushings have averaged between \$7 and \$8 per ton in free gold. For last month's run the owners received a dividend of \$200 apiece after paying all running expenses.

**MISCELLANEOUS.**—At the Kennedy the material for the 40-stamp mill is arriving on the ground very fast. Six or seven teams are engaged in hauling from Ione. Next week the mechanics will commence to put the mill together. Two or three of the principal owners of the Consolidated Amador are expected here daily, their mission being to take some action with regard to the future of the mine. It is thought by many that an entire change of program will be made if operations are resumed; that the water will be taken out of the old mine to a certain depth, and a connection made between the two shafts. The Lincoln mine paid off this week. The ten-stamp mill of the Iowa is running satisfactorily to all concerned. The look of the plates warrants the belief that the rock will pay handsomely. Operations have been started again at the McIntyre mine north of town. Two or three men are employed. Mr. McIntyre is confident that it will turn out a good mine.

## Calaveras.

**AGAIN IN OPERATION.**—Calaveras Chronicle: The machinery at the Utica mine in this town having been thoroughly repaired since the explosion, started up last Monday for the purpose of freeing the mine from water. Work will commence in a few days. Mr. Lane, the superintendent, being possessed of untiring energy, lost no time in placing the mine in working order again. We welcome the shrill blast of the Utica whistle as in times past.

## El Dorado.

**TUNNEL.**—Placerville Observer, August 14: John B. Paginini was in Placerville Saturday. He says the tunnel in his gravel mine at Newtown is now in for a distance of 500 feet, in addition to the open cut, and that the gravel shows considerable free gold. While but a small force of men are now employed there is room for many more, who will be put on as soon as the necessary pumping machinery is in place.

**MINING ACTIVITY.**—There is great mining activity at Poverty Point. The quartz mill at that place is kept almost constantly at work on custom rock extracted in its vicinity. On Sunday last a four-days' run was completed on rock taken from the Hulbert Bros.' mine. At present the rock is being crushed from the mine of Cohn & Smith, while Gus Salcovitch has 50 tons of ore waiting at the mill to be crushed.

## Fresno.

**MILL RUNNING.**—Fresno Expositor, Aug. 14: J. McNally came down from the Abby mine last night. He reports that their mill is running steadily, crushing about 20 tons of ore a day, and yielding handsomely.

**TO BE SOLD.**—The Hildreth mine, adjoining the celebrated Abby mine, and fully equal in extent and richness, is advertised to be sold at trustee's sale on Sept. 10th.

**THE ABBY MINE.**—W. H. Tew, of Hildreth, came down yesterday. He reports the Abby mine as doing well. Their 10-stamp mill is putting out about \$1000 a day. Mr. Tew was making arrangements to have about 12,000 pounds of freight moved from this place to Hildreth, for the firm of Brower & Grayson. Everything is booming in that quarter.

## Lake.

**GOLD HILL.**—Lower Lake Bulletin, Aug. 14: At Sulphur creek the old Manzanita mine is again in operation and its little quartz mill is pounding away at its auriferous ore. Considerable money has been invested by the new proprietors in machinery and works at the Cherry mine, but they do not yet seem to have started up—at least there was no smoke from the huge smoke-stack the other day. Alex. Hunger and Mr. Williams are driving a prospect down on their coal vein which promises well.

## Mono.

**BODIE.**—Cor. Virginia Enterprise, Aug. 15: The old reliable Standard Con. Mill and Mining Co. is at present doing considerable work under the judicious management of Supt. A. Pettibone. The Standard half of the Bulwer-Standard mill is kept steadily at work crushing Standard ore, and report says will start the other side (Bulwer) on the same ore in a few days. Mr. Pettibone started the old Standard mill going on their surplus tailings. Some three weeks ago Captain Kelly, of the Bodie, Lent, Mono, Bulwer and Dudley Mining Companies, started in to remove the Bodie mill and residences from the old mill-site—two miles down the canyon—to the Lent shaft, which work will be completed in a month hence. This change will greatly facilitate the workings of those mines. The Dudley mine is going to be prospected through the Lent shaft. The Bodie Tunnel mill will start up again on Tunnel ore,

The mill will be under the management of Captain Buckley, superintending both mine and mill, an experienced millman and mechanic. Bodie has a brighter outlook to-day than for a long time past. Many old Bodieites who left this camp some years ago, for better or worse, are on the repentant stool and coming back. Notably among the many may be seen Malachi Norton, an old resident of this camp, and formerly constable of your city, coming to us from the land of cactus and rattlesnakes, and Jerry Ryan, another old Comstocker, returned yesterday, coming from Montana, Idaho, Utah and California. Old miners from Nevada and California mountains do not take kindly to tenderfoot camps, especially where they camp at night with the thermometer registering 120 degrees.

## Nevada.

**MORNING STAR DRIFT MINE.**—Grass Valley Union, Aug. 11: On Monday, Captain Frank Richards went over to Iowa Hill to visit the Morning Star drift mine, in which he and other Grass Valleyans are interested. This mine has been heretofore mentioned in the Union, having obtained rich prospects by making a raise from the tunnel into the gravel channel and then drifting along the channel for a distance of over 400 feet. The last gravel taken out yielded \$3 to the carload, and one man could take out two loads of gravel per day. At the point where the upraise was the tunnel was in 1900 feet, and it was found necessary to continue this tunnel 500 feet to bring it under the channel where the rich pay was found, in order to secure practical and economical working. To this end a contract was let to John Hobson, of Iowa Hill, to run 500 feet of tunnel, and he has had a force of men upon it for some months. The rock is found exceedingly hard, as many as 50 drills being used in putting down a single hole. Of late, the ground has been a little more favorable; but yet only about six feet of drift run under the contract, and it is hoped to complete the full 500 feet by the first of the new year. The work is tedious and expensive, but the rich prospects obtained is full encouragement, as when the channel is opened up a large output of gold will certainly be realized.

**ROCKY BAR.**—Grass Valley Union, Aug. 10: Twenty men are at work on tribute in the Rocky Bar mine. The hoisting and pumping machinery from the Eureka mine, Gold Flat, is being removed to the Lone Tree mine, of this district, and will be in running order on the latter mine in 10 or 12 days, when underground operations will be resumed. The Lone Tree was looking well when operations were suspended on account of the water.

**GOLD PRODUCERS.**—Tidings, Aug. 8: The Idaho is still looking first rate in its bottom or working levels. Good results are expected from the 1700 level, which is soon to be opened. The Empire is doing as well if not better than ever, and the new mill is the admiration of all who see it. The two large air compressors arrived here yesterday from the Risdon Iron Works, and are being taken from the depot to be placed in position at the mine. The Badger has a very good-looking ledge in the bottom of the shaft. While no free gold is visible to the naked eye, the ore is of fine quality. The ledge is widening out and it is hoped that better ground will soon be reached, as it is now extra hard ground to work. Mr. Wm. Body will, in all probability, soon commence making preparations for erecting a mill at the North Star. The mine is doing well; in fact, all that has been claimed for it—and the company will soon have a mill of their own. Tretheway & Co. have taken a contract for sinking the shaft of the Loami 50 feet, and also to pump out the mine. The shaft is about 145 feet deep now and contains about 100 feet of water. A six-inch pump is now in position at the shaft and the mine will soon be clear of water, when sinking will commence. The Loami is located west of the Adams ranch, and the company are searching for the famous Alta gravel lead, with good indications of being near it. One thing to be regretted: There are too many valuable quartz mines lying idle around here. The owners of these mines have plenty of money and are living elsewhere in ease and luxury. They have patents upon their mines and are perfectly independent as to whether they are worked or not. The work in the Horse Shoe mine, on Wolf creek, is going steadily ahead, and the company are not bothered nearly so much with water as they expected to be. The shaft is now down 140 feet, the contractors who are to sink it having made 10 feet already. The ledge in the drift is about 2½ feet wide and prospects well, many pieces taken from the ledge showing free gold, and all of the ledge being good ore. The Horse Shoe, it is pretty certain, is the same ledge as the famous Allison Ranch. The Lone Tree Company has commenced erecting machinery on its prospect. It purchased machinery from C. W. Cross, at Nevada City, and it is now being hauled to the mine. The Central mine, on Greenhorn creek, started up Monday under favorable circumstances. We expect before many days to chronicle some good results from this mine, for it looks well.

**THE CHICAGO CON.**—Nevada Transcript, Aug. 15: At the Chicago quartz mine on Gold Flat, near the Pittsburg, the third level is now being sunk for. The ledge is of fair size and quality. It is proposed by the parties who hold the bond to have some more extracted on tribute.

**MACHINERY MOVED.**—J. C. Locklin has removed the hoisting and pumping machinery that he put up some time ago on the Macklin ledge, to the Chapman Ranch ledge about 1000 feet below. He will thoroughly prospect the latter.

**THE MOUNTAINEER MINE.**—Transcript, Aug. 13: The work of erecting stronger hoisting machinery in the tunnel of the Mountaineer mine than has heretofore been used will begin shortly. The change will cost between \$8000 and \$10,000, and while it is being made the mill will be shut down more or less. When the new works are in operation, however, the mine can be worked to much better advantage than at present, and the increased output will in due time compensate for the outlay required for the improvement.

**QUARTZ.**—North San Juan Times, Aug. 14: A new quartz ledge has been struck below Buckeye Hill by J. P. Sudger and John McCoy. This is of the white quartz formation and prospects well. Good paying ledges are being found in this vicinity almost every day, which leads us to the belief that North San Juan is on the verge of a mining boom. The boss quartz mill is expected to arrive here to-day,

and will be put in place at once. The framework is all up and all that will have to be done will be to put the mill in position. Water will be taken out of the Milton ditch in a pipe that is already laid, and the mill will be run by a Pelton wheel. In our last issue we stated that the ledge in the Delhi mine, as then developed was 2½ feet wide. Since then it has been widening continually as the tunnel is driven ahead, until now the width is 8 feet. The rock is very rich, as the next monthly statement will show. We learn that for the present the rock will be taken to the mill on a tramway.

## Shasta.

**BULLION.**—Shasta Co. Democrat, Aug. 11: Last week Tom Greene brought down another good-sized chunk of bullion, the first cleanup from his new mill. It is reported that a New York incorporated company is soon to take hold of certain mining property on Squaw Creek. The Winthrop company has resumed work on the mine of that name at Copper City. A force of men are at work cleaning out the old tunnel and running one to tap a new body of ore. Peter Scheerer informs us that so far the process erected on his mine has proved satisfactory, with one exception, and that is, the plant does not reduce as much ore by consideration as was claimed for it. From 2400 pounds of ore, second class black slate ore, yielded \$400, a result far in excess of what was anticipated. He says the capacity of the plant is to be increased immediately sufficient to work ten tons of ore per day. Mr. Scheerer is in high spirits and feels confident of achieving grand success.

## Sierra.

**MONTPELIER.**—Mt. Messenger, Aug. 14: The owners of the Montpelier mine (the old Wheeler quartz mine) are expected out from Boston at an early day to examine the property with a view of developing it. The Wheeler ledge was very rich in the upper level, and paid well with the one-horse mill in use at that early day. A lower tunnel was run nearly 20 years ago and a good-sized ledge cut, but so far as we remember no prospecting was done. This tunnel was put in only about 300 feet. With improved appliances we can now work rock at a profit that would not pay 20 years ago. We hope soon to see one of Forbes' mills crushing rock from this ledge. P. A. Haven is making arrangements to further develop his quartz ledge at Gold Lake. The ledge was worked in early days and paid well. Another nugget of gold worth in the neighborhood of \$800 was found a few days since by Steelman & Hays at their diggings in Gold Lake district. The Pennsylvania company are preparing to start a tunnel to open their drift gravel claims near Cornish ranch. A shaft has been sunk 200 feet on the channel.

**GOOD NEWS FROM GOLD LAKE.**—Sierra Tribune, Aug. 14: A prospector was in from Gold Lake Sunday. He says that the owners of the Forest King are pretty sure they have a big thing. They have a drift in on their ledge 70 feet. The vein is about three feet wide, of solid quartz that they believe will average \$50 a ton. The drift is being pushed ahead. This mine is owned by Loyaltan parties. A shaft has also been sunk on what is known as the old Rhodes mine. This is owned by parties from the Valley.

**MEADOW LAKE BOOM.**—We learn that matters at Meadow Lake are "booming." The company are building a fine road to Cisco, on the Central Pacific, which is said to be 12 miles from the mines. Lumber is going in from about Sierraville, town lots are staked off by a number of persons, and there is over 200 tons of freight at Truckee for the camp. The new company show that they have the utmost confidence in their ability to work the ores. Several tons of the ore have recently been shipped to San Francisco for trial by still another new process. If they can only work the ore "there's millions in it."

**YOUNG AMERICA COMPANY MEETING.**—At the last regular meeting of the Young America Mining Co., the following named gentlemen were elected directors for the ensuing term: A. C. Busch, Watt Hughes, Oliver Saunderson, John Saunderson and Phillip Deidesheimer. Mr. Busch was elected president and treasurer and Henry Knuthson secretary. A dividend of four cents per share was declared, aggregating \$20,000. The last cleanup amounted to \$28,700—\$200 more than was stated last week.

**THE OLIO.**—The Olio quartz mine, located between Deer Lake and Gold valley, about eight miles from town, is owned principally by T. Berger, formerly superintendent of the Marguerite mine. One hundred and fifty feet of tunnel has been run to tap the ledge, and it is expected to reach the lode in about 25 feet further. Progress has been slow on account of the hardness of the rock through which the tunnel has been run, but it is thought that a change for the better will be developed soon. Some of the quartz has been assayed by A. Maltman, the results being \$13.35 in gold to the ton and \$1.50 in silver.

**WARNER'S MINE.**—Mr. Stoddard, of Grass Valley, and C. B. Shattuck, of San Francisco, had a consultation with Harry Warner last evening in regard to the latter's mine. Through a failure to come to terms satisfactory to all parties concerned, nothing definite was arrived at. We understand that Mr. Warner wanted to pay him a certain amount of money within so many days, and that they wanted a longer time in which to raise the coin.

## Siskiyou.

**THE KLAMATH RIVER MINES.**—Yreka Union, Aug. 12: The Kanaka Co. struck good gravel on Tuesday and took out \$140. This is the first pay the company has realized, having been engaged in getting their mine in good working order. At the Fort Jones claim it was expected that bedrock would be reached yesterday, in which case the owners will soon be realizing a profit from their labors. The Phil Mott claim bids fair to pay handsomely this season. Bedrock has been reached and a large force of men are working night and day. Nothing definite can be learned as to what the Chinese companies on the river are doing, but they are pegging away and no doubt realizing big pay.

**SCOTT BAR ITEMS.**—Yreka Union, Aug. 12: The future prospects of Scott Bar seem rather bright. The company which bought Quartz Hill intends putting up a mill, which is already on the road from below. Several new locations have been made in

and near this vicinity. There is talk of the San Jose Ditch & Mining Co. starting up operations on a large scale. Brunt & Co.'s claim is paying well on French Bar. They are making good wages.

## Trinity.

**DEADWOOD.**—Cor. Trinity Journal, Aug. 12: All the mines flourish as usual. The addition of five stamps on the Brown Bear is quite an improvement and looks more like business than ever. Geo. Chenoweth, after doing a large amount of work on the Black Bear, has at last struck a lode which gives evidence of being a bonanza. The ledge is from six inches to two feet in width and prospects like old times. George is one of those faithful boys that never give up, and we hope his efforts may be crowned with success. Lamb & Co. are crushing ore from a rich and promising vein, and George Klein's cannon-ball mill is rattling away on good ore. Collopy & Kearney have purchased a half interest in a very rich vein on Thorn Gulch. Active work is now being done and the ore coming out is immense. Gibson & Leavitt on the Little Gem have a good-sized rich ledge, and are extracting ore at a lively rate. Rumor has it that Wm. Blagrove and others have struck a very rich ledge on the Brown Bear location. The vein is reported to be large and well-defined, carrying gold in paying quantities. McDonald & Franck's new tunnel is making rapid progress under the management of that scientific miner, Dick Roberts. Dave Mendenhall's dump pile is bargained for; arrangements have been made, and the dump will soon have a complete overhauling. All the mines seem to prosper, and Deadwood keeps well up to the old-time standard.

## NEVADA.

## Washoe District.

**CHOLLAR.**—Enterprise, Aug. 14: The crosscut west on the 3200 level has been discontinued and the main south lateral drift is again being advanced. Its face is in about 90 feet from the Combination shaft station and running in favorable material along the east side of the ore vein. The diamond drill is being sent east through the vein on the 3700 level from the main south lateral drift, about midway of the mine, to explore the richness of things in that direction.

**CON. CALIFORNIA AND VIRGINIA.**—The daily yield of ore is about the same—400 tons—but the quality has considerably improved the last two or three weeks, the average ore, per mill battery samples, running as high as \$16 per ton. The exploration and development work on the 1400 and 1650 levels progresses well, and a station is being opened from the old Consolidated Virginia shaft, for westward explorations at that eligible point.

**SAVAGE.**—The ore body developed by the main south or southwest lateral drift on the 600 level continues looking finely, with improvement as further developed. The best portion of the vein is a reminder of the rich ore of bonanza days. Both crosscuts west show fine ore, and it continues being hoisted to the surface through the Gould and Curry shaft.

**BEST AND BELCHER.**—On the 600 level the west crosscut has been extended 39 feet, and the east crosscut about the same distance, both in vein porphyry and clay, with small quartz s'ms. The practical building of the heavy stone bulkhead on the 2500 level, north of the Osbiston shaft, was commenced on Monday last.

**SIERRA NEVADA.**—On the 500 level north lateral drift No. 2 has been extended 48 feet, making a total of 475 feet. Material in face, vein porphyry with a little clay. A small force of men are at work prospecting the croppings on Cedar Hill, and taking out some pretty good ore occasionally.

**HALE AND NORCROSS.**—On the 3200 level good working progress is being made in the several crosscuts, east and west, with no new features of interest to report, although strongly mineralized quartz is met with, and the indications for finding the ore vein, especially to the westward, continue first-rate.

**YELLOW JACKET.**—The regular daily yield has fallen to about 100 tons by reason of 50 miners having to be drafted on account of the low stage of water in the Carson river not giving sufficient motive power to run the Brunswick mill. Steam will probably be substituted before long.

**MEXICAN AND UNION.**—Running the north west drift on the 700 level of Union Consolidated and crosscut No. 2 on the 700 of Mexican is the principal work being done in these two mines. Material in both, vein porphyry, with streaks of clay and decomposed quartz.

**OPHIR.**—The exploration work on the 1300 and 1450 levels makes the usual good progress, a southwest drift having been commenced at a point in the main south drift 340 feet south of the shaft. The repairs to the timbering of the shaft are completed.

**GOULD AND CURRY.**—North lateral drift No. 1, 150 feet above the 600 level, has been extended 39 feet, and the northeast drift from the east side of the incline station has been extended 30 feet. The material in both drifts is simply clay and porphyry.

**CROWN POINT AND BELCHER.**—The repairs to the incline engine are being pushed forward to completion as speedily as possible, but it will take another week at least.

**KENTUCK.**—Forty tons per day continues to be the regular daily yield from the old upper levels. It is simply low-grade ore which pays for milling.

**ALTA.**—The main lateral drift south from the west drift, skirting along the east side of the Keystone vein, on the 700 level, is now 183 feet in length.

## Central District.

**CONCENTRATING BY WIND.**—Silver State, Aug. 14: M. S. Thompson, who is engaged in mining at Central district, has built a small concentrator, which he runs by hand, and which separates sulphurets from quartz and gangue by a current of air forced through the machine by a blower. Mr. Thompson says the machine does good work, and he thinks can be arranged to save chlorides as well as sulphurets.

**CONTRACT LET.**—Richard Carter & Co. have the contract for sinking a new shaft on the St. John's ledge, Alta Hill. The shaft is to be 30 feet deep, under the contract, and the contractor to furnish all necessary supplies. Work was commenced yesterday.



**Columbus District.**

**HOLMES.**—Candelaria True Fissure, Aug. 14: In the east end of the seventh level we are extracting ore from the old Belle footwall ledge. The ledge has improved in size since last week. The stope below the General Thomas and near the old seventh is producing well. This stope is fully 100 feet long. The ledge is wider and the grade of the ore is better than at last report. The drift from eighth level running south to cut this ore body has not reached the ledge. The hanging wall of this ledge is very hard and progress is slower than we expected. The stope below eastern end of Bob Morris looks well and is producing good ore. We are now satisfied that this ledge is the same as the Morris, and the waste rock in the face of Morris that we supposed was the east end of Morris ledge is only a bunch of waste in the ledge. The stope below east end of eighth level is looking well and producing well. In the main tenth we are running south to cut the Yankee ledge. We are very near it and expect to cut it during the next two or three days. The General Thomas or 11th level going east is in a splendid formation and looks like we ought to cut the ledge very soon.

**MOUNT DIABLO.**—The winze from the west drift on the seventh level is down 103 feet and the south crosscut from this drift is in 41 feet. The south crosscut from the west drift on the sixth level is in 125 feet and the north crosscut from this drift is in 340 feet. We have sunk a few feet on a small streak of ore between the fifth and sixth, but at present there is very little showing. The raise from the intermediate between the fourth and fifth levels is up 12 feet and shows a small streak of ore. The drift in the intermediate between the first and second levels is in 28 feet and the face shows a foot of \$150 ore. The ore at the mill is all worked up and the cleanup will be finished in a few days.

**Eureka District.**

**ORE SHIPMENTS.**—*Sentinel*, Aug. 14: During the past week, ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Richmond works—Antonazzi mine, 2 tons; Whippoorwill, 15; Endeavor, 5; Silver Lick, 27; Marguerita, 22; King Lear, 3½; White Pine, 3; Bullwhacker, 2; Excelsior, 7½; Laird, 7; Silver Connor, 45. To the Eureka Con. works—Frazier & Molino mine, 3½ tons; Paul, 1; Dunderberg, 81; Featherstone, 8½; Queen, ¼; Jackson, 25; Baldy, 2½; Alturas, 8½.

**Grantsville District.**

**RUNNING STEADILY.**—*Belmont Courier*, Aug. 14: Deputy District Attorney John Reynolds, who returned from Grantsville on Monday's Austin stage, informs us that the Alexander mill is running steadily and doing good work. The Golden Gate Concentrator, which has just been put in place by George W. Waitt, of 21 and 23 Fremont street, San Francisco, Cal., does all that has been claimed for it in a highly satisfactory manner, and John Phillips thinks that it is fully capable of concentrating the ore from 20 stamps. This ore is coming from the sixth level of the Alexander. There is an abundance of it in the mine, and if the concentrations are successfully treated, Grantsville has a good chance of becoming a live camp again and a steady bullion-producer. At present the heavy discount on silver eats up the profits that ought to go to Phillips & Kuchel, but it is hoped that silver will soon be on the up-grade. The mill is being run under the direction of C. J. Kuchel, and the mine by John Phillips, who is a miner of large experience both in California and Nevada.

**Hawthorne District.**

**LAPANTA BULLION YIELD.**—*Virginia Enterprise*, Aug. 11: The 40 tons of ore recently mentioned in this paper as being worked at the Thompson mill, Lower Gold Hill, yielded \$5100, or \$127.50 per ton. This is what might be called pretty good ore, and as for the bullion, there is no discount on that, it being nearly pure gold. There is plenty more of that rich ore in the golden Lapanta.

**Ione District.**

**ORE.**—*Belmont Courier*, Aug. 14: The chloridizers of Ione are taking out some fine ore.

**Morey District.**

**CHLORIDERS.**—*Belmont Courier*, Aug. 14: Some very fine ore is being extracted from some of the Morey mines by chloriders.

**Ophir Canyon District.**

**CHICAGO M. & M. Co.**—*Eureka Sentinel*, Aug. 10: The town of Ophir, where is located the property of the Chicago Mill and Mining Company, has a population of 150, ten of whom are women. The company named have there a mill of 20 stamps which crushes 25 tons a day. They use a White furnace, for which much excellence is claimed. The stamps never hang up unless there is a breakage or for a cleanup. The ore supply is unfailing, and if the mill were double the capacity it could easily be kept going. It has been the custom not to sort the ore closely but to run it through about as it came from the mine. By this means much that was low grade was crushed and occupied the attention of the stamps as long as 200-ounce ore would. This will now be changed and by judicious sorting the yield of the mill can be easily increased 25 per cent. It is now producing a bar of bullion a day, which runs about 4 fine in gold. H. H. Warne, who is well known in Eureka, and others have a gold mine perched on the hillside opposite the town, and are said to have very excellent prospects. They are erecting a three-stamp mill, to be run by water power to test it, and they hope it will prove a bonanza.

**THE MILL.**—*Belmont Courier*, Aug. 14: The three-stamp mill owned by Leonard, Cruickshanks & Warne is completed and will soon drop stamps on ore from their gold mine in Ophir canyon. There are quite a number of gold mines in Nye county, but for some reason or other they are not worked. They will all pay if properly handled.

**Tuscarora District.**

**NORTH BELLE ISLE.**—*Times-Review*, Aug. 12: The work on the 150-foot level has advanced 8 feet during the past week.

**NAVAJO.**—During the past week the south drift on the east vein, 250-foot level, has been extended 18 feet. The stopes are yielding the usual amount of ore.

**Wild Rose District.**

**CONCENTRATED ORE.**—*Silver State*, Aug. 16: One of the Paradise Valley Co.'s teams arrived yesterday from the mill with 24,000 pounds of concentrated ore.

**ARIZONA.**

**CHERRY CREEK.**—*Prescott Courier*, August 14: The steam arastra in Cherry creek district is doing good work; gold rock now being crushed by it is paying right well. The mill and concentrators on Groom creek are being run night and day. A lot of gold rock which Chris Linde had put through paid \$25 per ton in free gold. Mr. Craigue's tailings, from the Buzzard mine, yielded well. Mill is now crushing Parker gold rock. Col. Bigelow says he is prepared to furnish a smelter with any number of tons of good ore from his mines in Hassayampa district. We know many more mine-owners who can do quite as well. So everybody is praying for the railroad and smelter. The man who discovered the rich ledge of gold-bearing quartz near Lynx creek is very reticent concerning the same, but it is a fact that the rock is very rich.

**BRITISH COLUMBIA.**

**THE BOOM BURSTED.**—*Victoria Colonist*, August 7: A gentleman who arrived yesterday from Granite creek confirms the late reports we have given of the flat times prevailing there, and says that with the exception of Granite creek proper, and the Beaver and San Francisco claims, in the Tulameen river, all claims have been left. Along the creek extending some four miles above and below Granite City, miners are busily working, and with these it is thought that the results will be good enough; although with the exception of what was taken out last year nothing is known of the richness of the creek. Until more favorable reports of the diggings are received it is thought that more men will go in, the number of arrivals having most materially lessened.

**COLORADO.**

**THE LATEST STRIKE.**—*La Plata Miner*, Aug. 12: The latest strike in the Lake lode at Red Mountain is by far the most substantial yet made in the mine. The shaft for some weeks has been in a large body of ore, but, unfortunately for all concerned, much too low a grade to ship. Notwithstanding this drawback, the Messrs. Rapp & Co. have kept diligently at work on the shaft and Thursday morning were rewarded with the appearance of a body of ore altogether different from that previously obtained. A sample of 25 pounds was quickly made up and taken to the assay office at Ironton, and the returns brought down by Mr. David Lowenstein were 400 ounces silver and 2 ounces gold per ton. The strike was made in the level which is being run to cut the shaft, and the ore body promises to be both permanent and remunerative. The Erickson Bros. are making old Anvil mountain boom with the blasts in the Emerald mine. The boys have lately taken a lease of the property and have made a new opening on the vein. Joe brought down a fine chunk of gray copper which had been taken from the floor of the drift, and he says there is lots of the same kind left. About two tons of good-grade ore is on the dump, and a shipment will be made in a few days. Otto Mears and Ed. Hull have a lease and bond on the Tornado mine, on Lookout mountain. This mine has in early days produced some very rich gold and silver ore, but owing to various complications the works have lain idle for several years and the workings allowed to cave in. The lessees do not intend to fix up the caved portion, but have started a 250-foot crosscut, now in 125 feet. The Tornado presents a mine of rich promise, and in the hands of such energetic men as Messrs. Mears and Hull, only success can be predicted for their enterprise.

**DAKOTA.**

**TIN.**—*Custer Chronicle*, Aug. 7: Daily developments continue to more fully confirm Custer's claim to being the great tin center of the Black Hills. For seven miles in every direction she is surrounded by a continuous chain of tin locations in all stages of development, many of which give ample promise of becoming in the near future the greatest tin producers of the world. After a careful study of the subject, we do not hesitate to say that nowhere in the world have there been lodes discovered of such surprising magnitude and of such remarkable high grade.

**IDAHO.**

**THE BONANZAS OF MILO GULCH.**—*Coeur d'Alene Record*, Aug. 7: The reporter paid another visit to Wardner a few days ago, and of course went up to see the lead and galena elephants. The main tunnel of the Sullivan has been driven 260 feet, and an enormous amount of ore is in sight. The walls fairly glitter in the dim candle light. The middle tunnel of the Bunker Hill is in about 100 feet, and the visitor, even if he is not a miner, can readily perceive that there are many thousands of tons of ore in sight. Verily the tunnels show much, but the half has not been told, and it is reasonable to believe that the hundredth part has not yet been revealed. The mines could hardly be more favorably located for economical management. No hoisting works are necessary, the main tunnels are high above the concentrating works, and well-built chutes carry the glittering ore almost into the crusher. The mines are so easily worked that the superintendent tells us six men can get out all the ore that the concentrator can use, and its average capacity is 52 tons per day, from which 17 tons of concentrates are obtained, or an average of one ton of concentrates to every three tons of ore. An effort is now being made by the lessees to secure a contract that will justify the erection of a hundred-ton concentrator on the Bunker Hill side of the gulch. A few yards below the concentrator is the well-appointed assay office of C. A. Wing, assayer for the owners. Sampling works have been purchased and will soon be in operation in charge of Mr. Wing, in a building adjoining the assay office. A short distance down the gulch is the office of Mr. Bryant, assayer

for Messrs. Esler & Wardner, lessees. Visitors receive very courteous attention from the mine-owners. Not a day passes that parties are not shown about the mines and works under the guidance of Supt. Ray or some one of the owners or lessees. It is a matter of common remark that every part of the machinery runs to perfection, and all the work about the premises is very quietly and efficiently done. The mines are veritable marvels, and it is well for Wardner and the entire Coeur d'Alene that they are in the hands of able and energetic business men.

**SILVER MINERS' WAGES.**—*Wood River Times*, August 11: Taking the price of silver as a basis, the wages of miners in Idaho are higher now, at \$3.50 per day, than when they were \$4 per day. At that time silver was worth \$1.12 per ounce, and only about three and a half ounces were required to pay for a day's work; now, with silver at 91 cents per ounce, nearly four ounces are required to pay for a day's work. In silver mines, wages at \$3.50 to-day are therefore higher than when they were \$4 per day.

**THE IMPERIAL GROUP.**—Messrs. Emerson and Symons, who, with their partner Nichols, have a lease on the Imperial group, in Greenhorn gulch, were in town to-day, looking after the sampling and sale of a lot of ore. Since taking hold of the property, about three months ago, they have shipped about 13 tons of ore that netted them an average of about \$90 per ton, and have made good wages. They expect to do a little better in future.

**THE QUAKER CITY.**—Probably as rich ore as was ever seen in quantity in Idaho has been extracted recently from the Quaker City mine, in Elkhorn gulch, which is owned by Professor Jenney and others. One lot assayed 1967.30 ounces per ton; another lot assayed 2450 ounces, and another 2300 ounces. This, exclusive of lead. Not over 12 tons of this class have been shipped, to be sure; but the returns are so good that a six-inch vein would make the owners independently rich. The Quaker City is being worked under a lease, and Professor Jenney informs the *Times* that the lessee is clearing over \$100 per day.

**ORE.**—*Ketchum Bulletin*, Aug. 14: The Queen of the Hills and Minnie Moore mines at Broadford ship a carload of ore per day each, regularly. The Carrie Leonard mine has shipped about \$45,000 worth of ore this season. There is more in the mine now than ever. A ten-ton lot of ore will be shipped from the Yankee Blade mine, Boulder, about the 20th instant. This ore is of an average value of \$300 per ton. The Blackhorse mine is now looking better than for months. They now have a good ore body and the mine is producing quite a quantity of ore. Regular shipments will be made from this date on during the season. Eugene Howe, Walt Gooding, Harry Vivian and John Moore have taken a lease on the Niagara mine, Warm Springs creek. They are now working the property and have a foot vein of good ore in sight. In a short time they expect to commence shipping ore. The Niagara belongs to the Ontario company. J. P. Lockman, Louis Roberts and M. Mayue have just taken a lease and bond on the Saratoga mine, Smoky, from the owners, Fred Potthar and I. L. Lewis. The bond calls for \$10,000 and runs for one year. The mine shows plenty of ore, and is located about a half a mile from the Carrie Leonard. M. Mayue will go over and put men to work immediately. The crew of men will be added to as required.

**NEW PLACER DIGGINGS.**—*Idaho Statesman*, Aug. 7: News comes from Idaho City that new and rich placer diggings have been discovered in Long valley. The accounts of their richness are most fabulous, said to equal anything discovered in the famous Boise basin. As a result a general stampede from the basin is made to Long valley. For years mining has been going on in a small way on the tributaries of the Payette and south fork of the Salmon river in that vicinity, but the returns have not been very large. The new diggings are said to be on Spring creek, a tributary of the Payette. Recently there was some excitement in regard to placer mines in Yellow Pine basin, but investigation did not warrant the excitement. Further investigation is awaited with interest in regard to the discoveries in Long valley.

**MONTANA.**

**HOME OF THE LOCATIONS.**—There are some 9 or 10 strongly marked lodes being prospected with the most encouraging results, from each and every foot, gained in development. The Hardfoot, with a tunnel of 40 feet, shows a vein 4½ feet wide. The Razorback gives returns as high as \$105, with an average of \$24. The Rover, Humming Bird, I X L, the Daisy, Atlas, Luenna, Maine and Boss all show from 2½ to 3 feet on the surface and carry free gold, increasing in yield with the depth attained. The Little Giant Co. is piling up a large lot of fine-looking ore from its vein of about five feet in width. The Chief, a new discovery, shows six feet of ore that prospects well. The Bona Fide has 2½ feet of a vein averaging \$16. The Gypsy, Vermilion, Shooting Star, Oro Fino and Lone Star, all discovered within the past month, give promise of merging into important gold-producers. Samples of ore from a number of the above-mentioned mines have been found to contain 6.2 ounces silver and 4.2 ounces gold, which is over \$90 per ton.

**THE ANACONDA.**—*Butte Inter-Mountain*, Aug. 14: Anaconda ore is still being shipped to the smelter and no furnaces have been discontinued during the past week. The alterations and improvements already begun, as chronicled in the *Inter-Mountain*, are still in active progress and we have reason to believe that in the near future the new as well as the old concentrator, and all furnaces, will again be in full blast. This information will prove particularly cheering, and increase if possible the already firm public faith in the great future of the Anaconda company, and the 5000 men, women, and children who directly and indirectly are depending upon it for a livelihood.

**AT WORK.**—*Butte Inter-Mountain*, Aug. 14: A week ago silver was 91½ on an apparently falling market, and it was painfully realized that any considerable decline from that point would result in severe losses to the Butte mining companies and probably close some of the mills. Apprehensions of the gravest possible nature filled the minds of the mining and business men, and it was feared that the situation would grow worse. Happily the alarm

has decreased, and Hope once more spreads her wings over the camp. Silver has advanced to 92, not with a sudden jump as if caused by speculative excitement, but slowly as though the advance was of a legitimate and permanent character. With the exception of the Clear Grit, in which the force was curtailed, no mines have ceased operations. All the big silver companies are working as usual, and most of the copper concerns are following suit, though some of them are treating more silver and less copper ore. The Anaconda people are actively prospecting the Wake Up Jim, Wild Bill, High Ore and Modoc. The Bluebird is rushing the completion of its mill untirred by the condition of the silver market. The Amy-Silversmith is fully maintaining its splendid production, and on good information the *Inter-Mountain* believes there is no sign of any diminution of the custom ore supply. This explains why a much better feeling prevails at the close of the week, and the indications are that a still further improvement can be chronicled at the close of next week.

**NEW MEXICO.**

**OSCURA MINES.**—*Cor. Socorro Bulletin*, Aug. 10: I send you some ore from the bottom of my Copper Bottom shaft, about 18 feet from the surface. It speaks for itself. We have some good claims north of this, on the same lead. I am of opinion that the ore will run fairly well in silver, perhaps some gold, and most undoubtedly high in copper. The lode from which it is taken is in all probability the mother of the mountains, and in places over 60 feet wide; while the formation is just full of feeders or small veins intersecting the main lode at different places along the surface. The ledge proper is traceable for over 50 miles, running from the north end of the Oscuras, through the Little Burros, San Andres and Organ ranges. Of course, the distance from railroad communication and the scarcity of wood and water where my copper group is located have prevented owners from doing much more than assessment work for the last five years; but it is the experience of all isolated mining camps to be deserted several times before the proper facilities are found for extensive operations, and this is especially so in camps which contain low-grade ore. Still, the recent gold strike in the Magdalenas is pretty good evidence that a low-grade country can and occasionally does produce a bonanza of rich ore. I am working five men, and will continue to do so for the next month, when, if the showing is as good as it is now, I have parties interested who will not hesitate to put a million dollars into the properties. There are a number of men working in the camps north of us. One of them, Mr. Dunn, visited my camp two weeks ago with fine specimens of exactly the same character of ore as I am now taking out, filled with copper glance, copper pyrites and red oxide of copper. I have never seen better indications for gold, and would not be surprised if some one struck it big in the near future.

**RICH RETURNS.**—*Percha Shaft*, Aug. 12: Sixteen of the 10 cars of ore shipped from the Comstock mine in New Mexico to Denver, last shipment, yielded a gross value of about \$80,000, two cars containing \$55,000. Product of the mine for the first 45 days is thus estimated by Messrs. Barton & Rugg. Shipments to Socorro 222 tons, \$45,000; sacked and loose on dumps 1200 tons, \$240,000; waste dump 500 tons, \$25,000, and Denver shipment, about 300 tons, \$800,000; a total of 2215 tons, worth \$390,000.

**OREGON.**

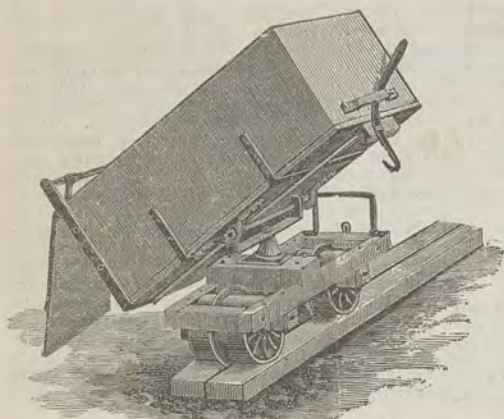
**QUARTZ AND PLACER.**—*Jacksonville Times*, Aug. 11: The mining outlook seems more favorable than for years past. M. S. Booth, of Seattle, W. T., is in Josephine county looking after chrome and quartz. Jack Layton is still at work at his gravel diggings on Farris gulch, but will soon commence cleaning up. Several parties from Forest creek have gone to the Elliott creek to mine, now that water is low enough. A considerable force is at work cleaning out the ditch, repairing flumes and getting ready for next season's run at the Sterling Co.'s mines. There is quite a quartz excitement in Ashland precinct, nearly everybody there having one or more specimens in their possession. Considerable work is being done in the quartz mines on Wagner creek. Two mills are crushing ore at a lively rate, with good prospects. More solid work in the quartz mines is now being done than at any other time during the history of Jackson county; and not without good results, either. Work continues steadily on Baume Klippel & Co.'s quartz mill, which will be in running order before many months. The machinery for it will soon arrive. It will be a first-class one. The quartz mill which has been crushing ore from the Swinden ledge in Rock Point precinct is lying idle. It now seems doubtful whether L. D. Brown will put up the new mill talked about some time since.

**UTAH.**

**PARK NOTES.**—*Record*, Aug. 14: The work of retimbering No. 2 shaft of the Ontario is nearly completed, and it is pronounced a fine job. The force at the Crescent mine has lately been increased to about 75 men, and good results are obtained. The tramway brings down about 150 tons of concentrating and shipping ore daily. Matters at the Sampson both in the tunnel and in the lower workings are looking in an improved and encouraging condition. The good work is having a telling effect. The Apex assessment has been paid up entirely; no delinquent list this time. This certainly speaks well for the faith the stockholders have in the property and its excellent management. The grading for the Morgan Hoisting Works is completed, and the sinking of the shaft will commence at once.

**ORE AND BULLION SHIPMENTS.**—During the past week the Mackintosh sampler received 354,680 pounds of Ontario ore, 164,030 pounds of Daly, and 45,320 pounds of Sampson ore. The Crescent shipped during the week 492,385 pounds of concentrates, and 116,000 pounds of first-class ore. The Daly bullion shipment from the Marsac mill was seven bars, on the 9th, containing 7309 fine ounces of silver, and on the 11th, six bars, containing 6602 fine ounces of silver. The Ontario bullion product for the week was 32 bars, containing 17,561.35 fine ounces of silver.





JAMES' PATENT ORE CAR.

This Car has two double Tread Wheels that carry it on two pieces of scantling laid side by side, two inches apart, making a track ten inches wide for the car driver to walk upon, and only requires a narrow space in the tunnels or drifts for the track. **PRICE, \$35.00.**

We have recently furnished the contractors the machinery for LA TRINIDAD (300 tons per day) and SILVER QUEEN (100 tons per day). These mines are located in Mexico and owned in London. The Process is the Wet Concentration and the plants are, without doubt, the most substantial and complete ever built.

# TATUM & BOWEN,

34 &amp; 36 FREMONT ST., Donahue Building, SAN FRANCISCO.

91 &amp; 93 FRONT ST., PORTLAND, OREGON.

## JAMES' PATENT ROCKING STAMP QUARTZ MILL.

**PRICE, \$850.00.**

CAN BE SEEN IN OPERATION AT OUR WORKS.

It is the **CHEAPEST, SIMPLEST, MOST DURABLE** and **EFFECTIVE MILL** for the Reduction and Amalgamation of Gold Ores.

NO WEAR EXCEPT ON SHOES AND DIES.

Combined weight of Boss and Shoes (1400 lbs.) is alternately imparted to EACH Shoe with any requisite degree of rapidity.

It saves a higher percentage than any other machine, and requires no skilled labor to set up and run. Weight, 3000 pounds. Capacity, 6 tons in 24 hours through No. 40 Screen. Requires 4 H. P.

## H. P. GREGORY & CO.

Nos. 2 and 4 California St., - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

# MACHINERY

SOLE AGENTS FOR

J. A. FAY &amp; CO.'S WOODWORKING MACHINERY.

FRANK &amp; CO.'S WOODWORKING MACHINERY.

NEW HAVEN MANUF'G CO.'S MACHINISTS' TOOLS.

BEMENT &amp; SON'S MACHINISTS' TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND EXHAUSTS.

SHIMER MATCHER HEADS.

BRANARD MILLING MACHINES.

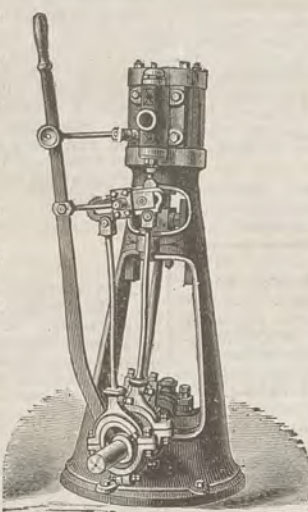
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS.

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISHERS.



YACHT ENGINES.

WILLIAMSON BROS' HOISTING ENGINES.

ATLAS ENGINE WORKS ENGINES AND BOILERS.

PAYNE'S VERTICAL AND HORIZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS.

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECTORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

THE CONSUMERS' COMPANY.

## VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

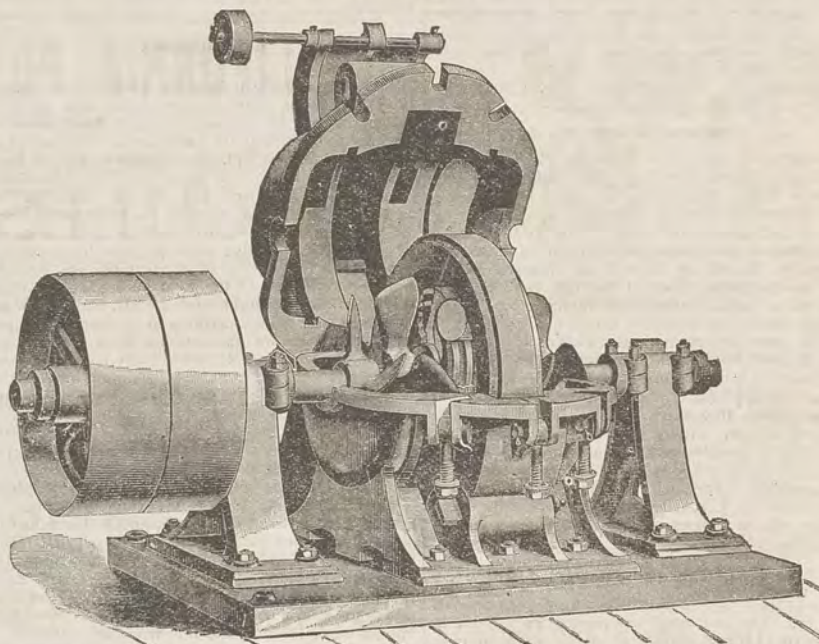
Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.

218 California Street, San Francisco, Cal.



## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied. At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet. All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco. Certificates as to performance of the Mills, and any information required, furnished on application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 &amp; 106 Washington St., NEW YORK.

OR PACIFIC IRON WORKS, SAN FRANCISCO.

## THE SCIENTIFIC PORTABLE FORGE



## AND BLACKSMITH HAND BLOWERS.

GUARANTEED

The Lightest Running! The Strongest Blast! The Most Durable!

ADAPTED TO ALL KINDS OF WORK, AND MADE IN STYLES AND SIZES TO SUIT.

THE FOOS MANUFACTURING CO., - - Springfield, Ohio

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

**MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.**

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,  
JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

UTAH OFFICE—SALT LAKE CITY, UTAH.



THE Sign of the Arkansaw Cough Syrup is looking you all square in the face.

Do you want a sure, safe and reliable Cough Syrup? Are you troubled with a Cough, Cold, Bronchitis or Lung Complaint? Do your Babies keep you awake all night with Hacking Coughs, Colds in the Head, etc. Do you want something reliable in the house to meet these emergencies? We answer to all: "Go to your Druggist and get a Bottle of the Arkansaw Cough Syrup, and be troubled no more." Price, 50 cents per Bottle!

For Sale by all Druggists.

Dewey & Co.'s Scientific Press  
Patent Agency.



OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

DEWEY & CO., Patent Agents.  
No. 252 Market St. Elevator 12 Front St.  
S. F. Telephone No. 658.

A. T. DEWEY. W. B. EWER. GEO. H. STRONG.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,  
JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

UTAH OFFICE—SALT LAKE CITY, UTAH.

## CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

### Sporting, Cannon, Mining, Blasting and HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.  
No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street - - San Francisco, Cal.

## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,  
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.



## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 & 131 Fremont Street,

San Francisco, Cal.

## THOMAS PRICE'S ASSAY OFFICE,

CHEMICAL LABORATORY,

BULLION ROOMS and ORE FLOORS,

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

## Metallurgy and Ores.

### SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY  
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,  
Under Chamberlin Patent.

J. KUSTEL.

H. KUSTEL.



METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

C. H. AARON,

ASSAYER AND METALLURGIST,

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

514 Kearny Street,

SAN FRANCISCO, - - CALIFORNIA.

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

### JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - - San Francisco.

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

### Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED 1869.

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists



The California  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco



## Wood River Gold Mines.

(Continued from page 121.)

is pushed in a systematic, economical and miner-like manner, but in proportion to the magnificent showing it is not half worked.

About 400 tons of high-grade ore is out on the Donavan group dumps, and the vast ore body exposed in the mines would justify the erection of a 40-stamp mill and keep it running for years.

Capitalists or mining men desiring reliable information on mining matters in Wood River district could not find a better posted or more thoroughly reliable man to address than Ole Rorem, Esq., of Hailey.

While prospectors in this district ask big prices for their locations, a number of instances of offering a reasonable price, "cash up and no grumbling," has had the effect of some property changing hands.

Captain Lusk, superintendent of Queen of the Hills and the Overland system of mines at Bellevue, is interested in the Donavan group, but, owing to his arduous duties looking after the properties, he neglects these gold prospects. If he would dispose of his interest to some mining man who would join Mr. Rorem in developing them, or let some Western company that would work the claims as they merit being worked, the captain would be doing Wood River a good turn.

If any one told the writer that there was such a rich gold belt as this one, with the prospects it has, and the fine opening for capital and mining men who desire an opportunity to get hold of a number of good-paying properties cheap, I would hardly have believed an exact statement of the merits of the district. The representative of the MINING AND SCIENTIFIC PRESS assures the readers that the facts set forth in this letter can be fully substantiated by investigation, and if anything the claims of the district have been underestimated rather than embellished.

## Mining Share Market.

Stocks have shown a little more animation this week than for some weeks past, though no specially large business has been done. Reported improvements on the 1400 level of the Consolidated California and Virginia, going toward the Ophir, carried up the prices of the stocks a little; but official information gives no justification to the rise. In the middle mines good development progress is made; but the expected good ore developments have not yet been arrived at in either Chollar, Hale and Norcross or Savage. In the latter mine some very excellent ore is being raised from the 600 level, and a good-sized deposit of the same is being developed; but it can hardly be classed as a big bonanza as yet, although the bullion proceeds will be very acceptable by way of paying development expenses.

It will take another week to complete the repairs to the incline engine in the Crown Point shaft. But even if that important work were completed there would be no certainty of resuming the work of ore extraction in full in the Crown Point and Belcher mines, owing to the sudden and rather unexpected subsidence of water in the Carson river, thus not furnishing the requisite supply of water power to the mills. The Brunswick mill has therefore been obliged to hang up a portion of its stamps, necessitating the drafting of a considerable portion of the mining force in the Yellow Jacket mine.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Young America (for 28 days), \$38,500; Sierra Buttes, for July, \$29,500; Martin White, August 14, \$5619; Moulton, 12, \$12,800; Lexington, 12, \$27,200; Argus, 14, \$10,265; Monitor, 14, \$15,000; Martin White, 7, \$5693; Barbers' Mill, 15, \$2000; Thalberg & Thede, 15, \$2000; Odessa Mill, 15, \$10,200; Oro Grande, 15, \$9066; Germania, 8, \$3768; Stormont, 8, \$3440; Crescent, 8, \$12,030; Queen of the Hills, 8, \$1455; Argenta, 8, \$650; Alice, 10, \$9958; Pascoe, 10, \$1850; Queen of the Hills, 11, \$5450; Germania, 12, \$9996; Alice, 13, \$14,755; Hanauer, 13, \$3230; Queen of the Hills, 14, \$5068; Hanauer, 14, \$3385; Queen of the Hills, 15, \$1285; Hanauer, 15, \$6525. The banks of Salt Lake City report the receipt for the week ending August 11th, inclusive, of \$98,587.07 in bullion and \$57,935.25 in ore, a total of \$156,522.32.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
G. W. INGALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
R. G. HUSTON—Idaho and Montana.  
GEO. McDOWELL—San Luis Obispo and Santa Clara Co's.  
FRANK W. SMITH—Montana, Utah and Colorado.  
M. S. PIERCE—Alameda Co.

A GRIST MILL is to be erected at the San Carlos Reservation, Arizona Territory, to work up the wheat raised by the peaceable Indians there during the past season.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS. ASSESSMENTS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Con Amador M Co.	California.	13.	15.	July 15.	Aug. 16.	Aug. 31.	F. B. Latham.	327 Pine St.
Con Imperial M Co.	Nevada.	23.	10.	Aug. 5.	Sept. 8.	Sept. 28.	C. L. McCoy.	329 Pine St.
Dudley M Co.	California.	12.	25.	June 21.	July 27.	Aug. 16.	J. Stadfeld Jr.	419 California St.
Eintracht Gravel M Co.	California.	12.	05.	June 5.	July 28.	Aug. 21.	H. Kunz.	409 Sansome St.
Eureka Con M Co.	Nevada.	10.	1.00.	July 28.	Sept. 8.	Sept. 25.	E. H. Wilson.	328 Montgomery St.
Forty-Nine M Co.	California.	3.	05.	July 8.	Aug. 9.	Aug. 30.	A. L. Perkins.	310 Pine St.
Golden Fleece G M Co.	California.	5.	20.	May 23.	July 31.	Aug. 21.	W. J. Glason.	Pine Block
Horseshoe M Co.	California.	10.	02.	July 27.	Aug. 30.	Sept. 15.	T. R. Covey.	Grass Valley
Hale & Norcross M Co.	Nevada.	91.	50.	July 16.	Aug. 18.	Sept. 8.	J. F. Lightner.	309 Montgomery St.
Indian Spring Drift M Co.	California.	6.	03.	July 26.	Aug. 30.	Sept. 30.	L. H. Sharp.	213 Sansome St.
Loreto M & Co.	Mexico.	9.	40.	Aug. 5.	Sept. 6.	Sept. 29.	J. A. Bridge.	324 California St.
Mount Como M Co.	Nevada.	1.	10.	Jan. 7.	Aug. 7.	Sept. 8.	M. H. Horvack.	328 Montgomery St.
Mayflower Gravel M Co.	California.	31.	25.	July 1.	Aug. 9.	Aug. 31.	J. Moriz.	328 Montgomery St.
New Coso M Co.	California.	19.	20.	July 13.	Aug. 27.	Sept. 13.	J. L. Hunt.	5 Pioneer Place
North Banner Con M Co.	California.	14.	14.	Aug. 7.	Sept. 9.	Sept. 2.	T. J. M. Hall.	Grass Valley
Occidental M Co.	Nevada.	7.	30.	Aug. 9.	Sept. 13.	Oct. 4.	A. K. Durbin.	309 Montgomery St.
Pilgrim M Co.	Idaho.	6.	01.	Aug. 7.	Sept. 17.	Oct. 16.	A. Halsey.	328 Montgomery St.
Panalteta M Co.	Mexico.	2.	30.	July 14.	Aug. 20.	Sept. 10.	M. Hergstein.	330 Sutter St.

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Alaska M Co.	California.	A. Judson.	370 Sansome St.	Annual.	Sept. 7
Brush Creek M Co.	California.	A. Judson.	320 Sansome St.	Annual.	Sept. 7
Con Amador M Co.	California.	F. B. Latham.	327 Pine St.	Annual.	Sept. 7
Goldconda M Co.	California.	J. M. Buttington.	309 California St.	Annual.	Aug. 23
Trinity M Co.	California.	J. M. Selfridge.	628 California St.	Annual.	Sept. 2

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Holmes M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	25.	Mar. 20
Mono M Co.	California.	G. W. Sessions.	359 Montgomery St.	25.	Mar. 10
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	25.	July 26
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Aug. 16
Young America M Co.	California.			40.	May 20

## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING AUGUST 10, 1886.

- 347,022.—TWO-WHEELED VEHICLE—T. S. Bayley, Alturas, Cal.  
347,041.—THROTTLE VALVE—Hopkins & Johnson, Austin, Nev.  
347,244.—TOY AIR-GUN—P. D. Horton, S. F.  
347,007.—SLIDING GRATE FOR STOVE OVENS—M. L. Miller, Oregon City, Oregon.  
347,251.—OILER—Elijah Moat, Los Angeles, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

THROTTLE-VALVE.—Herbert Hopkins and Alfred E. Johnson, Austin, Nev. No. 347,041. Dated August 10, 1886. This invention relates to a novel construction and operation for throttle-valves. It consists of a double disk or balance puppet-valve with guiding flanges and intermediate disk, an eccentric mounted on a shaft so as to rotate between the back of one of the valve-disks and the intermediate disk and shaft, and a handle by which it is operated so as to open or close the valve.

TWO-WHEELED VEHICLE.—Thos. S. Bayley, Alturas, Modoc county. No. 347,022. Dated August 10, 1886. This improvement on "carts" consists in connection with the axle and shafts, of loops or hangers, springs clipped to the frame, and a body supported by the springs. The object is to give the body such independence of movement as to enable the rider to counteract the unpleasant jogging motion which in ordinary carts is imparted to the body as the result of the jogging motion of the horse.

## New York Metal Market.

Telegraphic advices dated August 19th give the following New York prices:

BORAX—6½¢@7¼¢.  
BAR SILVER—91½¢ per oz.  
COPPER-LAKE—\$10.25.  
IRON—No. 1, \$17@18.00; No. 2, \$15@16.00.  
LEAD—\$4.85@4.95.  
QUICKSILVER—43¢@43½¢ per lb.

The following is the latest by mail from the "New York Metal Exchange Market Report":  
COPPER—Quiet but steady; Lake offered at \$10.15 @10.30. Transferable Notices (Lake) offered at 10.20; Transferable Notices (Chili Bars) offered at 10.55.

LEAD—Nominal at \$4.72½¢@4.80¢. Transferable Notices (Domestic) issued at 4.75.

TIN—Steady, closing at \$21.75@21.85. Transferable Notices issued at 21.75¢.

SILVER—New York, 92½¢ per oz. London, 42d. MAKER'S PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18@18.50; No. 2, \$17.00@17.50; Grey Forge, \$15.00@16.00.

Southern, Grade No. 1, \$18.00@18.50; No. 2, \$17@17.50; Grey Forge \$15@16.  
Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.00@22.10; Billiton Tin, \$22.00@22.35; Banca Tin, \$22.40@22.80; Baltimore Copper, \$9.25@9.40; Orford Copper, \$9.25@9.40; P. S. C. Copper, \$9.25@9.40; Foreign Lead, \$4.80@4.90; Foreign Spelter, \$4.80@4.85.

COMPOUND lenses, of every possible combination, mounted in two hours' notice. C. Muller, optician, 135 Montgomery street.

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING July 29.	WEEK ENDING Aug. 5.	WEEK ENDING Aug. 12.	WEEK ENDING Aug. 19.
Alpha.	.85	.90	.85	.80
Alta.	.70	.75	.65	.70
Andes.	.70	.75	.65	.70
Argenta.	.70	.75	.65	.70
Belcher.	.70	.75	.65	.70
Belding.	.70	.75	.65	.70
Best & Belcher.	1.60	1.85	1.25	1.05
Bullion.	.40	.30	.40	.20
Bonanza King.	.70	.75	.65	.70
Belle Isle.	.70	.75	.65	.70
Bodie Con.	2.70	2.95	2.60	2.90
Benton.	.70	.75	.65	.70
Bodie Tunnel.	.70	.75	.65	.70
Bulwer.	.85	.90	.80	.75
California.	1.65	1.90	1.35	1.05
Challenge.	.70	.75	.65	.70
Champion.	.70	.75	.65	.70
Chollar.	2.10	2.35	2.25	2.50
Confidence.	2.75	2.90	2.25	2.75
Con. Imperial.	1.65	1.90	1.35	1.05
Con. Virginia.	1.65	1.90	1.35	1.05
Con. Pacific.	.70	.75	.65	.70
Crown Point.	1.15	.95	.85	.95
Day.	.70	.75	.65	.70
Eureka Con.	2.75	2.95	2.35	2.30
Eureka Tunnel.	.70	.75	.65	.70
Excelsior.	.70	.75	.65	.70
Grand Prize.	.70	.75	.65	.70
Gould & Curry.	1.55	1.80	1.15	1.05
Goodshaw.	.70	.75	.65	.70
Hale & Norcross.	2.80	3.05	2.80	3.00
Holmes.	2.50	2.75	2.50	2.75
Independence.	.70	.75	.65	.70
Justice.	.70	.75	.65	.70
Martin White.	.70	.75	.65	.70
Mono.	2.20	2.40	2.25	2.50
Mexican.	.85	1.00	.65	.80
Mt. Diablo.	.70	.75	.65	.70
Northern Belle.	.70	.75	.65	.70
Navajo.	.70	.75	.65	.70
North Belle Isle.	.70	.75	.65	.70
Occidental.	.70	.75	.65	.70
Ophir.	1.45	1.70	1.05	1.45
Overman.	.25	.30	.15	.20
Potosi.	.80	1.20	.70	.95
Phal Con.	3.10	4.35	3.45	3.80
Savage.	3.10	4.35	3.45	3.80
Seg. Belcher.	.70	.75	.65	.70
Serra Nevada.	.85	.90	.80	.75
Silver Hill.	.70	.75	.65	.70
Silver King.	.70	.75	.65	.70
Scorpion.	.70	.75	.65	.70
Syndicate.	.70	.75	.65	.70
Toga.	.70	.75	.65	.70
Union Con.	.65	.75	.60	.70
Utah.	.90	1.35	.80	1.10
Yellow Jacket.	1.25	1.40	1.00	1.25

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., Aug. 19.	220 Justice.	45c
400 Alta.	50c	10c
50 Alpha.	70c	50c
300 B. & Belcher.	1.25	250 Mono.
50 Bodie Con.	2.60	200 Navajo.
500 Bulwer.	1.00@1.05	200 N. Belle Is.
550 Benton.	1.50	1800 Ophir.
1350 Chollar.	.85c	550 Potosi.
350 Con. Va. & Cal.	.85c	300 Peerless.
50 Con. Imperial.	.65	350 Savage.
100 Crown Point.	1.00	400 Sierra Nevada.
200 Gould & Curry.	.85c@1.00	100 Utah.
400 Hale & Nor.	1.60	100 Union Con.
100 Holmes.	1.75	50 Yellow Jacket.

## San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Aug. 19, 1886.

ANTIMONY—French Star.	91¢	—
BORAX—San Bernardino.	—	@ 8
Armago.	—	@ 61
IRON—Glenbrook ton.	—	@ 22 50
Eglinton, ton.	—	@ 21 50
American Soft, ton.	—	@ 23 00
Oregon Fig, ton.	—	@ 21 00
Clippert Cap, Nos. 1 & 4.	—	@ 22 50
Clay Lane White.	—	@ 21 50
Shots, No. 1.	—	@ 23 50
STEEL—English, lb.	14¢	@ 15
Black Diamond, ordinary sizes.	10¢	@ —
Plow.	4¢	@ 5
Machinery.	5¢	@ 6
Sanderson Bros.	10¢	@ —
COPPER—	—	—
Braziers' sizes.	30¢	@ —
Fire-box sheets.	30¢	@ —
Bolt.	19¢	@ —
Sheathing.	18¢	@ —
Ingot.	12¢	@ 13
LEAD—Pig.	4¢	@ 4 75
Bar.	54¢	@ 54
Pipe.	2¢	@ —
Sheet.	3¢	@ —
Shot, discount 10% on 500 bag.	Drop, 1¢	@ 5¢
Buck, 1/2 bag.	1.85¢	@ —
Chilled, do.	2.05¢	@ —
ZINC—German.	9¢	@ 10
Sheet, 1x3 ft. 7 to 10 lb. less the cask.	71¢	@ —
QUICKSILVER—By the flask.	37¢	@ 37 50
Flasks, old.	1.05¢	@ —
Flasks, old.	85¢	@ —
TINPLATE—Oke.	6.00¢	@ —
Charcoal.	7.00¢	@ —

THE STARR MILLS, at South Vallejo, employ 90 men regularly. The mills run night and day and convert 250 tons of wheat into flour every 24 hours.

## Books on Working Ores.

BY GUIDO KUSTEL, M. E.

ROASTING OF GOLD AND SILVER ORES (Second Edition) and the Extraction of their Respective Metals without Quicksilver. By GUIDO KUSTEL, M. E. 1880.

This rare book on the treatment of gold and silver ore without quicksilver is liberally illustrated and crammed full of facts. It gives short and concise descriptions of various processes and apparatus employed in this country and in Europe, and the why and wherefore. It contains 156 pages, embracing illustrations of furnaces, supplements and working apparatus. It is a work of great merit, by an author whose reputation is unsurpassed in his specialty. PRICE, \$3, cloth, postage free. Sold by DEWEY & Co., Publishers, 252 Market St., San Francisco, Cal.

BY C. H. AARON.

AARON'S LEACHING GOLD AND SILVER ORES, the most complete hand-book on the subject extant; 164 pages octavo. Illustrated by 12 lithographic engravings and four wood cuts. Fully indexed. Plainly written for practical men. In cloth, \$3. Sold by DEWEY & Co., S. F.

## Testing and Working Silver Ores

An illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroehnke's process, etc. Under "Pulverizing Machines" are described the arrastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

Price, post-free, \$2.00. Sold by DEWEY & Co., Publishers, 252 Market St.

## Practical Treatise on Hydraulic Mining.

BY AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' lynch. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by DEWEY & Co., Publishers, 252 Market St



**A Great Repository of Practical and Scientific Information.**

One of the Fullest, Freshest, and Most Valuable Hand-books of the Age. Indispensable to every practical man. Just Ready. Price, \$2.00. Free of Postage to any address in the world.

**THE Techno-Chemical Receipt Book:**

Containing several thousand Receipts covering the Latest, Most Important, and Most Useful Discoveries in Chemical Technology, and their Practical Application in the Arts and the Industries. Edited chiefly from the German of Drs. Winckler, Elsner, Heintze, Mierzinski, Jacobsen, Koller, and Heinzerling, with additions by William T. Brandt, Graduate of the Royal Agricultural College of Eldena, Prussia, and William H. Wahl, Ph. D. (Heid.), Secretary of the Franklin Institute, Philadelphia; author of "Galvanoplastic Manipulations," illustrated by 78 engravings. One volume, over 500 pages, 12mo., elegantly bound in scarlet cloth, gilt, closely printed, containing an immense amount and a great variety of matter.

Price, \$2.00, free of postage to any address in the world.

**ABSTRACT OF CONTENTS:** Adulterations, Imitations, etc. How to Detect Them; Alloys; Artificial Gems, Pearls, and Turkish Beads; Bitters, Cordials, Elixirs, Liqueurs, Rafafias, and Essences, Extracts, Tinctures, and Waters Used in their Manufacture, and the Manner of Coloring them; Blasting Compounds, Blasting Powder, Dynamite, Gun Cotton, Gunpowder, Nitro-Glycerine, Fulminates, etc.; Bleaching; Boiler Incrustations; Bone, Horn, and Ivory, to Bleach and Dye them, and make Imitations and Compositions; Bronzing and Coloring of Metals; Building Materials, Artificial Building Stone, Mortars, etc.; Cocoa and Chocolate; Celluloid, Caoutchouc, Gutta Percha, and Similar Compositions; Cements, Pastes and Putties; Chemical and Techno-Chemical Expedients, Preparations; Cleansing, Polishing, and Renovating Agents; Colored Chalks, Crayons, Pencils, and Inks for Marking Linen, etc.; Confectionery; Copying and Printing; Damascening Steel; Decoration, Ornamentation, etc.; Dentifrices and Mouth Washes; Dyeing Woolen and Cotton Goods, and Yarns, Silk, Straw Hats, Felt Hats, Kid Gloves, Horsehair, etc.; Mordants; Electro-Plating, Galvanoplastic, Gilding, Nickelizing, Silvering, Tinning, etc.; Enamels and Enameling; Feathers, Ostrich, Marabouts, etc., how to Wash, Restore and Dye; Fire-extinguishing Agents and Means of Making Tissues; Wood, etc. Incombustible; Fireworks; Food and Food Preparations; Freezing Mixtures; Fruit and other Syrups; Fuel and Heating, Heat Insulation (Non-conducting coverings); Fusible Colors used in Porcelain Painting; Glass, Composition of the various kinds of, Colors for, and Processes for Enameling, Engraving, Gilding, Silvering, Pulverizing, Filing, Bending, etc.; Glazes for Earthenware; Glass and other Signs; Glue, Manufacture of; Household and Rural Economy; Illuminating Materials; Imitations, Substitutes, etc.; Indigo, Indigotine, and Alizarine; Inks, Lithographic, Printing, and Writing; Jeweler's Foils; Lacquers and Varnishes; Leather, Tanning and Dyeing, including Furs, etc.; Liquors and Beverages: Beer, Brandy, Gin, Whisky, Wines, etc.; Lubricants for Machines, Wagons, etc.; Marine Glue; Matches; Metal Industry: Mustards; Oils and Fats, Animal, Vegetable, and Mineral; Oil Paintings; How to Cleanse, Pack, and Varnish them, and to Restore Gilt Work; Paints and Pigments. Grinding and Mixing Colors, Graining, Imitation of Marbles. Paints and Washes for Various Purposes, etc. Paper and Paper Materials, Manufacture, Staining, etc.; Glass, Sand and Emery Paper; Perfumery, Aromatic Vinegars, Cosmetics, Extracts, Hair Oils, Pomades, Powders, Washes, Fumigating Articles, etc.; Pharmaceutical preparations; Photography; Plaster of Paris Casts which can be Washed; Preserving Meat, Milk, Vegetables, Vegetable Substances, Wood, etc., and Preservatives; Sealing Wax and Wafers; Sho-Blacking, Dressings, etc.; Sizing and Dressing for Cotton, Wool, Straw, etc.; Soap, Hard and Soft Soaps, Medicated and Toilet Soaps, etc.; Soldering and Solder; Sugars, Glucose, etc.; Textile Fabrics and Tissues; Tobacco, Smoking Tobacco, Snuff, Sternuative Powders, etc.; Vinegar; Manufacture of Ordinary and Fine Table Vinegars; Washing and Scouring, Manufacture of Washing Blue, etc.; Waste and Offal, Utilization of; Water-Glass (Soluble Glass) and its Uses; Water-proofing Compounds; Wax and Wax Preparations; Wood Gilding, Polishing, Staining, etc.; Yeasts, Manufacture of Pressed Yeasts, Bakers' and Brewers' Yeast, etc.; **Addenda.** Alloys; Antiseptic and Preservative Agents; Artificial Eyes, Manufacture of; Asbestos and its Uses; Bleaching; Bookbinding, Gilding, and Ornamenting; Bronzing Gilding, Silvering, etc.; Building Materials, Celluloid, Imitations, Substitutes, etc.; Cement Work; Cleansing, Polishing, and Renovating Agents; Colors, Enamels, Cements, Glue, Varnishes, Water-proofing Substances, etc.; Copying; Explosive Agents; Glass; Horn Combs, Manufacture of; Lubricants, Blacking, etc.; Metal Industry; Miscellaneous; Oils and Fats; Paper; Straw, Bleaching and Dyeing of; Strength of Materials; Willow-Ware; Index.

A circular of 32 pages, showing the full Table of Contents of this important book, sent by mail free of postage to any one in any part of the world who will furnish his Address.

**HENRY CARBY BAIRD & CO.,**  
Industrial Publishers, Booksellers & Importers, 810 Walnut Street, Philadelphia, Pennsylvania, U. S. A.

**LUBRICATION.**

Our readers can procure of **CHARLES J. WOODBURY** Manufacturer of Oils, 123 California St., San Francisco, a fine Lard Engine Oil, unsurpassed by any other Oil for general use, and which will flow through any feeder at all temperatures. Also, Cylinder Oils, Refined Cylinder Tallow, Lubric Compound, Farm, Machine, and strictly pure Lard Oil. The Woodbury Oils are in use on the Central, Southern, and Northern Pacific Railways, and nearly every Railroad and Steamship line on the coast.

**GOLD MINES.**

**FOR SALE—QUARTZ, AND HYDRAULIC PLACERS;** extraordinary bargains; immense vein, five miles long, sixty feet wide, free milling, ten-dollar rock. Also vast area of rich placers, hundreds of feet deep, gold from top to bottom. Plenty wood and water; rare opportunity. For full particulars, address

**CHAS. F. BLACKBURN,**  
Via Birch Creek. Blackburn Mine, Idaho.

**American Exchange Hotel,**  
**SANSOME STREET.**

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

**Board and Room, \$1.00, \$1.25 and \$1.50**  
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. **Free Coach to and from the Hotel.**

**MONTGOMERY BROS.,** Proprietors.

**NATIONAL ASSURANCE CO.,**  
**OF IRELAND.****ATLAS ASSURANCE COMPY.,**  
**OF LONDON.****BOYLSTON INSURANCE COMPANY,**  
**OF BOSTON, MASS.**

**H. M. NEWHALL & CO.,**  
GENERAL AGENTS,  
309 & 311 Sansome St., San Francisco, Cal.

**A Good Opportunity for a Mechanic.**

A variety of good Tools, Patterns, etc., with business for sale cheap by a party retiring from business. A splendid opportunity for an enterprising mechanic.

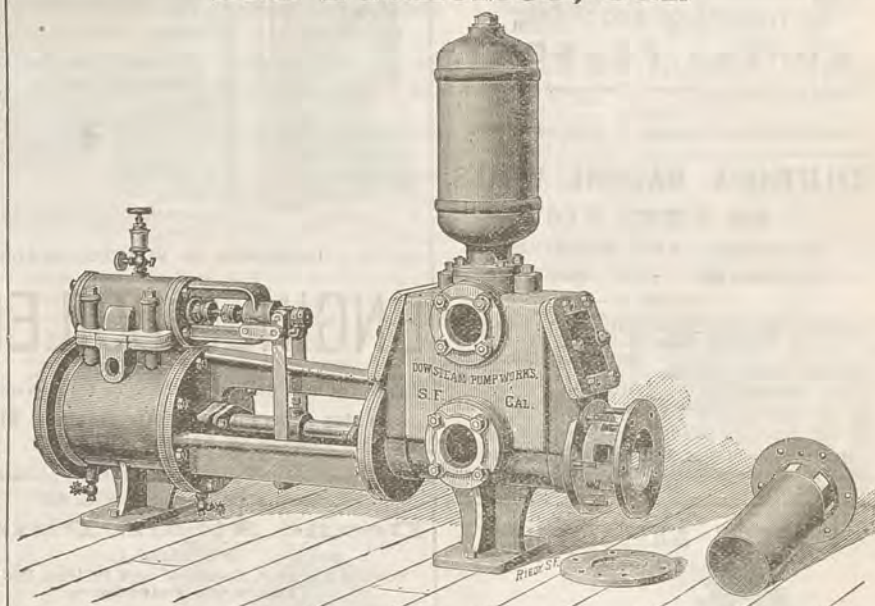
Address A. B. C., care of this paper.

**RUPTURE!**

A New Invention! The "Perfection" Belt Tension, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort and gives universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDBEE, (Druggist) 701 Market Street, cor. Third, San Francisco.

**HEALD'S BUSINESS COLLEGE,**  
24 Post St. S. F.  
Send for Circular.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

**DOW STEAM PUMP WORKS,**  
**San Francisco, Cal.****DOW'S IMPROVED STEAM PUMPS**  
**And Pumping Machinery**

FOR EVERY POSSIBLE DUTY.

**COMPOUND PUMPING ENGINES,**  
Condensing and Non-Condensing,

.....FOR.....

**Water-works,**  
**Mining Purposes,**  
**Irrigation, Etc.**

**GRAND SILVER MEDAL** Awarded at Mechanics' Institute Industrial Exhibition for Best Direct and Double-acting Pump.

Works: 114 & 116 Beale St. Correspondence solicited. Call or send for Catalogue.

**CINCINNATI**  
**CORRUGATING**  
**COMPANY.**

JOHN F. HAZEN, Prest.

JAMES HICKS, Treas.

J. G. BATTELLE, Sec'y.

**Over 1500 Tons Iron in Stock!**

**FOUR WIDTHS OF CORRUGATIONS MADE!**  
**STANDING SEAM PLAIN ROOFING!**  
**All Paint Re-ground in Pure Linseed Oil!**

**JENKINS PATENT VALVES.**

**Gate, Globe, Angle, Check and Safety.**

Manufactured of BEST STEAM METAL. We claim the following advantages over all other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrounding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

**DUNHAM, CARRIGAN & CO.,** San Francisco, Cal.

**CALIFORNIA**  
**ARTIFICIAL STONE PAVING CO.**  
(SCHILLINGER'S PATENT.)**SIDEWALKS, GARDEN WALKS, CORRIDORS, OFFICES, CARRIAGE**  
**DRIVES, STABLES and CELLAR FLOORS, KITCHENS, Etc.**

The Courts here and in the East have decided that Artificial Stone Pavements with plastic concrete and in detached blocks, are infringements on the Schillinger Patent; and also, that when the plastic material is blocked off with a trowel and cut through far enough to control the cracking caused by shrinkage, that such pavement is in law the same as if laid in detached blocks, and is an infringement of the patent. All property-owners having such pavements laid without the license of the above Company, will be prosecuted.

**OFFICE, 404 MONTGOMERY STREET, SAN FRANCISCO.**

**EGBERT JUDSON, President. ALBERT H. REICHLING, Secretary. G. GOODMAN, Manager**





## Iron and Machine Works.

**UNION IRON WORKS,**  
SAORAMENTO, OAL.  
**ROOT, NEILSON & CO.,**

MANUFACTURERS OF

**STEAM ENGINES, BOILERS AND ALL**

**Kinds of Machinery for Mining Purposes.**

uring Mills, Saw Mills and Quartz Mills Machinery,  
constructed, fitted up and repaired.

Front Street, Between N and O Streets,  
SACRAMENTO, CAL.

**Golden State & Miners Iron Works.**

Manufacture Iron Castings and Machinery  
of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

**Mold-Board AMALGAMATORS,**

**Golden State Pressure Blowers.**

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON

THORNTON THOMPSON

**THOMPSON BROTHERS,**

**EUREKA FOUNDRY,**

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

**CALIFORNIA MACHINE WORKS,**

**WM. H. BIRCH & CO.,**

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

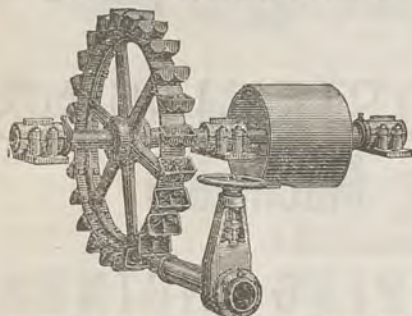
BUILDER OF

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines

Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. **ESTD 1877** ORDERS SOLICITED.

**PELTON'S WATER WHEEL.**



THIS WAS ONE OF THE FOUR WHEELS TESTED  
by the Idaho Company at Grass Valley, Cal., and  
gave 90 2 per cent., distancing all competitors. Send for  
Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street  
San Francisco, Cal.

**N. W. SPAULDING  
SAW COMPANY**

Manufacturers of

SPAULDING'S

**Inserted Tooth**

AND

**CHISEL BIT**

CIRCULAR

**Saws.**

**SAW MILLS AND MACHINERY**  
Of all kinds made to order. Send for Descriptive Cata-  
logue. 17 and 19 Fremont St., San Francisco.

**THE RUSSELL PROCESS COMP'Y.**

**C. A. STETEFELDT, President.**

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

This paper is printed with Ink Manufactured  
by Charles Eneu Johnson & Co., 500  
South 10th St., Philadelphia. Branch Offi-  
ces—47 Rose St., New York, and 40 La Salle  
St., Chicago. Agent for the Pacific Coast—  
Joseph H. Dorety, 529 Commercial St., S. F.

**Engraving** Superior Wood and Metal Engraving,  
Electrotyping and Stereotyping  
done at the office of this paper.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold  
in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co.  
(Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting  
that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,  
Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded  
to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quanti-  
ties to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**

316 California St., San Francisco.

## FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

(ESTABLISHED IN 1855.)

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure  
or Compound, Stern or Side-wheel En-  
gines.

MINING MACHINERY—Hoisting En-  
gines and Works, Cages, Ore Buckets,  
Ore Cars, Pumping Engines and Pumps,  
Water Buckets, Pump Columns, Air Com-  
pressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for  
Dry or Wet Crushing, Amalgamating  
Pans, Settlers, Furnaces, Rotors, Con-  
centrators, Ore Feeders, Rock Breakers,  
Furnaces for Reducing Ores, Water Jack-  
ets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MA-  
CHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines  
and Boilers, Dredging Machinery, Pow-  
der Mill Machinery, Water Wheels.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

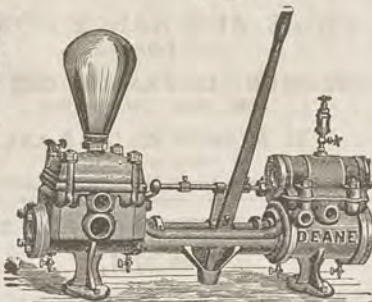
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.

— ALSO —

## HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.



**FRASER & CHALMERS.**

CHICAGO, ILL.

U. S. A.

General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

**PERFORATED METALS FOR  
REVOLVING and SHAKING-SCREENS,**

**JIGS & STAMP BATTERIES.**

Denver  
Office:  
No. 248  
18th Street,  
Denver,  
Colo.

NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.

Mexico  
Office:  
No. 11  
Calle  
de Suarez  
de Chihuahua  
Mex.

UTAH OFFICE—SALT LAKE CITY, UTAH.

**NOTICE TO  
MINING MEN,  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.**

**Engineers' Tables of Progress**

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, etc., address:

**INGERSOLL ROCK DRILL CO.,**

REPRESENTED BY

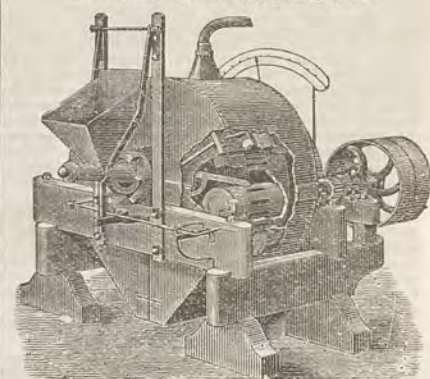
**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

## Tustin's Pulverizer WORKS ORE WET OR DRY

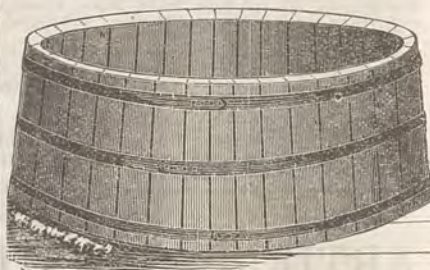
FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLEY, SPIERS & HAYES,

Mining Vats and Tanks.



LEACHING VATS with FALSE BOTTOMS.

PRECIPITATING VATS,

SOLUTION and WATER TANKS

For Mining Purposes.

WELLS, RUSSELL & CO.,

Mechanics' Mills, San Francisco.

**RICHARD C. REMMEY, Agent,  
Philadelphia Chemical Stoneware Manufactory,**

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of

all kinds of

Chemical Stoneware

—FOR—

Manufacturing

Chemists.

Also Chemical Brick

for Glover Tower.

**INVENTORS, TAKE NOTICE**

**L. PETERSON, MODEL MAKER,**

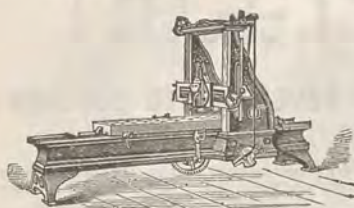
258 Market St., N. E. cor. Front (up stairs), San Francisco.  
Experimental machinery and all kinds of metal, tin  
and Brasswork.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



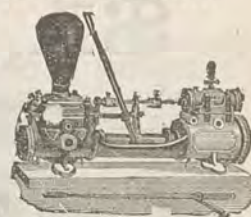
Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Knowles Steam Pump  
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.

### PACIFIC IRON WORKS

1850. 1885.  
**RANKIN, BRAYTON & CO.,**  
.....BUILDERS OF.....  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

### WATER JACKET SMELTING FURNACES

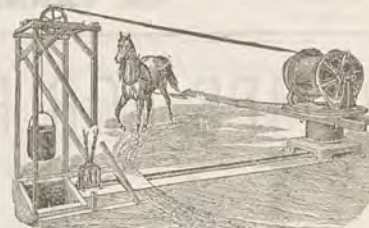
For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.

### WATER JACKET SMELTING FURNACES

### THE DUNCAN CONCENTRATOR

Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



### BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700-pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE OF CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.

### HOISTING WORKS.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.  
J. C. GUNN, Secretary.

### UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

### STEAM, AIR, AND HYDRAULIC MACHINERY.

**Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

### UNION IRON WORKS,

Successors to PRESCOTT, SCOTT &amp; CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



ADAMANTINE.

We manufacture the above Adamantine Shoes, Dies and Crusher Plates. They are in use on the hardest quartz in the United States and South and Central America, and have been for the last ten years; we warrant them to outwear three (3) sets made of any other metal, and many report that they last from 4 to 8 times longer than any other make. They never break AT THE SHANK, and the wear is so light that little or no foreign matter gets mixed with the crushed ore.

Also CHROME CAST STEEL for Mining and General Use, of the finest quality.

For further particulars, address

### CHROME STEEL WORKS,

H. D. MORRIS, Agent, 22 Fremont St., San Francisco.

When ordering, a rough sketch, with full dimensions, is all that is necessary.

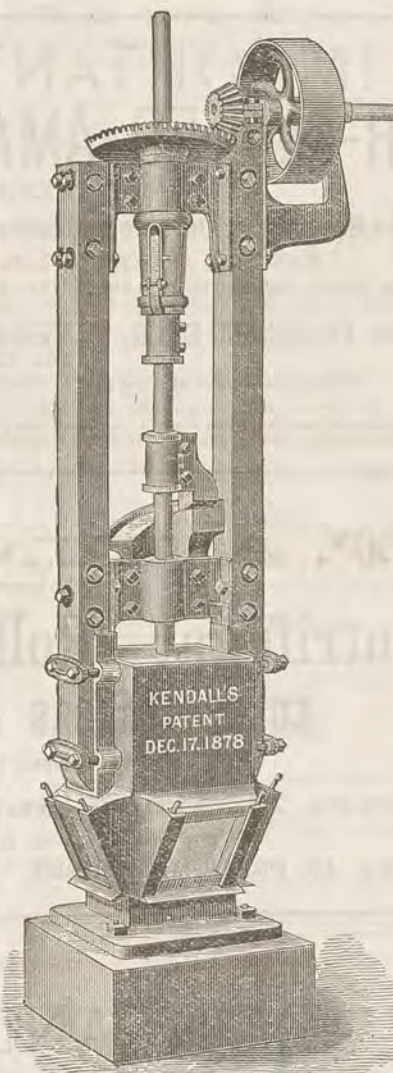
### CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

**STEIGER & KERR, Occidental Foundry,**

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.



### QUARTZ BREAKERS!

—AND—

### Pulverizers Combined.

To Run by Hand or Power.  
Mining Machinery of Every Description; Drawings, Plans and Specifications.

E. I. NICHOLS, 316 Mission Street, S. F.

L. C. MARSHUTZ.

G. T. CANTRELL.

### NATIONAL

### IRON WORKS,

N. W. Cor. Main and Howard Sts.,  
San Francisco,

.....MANUFACTURERS OF.....

Stationary and Compound  
Engines,

FLOUR, SUGAR, SAW and QUARTZ  
MILL MACHINERY.

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

.....SOLE MANUFACTURERS OF.....

### KENDALL'S PATENT QUARTZ MILLS.

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past seven years, we know their merits and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that is claimed for it and give entire satisfaction.

MARSHUTZ &amp; CANTRELL.

Send for Circulars and Price List.

### San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

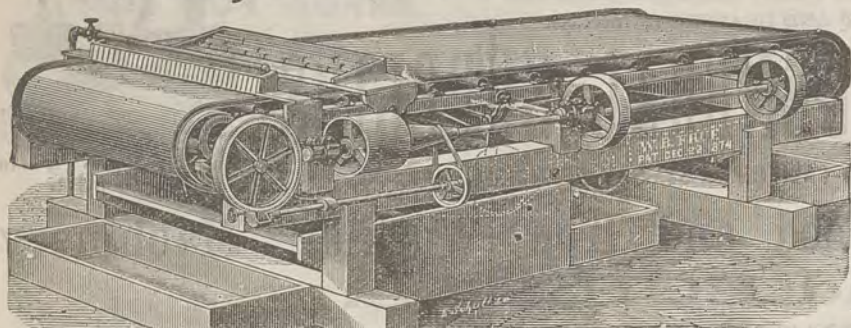
Extra sizes and lengths made to order on short notice.

TUBBS &amp; CO.

611 and 613 Front St., San Francisco.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS**  
(\$575 00), F. O. B.

**OVER 1,000 ARE NOW IN USE.** Saves from 40 to 100 per cent more than any other Concentrator Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 '874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

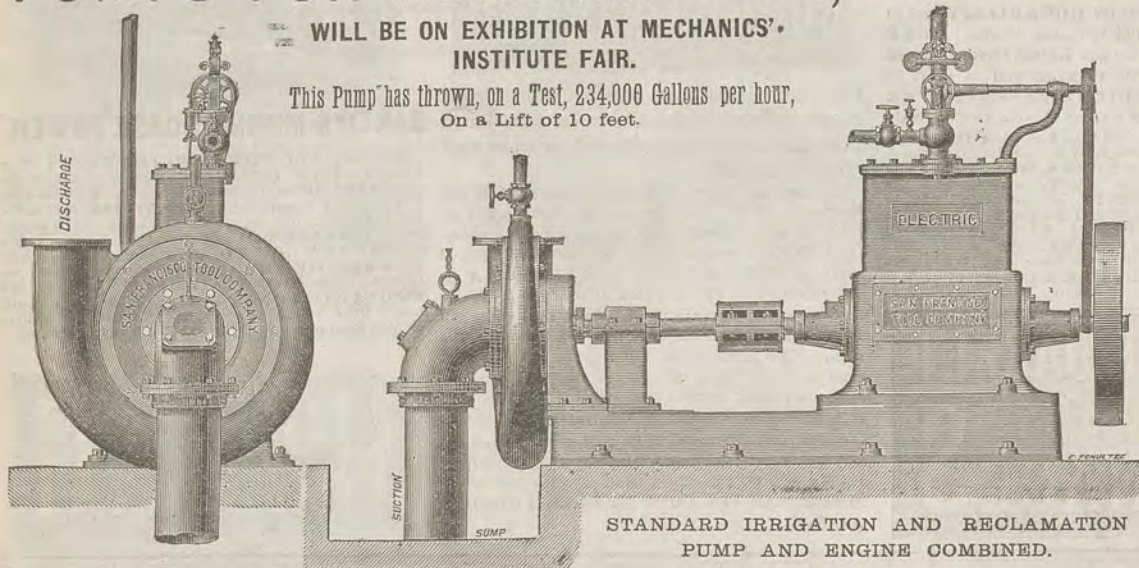
Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

## PUMPS FOR RECLAMATION, IRRIGATION, AND DREDGING.

WILL BE ON EXHIBITION AT MECHANICS' INSTITUTE FAIR.

This Pump has thrown, on a Test, 234,000 Gallons per hour, On a Lift of 10 feet.



STANDARD IRRIGATION AND RECLAMATION PUMP AND ENGINE COMBINED.

PIT, VERTICAL,  
BULKHEAD, TURBINE,  
CENTRIFUGAL AND  
LOW-LIFT PUMPS.

WE MANUFACTURE ALL KINDS OF

Machine Tools, Including Engine Lathes, Drilling Machines, etc.

Horizontal, Single Acting, Compound Condensing, and Automatic Steam Engines.

Cast Iron Sectional Boilers, Horizontal and Vertical Tubular Boilers, Water Valves, Water and Steam Fittings, Hydraulic Jacks, etc.

Mill Rolls Ground and Corrugated. SEND FOR CIRCULAR.

**SAN FRANCISCO TOOL CO.**

Works, First and Stevenson Sts., San Francisco, Cal.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

**BEST SOFT LAKE SUPERIOR COPPER USED.**

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.**

**E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



SEND FOR CIRCULAR.

## F. A. HUNTINGTON,

MANUFACTURER OF

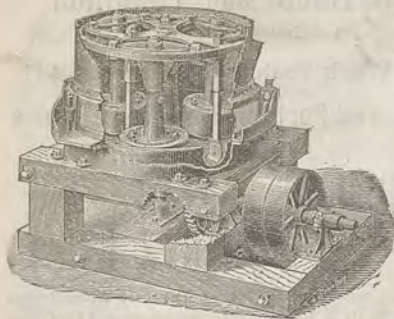
**Centrifugal Roller Quartz Mills,  
CONCENTRATORS AND ORE CRUSHERS,**

Mining Machinery of Every Description,

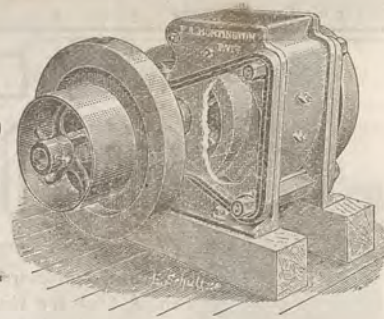
**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



Centrifugal Roller Quartz Mill.



ORE CRUSHER.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent

L. R. MEAD, Secretary.

## THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

**BUILDERS OF**

**QUARTZ MILLS**—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

**AIR COMPRESSORS**—Rope Power Transmission.

**HYDRAULIC PUMPING** and Hoisting Machinery.

**WROUGHT-IRON WATER PIPE** a Specialty. *NOTE*—Have just completed order for 35 miles of 44-inch

pipe of 1-inch iron for Spring Valley Water Works Company, San Francisco.

**SAW-MILL MACHINERY** of all kinds.

**STEAM ENGINES**—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.

**SOLE MANUFACTURERS** for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube);

50,000 horse power now in use.

**MACBETH PATENT STEEL-RIM PULLEYS**—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

**REFRIGERATING MACHINERY** for Steamships, Breweries, and Cellars.

**WILSON'S PATENT GAS-PRODUCER.**

**STEAM BOILERS** of all descriptions.

**SUGAR MACHINERY**—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

**STEAMSHIPS**—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship

Pumps, Steam Capstans, Cargo Winches, etc.

**Builders** of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain

Mining Company

Send for Circular and Price Lists.



# MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, AUGUST 28, 1886.

VOLUME LIII.  
Number 9.

## Geology of a Portion of the Rio Grande Region.

Intelligible sketches of the geological structure of the less known portions of the country are of general interest and value. Special interest pertains to the territory along our southern border and adjacent Mexican regions. We give on this page a map of the Rio Grande region in Texas, and Coahuila in Mexico, prepared by E. J. Schmitz, of New York City, to illustrate a paper recently read by him before the American Institute of Mining Engineers.

Coming from San Antonio, Texas, and following the Galveston, Harrisburg & San Antonio R. R. westward, one enters soon the Cretaceous formation, which forms a belt of several hundred miles, extending westward to the boundary of Arizona and across the Rio Grande into the State of Coahuila, Mexico. The members of this formation are very numerous and in petrographical character very diverse—from a whitish or bluish, slaty, impure limestone to a hard, beautiful blue-and-red striped and a compact, heavy-bedded, yellow-gray calcareous sandstone; from yellow and brownish-yellow calcareous soapstones or marlstones to crystalline limestones full of fossils; from argillaceous to calcareous dolomitic and bituminous marls, slates and bituminous slates, shales and whitish, yellow, blue and dark sandstones. In regard to the superposition of these members and their classification in groups, it would be very difficult to give a correct opinion after a short and hasty examination, but the heavy-bedded, yellow-gray calcareous sandstones may be named with some certainty as representing the oldest of the observed Cretaceous strata, while the yellow and brownish-yellow marlstones, the crystalline limestone, the blue and red-striped silicious limestone or calcareous sandstone, and certain dolomitic and bituminous marls belong to the middle Cretaceous. The thickness of these rocks is, in the eastern part of this formation, about 2000 feet, but further west it is greater.

While the country west of San Antonio is mostly level or slightly hilly and has an elevation of from 400 to 900 feet above the sea, we reach west of Del Rio and Devil's River (stations on the G. H. & S. A. extension) the slope of the Big mountain plateau, which extends in a south-southeast direction through New Mexico, Western Texas and Mexico, the continuation of the Rocky mountains. A few knobs or

mountains are known east of Del Rio. They are of eruptive or volcanic origin, as demonstrated by the basaltic debris along their edges.

Mounting the plateau and following the railroad, which runs for about 50 miles alongside the Rio Grande, we find the elevation increasing by degrees to 3000 and 4000 feet, until we reach the highest point along the road, in Presidio county, 4800 feet above the sea. The rocks of the country have been flat or slightly in-

of the whole plateau took place in the time defined by the deposition of these sandstones and of the calcareous rocks.

From Maxon Springs westward to the next station, one can observe these sandstones in less inclined position, or even level, while they can also be seen occasionally cropping out between the stations of Marathon and Strobel. Here we enter the southern portion of the Apache mountains, which has (with the whole

## A Simple Water-hoisting Device.

At the mine of a company in New Zealand, recently described in a Government report on the gold fields of that country, they have an ingenious but simple method of hoisting from a shaft, which, though rather slow for large operations, answers well for a small mine, where water is handy. The company has an underlie-shaft, following the dip of the lode in the main level to a depth of 312 feet, and has run levels from that. The underlie-shaft is six feet by three feet six inches, having a partition for hoisting, of three feet six inches square, the other portion being used as a ladder-shaft for the men to get up and down to their work.

The quartz is hauled up this shaft in a small truck or box, capable of holding 7 cwt. of stone. This box has wheels like a truck, and it is kept in position by rails fixed in the shaft. When the box is wound up to the top of the shaft another truck is run underneath it, and the quartz in the box is emptied into this truck from a trap-door which there is at the bottom of the box. The winding in this underlie-shaft is done by a water-balance erected outside the mine. This water-balance is a tank mounted on wheels, which runs on an inclined tramway the same length as the depth of the shaft where the winding takes place. When this tank is at the top of the incline it is filled with water, and the weight of the tank, when filled, is sufficient to bring about 7 cwt. of stone in the box up the winding-shaft. When the tank arrives at the bottom of the incline there is an iron knob projecting which opens a valve in the tank, and allows the water to be discharged. The weight of the empty box in the winding-shaft is sufficient to haul up the empty tank to the top of the incline, to be again refilled with water, so as to bring up the next loaded box. The winding-rope, five-eighths inches in diameter, made of best plow steel, is carried on pulleys in the main drive to the incline-shaft, where there is brake-gear erected so as to regulate the speed of winding. One man works the brake-gear; and also, by levers attached to telegraph wire, the same man can shut off and on the water to fill the tank or water-balance when it is at the top of the incline.

A New steel steamer for Government service on the bay has been launched at the Union Iron Works.



clined all the way up to the plateau, and the first disturbance is noticed west of Maxon Springs station, where a yellow-brown, hard sandstone comes up to the surface, bearing a number of coal-seams. This sandstone resembles very much the sandstones found in the Sabinas coal-field, Coahuila, Mexico. Whether this sandstone is true Cretaceous or not, could not be ascertained either here or in the Sabinas field, since no fossils have been procured; but it may be that it is in both places older than that.

Near Maxon Springs and north of the railroad, one can observe a peculiar profile of the rocks, highly inclined sandstones and shales being covered by horizontal calcareous rocks, doubtless of Cretaceous age. This profile demonstrates that the country must have been under sea-level after the tilting of the strata mentioned. It is very probable that the elevation

plateau) a south-southeast course. Some fair samples of anthracite, reported to come from near the Rio Grande, and east of this mountain range, were shown.

The rocks of this range, which is composed of a number of distinct mountains and knobs, are principally sandstones, etc., of Triassic and Jurassic age, and crystalline and eruptive rocks. The occurrences of coal on the plateau east and west of the Apache mountains, or in those mountains, are quite numerous.

All the coal occurrences on the high plateau in Presidio and El Paso counties, Texas, and certain others east of the plateau land in Texas and Coahuila, Mexico, represent apparently two separate horizons of beds. The upper horizon belongs to the middle and upper Cretaceous, while the lower horizon is older and is characterized by the yellow-brown, hard sandstones referred to above.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

## Hints for Lubricating.

[Written for the Press.]

I wonder if any reader has missed these little notes during the past two months. I have been East finding out what there is new in lubricants, and a good many current impressions which I have long suspected I have also at last "found out."

For instance, though it reflects upon my own State pride (in soul I'm a '49-er), and though it contradicts what, sympathizing with some friends who have capital invested in California oils, I have often taught, I have at last "found out" California oil.

I took East 13 samples of the dark lubricating (sic) oils of the coast and went through a thorough chemical analysis of them, separating them into their constituent parts and making tests on machines especially invented for the purpose of determining the comparative values of lubricating oils. These machines are the Ashcroft and the Thurston. The Ashcroft has been adopted by the U. S. Government, and is uniformly used at its larger depots of supply for the purpose of testing the lubricating properties of the oils offered for national purchase. The Thurston machine, invented by Prof. Thurston, of Hoboken, N. J., is an ingenious and expensive mechanism, by which, with reasonable accuracy, both the efficiency and the durability of lubricating oils are readily determined. A fine specimen of one can be seen in the shops of the Southern Pacific Railway Company at Sacramento. The Pennsylvania Railroad Company have adopted the Ashcroft, and most of my experiments were conducted at their excellent laboratory located in the headquarters of the motive power department, Altoona, Pa.

I will not unusually lengthen these notes by adding the tables of analyses of these different oil-products of the coast, but will sum up the more important of our generalizations as follows:

The crudes of the California valleys differ from those of Wyoming in that they are largely composed of bitumen and asphalt. They contain very little paraffine or greasy substance. They are much darker in color and heavier in gravity than the crudes of Pennsylvania, Ohio and West Virginia, burn with much quicker flame and make more smoke. The flash and fire-tests of the vapors arising from the distillates of these oils did not differ materially (not more than one degree Baume) from those of Eastern crudes. We could, however, procure no wicks of sufficient capillary attraction. They would be overtaken by the inflammable oil so as to produce smoke rather than flame.

The character of our California oil seems to closely resemble that of Russia. Especially was this true of some samples from Baku and Batoum which I examined; most noticeably striking in the point of cold-test in which our coast crudes are phenomenal.

CHARLES J. WOODBURY.

## Lake Tahoe.

So many reports are spread about concerning the depth of this wondrous sheet of water that but few really know which to accept. Some reports go to show that no soundings were ever obtained in the center of the lake, and others that the greatest depth is 2300 feet. The following, ascertained from John McKinney, one of the oldest residents on the lake shore, and who assisted in taking the soundings, may prove interesting to the general public:

Fifteen miles of the lake on the State line average 1400 feet. The center of the line is 1500 feet deep. Three hundred yards from the mouth of Emerald bay the water is 790 feet deep, and four miles east thereof the soundings are 1400 feet. At Rubicon rock, 300 feet from shore, the water is 850 feet deep, and four miles out, easterly, it reaches 1460. At Sugar Pine point, one-half mile south, the depth is 770 feet, and four miles out, pitching to the north, 1500 feet. Half a mile from Idlewild the depth is 780 feet, and six miles out 1525 feet. At Saxton's old mill, near Tahoe City, 772 feet of water is found one-quarter of a mile from shore, and five miles east by north 1603 feet is reached. At Observatory point, one-quarter of a mile north-east from Tahoe City, soundings are 1300 feet, and four miles east 1640. Four miles south of Hot Springs 1645 feet, the greatest depth in the lake, is found. Blue water in any portion of the lake averages 1300 feet.

The temperature of the lake water at 800 feet is found to be 42°; at 1506 feet, 39½; at the surface, in winter time, the temperature is 44, and in deep water, during the summer, 65°.

The above will doubtless attract both interest and comment, but coming from the source it does, must be entitled to consideration. The theory of Mr. McKinney as to the original formation of the lake is that it occurred in the glacial period, and not from volcanic action, and if space permitted, his opinions on the subject would be given at this time, but it is certain that the bottom of the lake is riven, as are

the surrounding mountains, into chasms and ravines, leaving plateaus that extend for miles, as do other valleys or land. Could the water be drained from the lake the bottom would be several hundred feet lower than Carson valley, which valley was undoubtedly caused by the same operation as the lake, and was itself an inland sea or fresh-water lake.

A deal of sound sense and deep study is evidenced by Mr. McKinney's theories and argument, and it would be much to the benefit of science if they could be published.—*Carson Tribune.*

## Mining Booms.

Every one who has ever engaged in or watched gulch mining knows there is a peculiar fitness in the use of the word "boom," as applied to business. He has seen the water dammed up and forming into a pond, stagnant and quiet, suddenly liberated by a hoisted gate, go booming down the gulch, tearing and caving down the banks, and washing the gold into the sluice-boxes to be gathered by the miner. So, when the word "booming" is applied to the condition of any branch of business or a mining camp, its fitness is intuitively recognized. It signifies that enterprise has been dammed up by some great financial change and loss of confidence; that energy is stored away, growing stagnant, but all the time gathering force; that when the gate of doubt and distrust is raised the great store of energy and capital is liberated, and goes out tearing down banks, giving work for all, and washing hidden gold into the sluice-boxes of trade and commerce, to be gathered up by the workers.

No man who has ever been in a good mining camp, while the entire country was enjoying a boom, will ever forget his experience. There were no idlers, and from bootblacks to bankers, every one was prosperous; every prospect was looked upon as a probable deposit of wondrous wealth of gold or silver, and the value of even the most unpromising hole was put away up in the figures; every strike was magnified, as if by some enchanter's wand, tens had been made into hundreds and hundreds into thousands; the penniless prospector becomes a millionaire, and a beggar is transformed into a prince; the corner groceryman becomes a merchant; in the gambling-houses and gilded palaces of sin, money is as plentiful as blades of grass, and nearly every morning there is "a man for breakfast;" every stage or train brings in its load of "capitalists," who catch the fever, and "take a flyer," in the lottery of mining. It is a lottery to them, whatever it may be to the experienced miner of good judgment.

Outside of mining camps in the older regions of the country, the boom is different only in kind and degree. Only on the stock boards and in the speculative grain pits can the same quality of feverish excitement be found that characterizes the mining camp.

Booms move in cycles. Colorado has seen but two. The first was in the early days, following the discovery of gold, which culminated during the flush days of 1865. The second began in 1879, when Leadville became world-famous. There have been times when particular camps have had miniature booms, but local booms only when doubt and distrust is removed from all business circles, and the dammed-up energies and capital are liberated. A peculiar thing about them is that they cannot be found. Rich discoveries of placers or ore deposits attract no attention when the times are not ripe, and the accumulation of sudden and immense fortunes make only a ripple on the surface of affairs. During the days of a boom these things become known all over the civilized world, and aid the progress of the boom.

There have lately been discoveries in Colorado, of which the general public knows nothing, which in other days would have created an immense excitement and attracted tens of thousands of prospectors, speculators and all the hangers-on of a mining boom. In 1879 the quartzite discoveries of Red Cliff would have become known all over the world. There have been strange and rich deposits of ore extracted, and some large fortunes accumulated there, and penniless prospectors have suddenly grown wealthy. All these things have been faithfully reported to the *Tribune-Republican*, yet not to exceed 200 strangers have visited the camp. It is evident that the times are not yet ripe for another boom. When they will be ripe is the interesting question.—*Denver Republican.*

TOO MANY CLAIMS.—Would it not be well for those men about here who own from ten to a thousand claims, and never do a hundred dollars' worth of work on the whole of them during a year, to turn out and work their claims a little instead of sitting about town and blowing about their wealth—in the ground? Very few men have made big raises, excepting bills, in this manner. These mine-owners, who take up numerous claims, and hold them for years, in the hope that some one will relocate and find something while working them, so that they may step in and blackmail the relocators out of a few dollars, adopt both a slow and poor way of making a fortune. This character of men retards the development and progress of any country, and the sooner they are driven off, or sent to that mysterious country from whence no traveler ever returns, the better it will be for all—even the fellow who takes the trip.—*Pioche Record.*

## Silver Creek District.

A correspondent of the *Salt Lake Tribune* writes as follows concerning new discoveries in Eastern Oregon:

Allow me to inform you and your readers concerning this new found and remarkably rich mining region, which is in the near future destined to astonish the mining world. I must say that never before in the history of mining has a region of country offering such great advantages and facilities for mining operations, with its many mineral-bearing quartz veins, rich in the precious metals, remained unexplored, and almost untouched by the hand of the prospector until recently, although in the early days of placer mining and at a time when but little was thought or known of quartz mining, the streams and gulches which headed in these mountain ranges were filled with placer miners who took no notice whatever of the veins of quartz which had for ages been freeing themselves of the gold that supplied and fed the placers which have produced their millions. Being satisfied with the golden harvest yielded them by the gravel diggings, they abandoned them for other parts, leaving the country as wild and desolated as when they entered it. A few prospectors who have since ventured this way, in search of quartz lodes, have struck bonanzas in the way of gold and silver veins which have attracted considerable attention recently on the outside, and prospectors are beginning to pour in from every direction, who are making remarkably rich discoveries on every hand. The field for prospecting extends over a large area of country, with but little of it as yet explored by the prospector. The formation is of granite, gneiss, porphyry and slate, traversed by well-defined gold and silver bearing quartz veins, which vary in width from a few inches to 30 feet, except in the slate formation, where they are much larger, the veins in places showing an outcrop several hundred feet in width, which are probably the largest outcroppings of quartz in the world. What these immense veins may contain in the way of precious metals is a matter yet to be determined. Owing to the lack of prospectors they have never been explored. On the head-waters of Silver Creek, in the Blue Mountain range which forms the dividing line between this and Grant counties, also on the headwaters of John Day's river, on the opposite side of the range, can be found numbers of attractive quartz veins, which run a few degrees east of north, and by their cropping alone at intervals they can be traced, with the assistance of a compass, for miles. Some of these mines are now being located and developed by the energetic prospectors, who are daily arriving in the new Eldorado in search of fortunes with remarkable success. These mines in places show free milling quartz, and in places smelting ores are found that assay very high in both gold and silver. One of these veins, which is known as the Bellevue, and owned by the Cabell Brothers, who were the discoverers of this magnificent property, and for whom all credit is due for the development of the mineral resources of this region, is a vein from four to six feet in width, extending for miles through rough mountains.

## The Bellevue Lode.

In gneiss and porphyry formation the Bellevue mine is developed by tunnel, showing the vein at a depth of about 100 feet from the surface, where it is 4½ feet in width, between perfect walls and carrying several of the richest characters of silver ore, which is as rich in gold as in silver. A force of hands have been put to work taking out the vein matter which is sacked for shipment as it comes from the mine, then hauled to Baker City by wagons, where the first shipment will be made by rail to Denver, Col., or Salt Lake City for treatment. The ore is very rich and will yield several hundred dollars per ton. From indications along on this vein at the surface where it has been cut at different places, there is little or no room for doubt as to it holding its own, or increasing in width for thousands of feet through the Bellevue mountain. The northern extension of this vein was discovered three miles north and on the next mountain from the Bellevue, covered over by 12 feet of debris where the vein was exposed 5½ feet in width, between porphyry and granite walls, showing specimens of lead carbonates which assay from \$300 to \$500 per ton. The extension south from the Bellevue has also been discovered, showing up very rich carbonate ore. The mountains in this vicinity abound in numerous quartz lodes that are yet to be explored. About four miles east of the Bellevue mine, and running parallel with the Bellevue lode through granite and porphyry formation, is the magnificent California mine, where you will find further evidence of the Cabell Brothers' exertions in endeavoring to prove to the world the wealth that lies buried in the bosoms of these rough-breasted mountains, for which they have been rewarded with a bonanza almost equal and similar to the Bellevue mine. About a quarter of a mile east from the California lode is the Mother lode, the two lodes dipping toward one another with a large porphyry dike running between and parallel with them. The Mother lode can be traced for miles along its bold outcrop. At places the vein shows free milling gold quartz, while at other points in the vein it changes its character from one form of ore to another.

## Gold is King.

The town of Grass Valley has an enduring foundation. It is as the house "founded on a rock," and the rock of our foundation is good gold-bearing quartz. In all our vales and on every hillside are the sure evidences of the wealth deposited beneath our feet. Deep down in mother earth the hardy miner has forced his way almost 2000 feet below daylight; he has followed the golden veins through solid rock and picked and blasted many miles of galleries; he is still going downward, and finds still richer reward for his increased labor. Locked fast in their rocky safes, these rich deposits in our eternal hills are not to be wrested away and scattered in a day; they are safe from drouth and flood, and frost and blight and insect pests; no custodian of our deposits can take the treasure-box to Canada between two days. But, unchangeable and indestructible, the precious metal beneath our feet waits to be brought forth by the intelligence and industry of man. The gold field in the midst of which Grass Valley sits is of some miles in surface area, is thickly veined with gold-bearing ledges, and the depth is unknown, but it is known that with depth the richness of the mines increases. There is no reasonable doubt that for generations, and very likely for centuries, gold will be mined in Grass Valley. When the last fish shall have been caught from the sea, the last gold may be mined from the earth.

And above this treasure-box of ours smiles a genial sky, and the earth yields many of its fairest fruits and flowers in abundance.

But the grand fact which gives assurance of enduring prosperity and prominence to the place that can produce gold is to be found in human nature. Everybody loves gold, always has and always will love it—unless the Creator should become tired of the sort of beings that now inhabit the earth, and should people it anew with an entirely different kind of man. Gold is the only thing that all mankind delight in honoring and unite in loving—even its bright sister, Silver, is slightly spoken of by some. The gold miner need never fear that the ware he gives to the world will ever cease to be in demand. Gold will always be in fashion. The miner, too, can proudly reflect upon the enduring nature of his contribution to the world's wealth. The "golden grain" of the farmer is eaten, and its mission ends. The golden metal of the miner is coined and goes ever on and on, giving pleasure, if not blessing, to him who spends it and to him who receives it. In gold coin, labor is concentrated and wealth represented in a form such that the laborer and the capitalist can conveniently preserve or exchange his gains. The gold miner is often a hero; though his deeds of heroism are not so loudly sounded as the hero who wins a battle—and yet the hero-miner found and dug the gold which the hero-warrior's king or country had to have in order to place its armies and its hero on the battlefield. Truly, gold is king, and the miner holds up his throne.—*Grass Valley Tidings.*

## Treating Diamondiferous Material.

The treatment of the blue (the diamond-bearing material in South Africa) when mined is a tolerably simple process, although a long one. It is blasted in the mines when worked to the day with dynamite, and hauled to the surface by aerial gear of two kinds. The first is the tub and sling, the former being of from 6 to 32 cubic feet capacity, and mounted on a carriage on wire ropes anchored at both ends, on the top at the surface and at the bottom in the mine. On arrival at the surface the blue is tipped into depositing boxes, and from them passed through shoots into trucks. The second method, or sling gear, is an arrangement by which a truck of from 16 to 20 cubic feet capacity is run into a sling or cage which ascends and descends on fixed guy ropes, and on reaching the surface is at once conveyed to the depositing floors. On this account it is more economical than the slinging-tub method, and causes less handling of the blue, besides enabling from 400 to 500 loads of 16 cubic feet each to be hauled every day. At the depositing or disintegrating floors the blue is distributed about two feet thick, and after long weathering, three months or more, it is mechanically broken into pieces of about four cubic inches, and left for a further period. When the natural water has evaporated fresh water is applied, and it then slacks like lime, after which a further reduction is effected by rolling and harrowing. In this pulverized condition the blue is ripe for washing. The machine used for this purpose is called a rotary washing machine, and consists of a more or less circular pan, in which a vertical shaft rotates in the center. The pan varies from 8 to 14 feet diameter, while the shaft carries 10 radiating arms, the latter being provided with a series of teeth which project downward to within about one-half inch of the pan bottom. The blue is passed into a hopper situated above the pan, and saturated with water, whence it is conveyed by shoots into wire cylindrical inclined screens. Here all the larger stones roll out, the finer mixture passing through the screen and thence into the pan, where it undergoes the ordinary process of puddling. The lighter material passes off in a state of suspension



through an opening in the pan. The mud or tailings is led away by a shoot to a settling pit, whence it is lifted by a chain and bucket elevator to a series of screens, through which the mud runs to waste, and the water is thence returned to the machine for further use. The heavier materials, which have settled in the pan, are at the close of the day's work transferred to a gravitating machine called a "pulser," where they undergo an intermediate process of cleaning, and are thence placed on the sorting table and hand-picked both wet and dry. A rotary of this description will wash about 250 loads per diem. The entire process from the time the blue leaves the mine to that on which disintegrated material is ready occupies from four to six months.

### Costs of Mining and Milling "Free" Gold Ores.

[By HAMILTON SMITH, JR.]

The gold from all the mines for which the following comparisons are made is obtained nearly altogether by the simplest methods of amalgamation and concentration. The ore coming from the mines is first passed over grizzlies (long screens formed by parallel iron bars). The larger pieces of rock which do not drop through the grizzlies are then crushed by rock-breakers into small fragments. The fine ore is then fed to the stamp-mills, which consist of batteries each having five stamp-heads dropping in a cast-iron mortar. Electro-plated sheets of copper are generally placed inside these mortars, into which quicksilver is introduced. A sufficient supply of water is constantly poured into the mortar. The finely-crushed ore and amalgam is discharged from the side of the mortar through finely-punched or slotted screens of sheet iron, and the escaping "pulp" passes down in a thin sheet through inclined sluices over sheets of copper also silver plated. The tailings flowing from the sluices are in some cases passed over rough blankets or through buddles or vanners in order to concentrate and save the heavy particles of either amalgam or pyrites. In all the reduction works which will be spoken of, by far the larger portion of gold is obtained in the mortars and on the copper plates.

The following figures have all been derived from the official reports of the several companies, and embrace operating expenses of every kind, including dead-work in the mines, general management, taxes, etc. They do not include interest on cost of working plant, nor any depreciation of capital. No specific allowance is made for wear and tear of plant. In most cases the plant has been maintained in a perfect state of efficiency, and with the Callao mine for the past two years large additions have been made in plant, which have been charged to operation.

For convenience of comparison the several yields and costs have all been reduced to the United States dollar. The given weights are in tons of 2000 English pounds.

#### California.

The Sierra Buttes and Plumas Eureka mines are situated some 35 miles by wagon road from the Central Pacific Railroad. Wood for timbers and fuel is abundant and cheap. Mining labor costs about \$2.50 per diem. Water power is used for crushing at the Sierra Buttes; at the Plumas Eureka both water and steam are used. The lodes worked are of good size, averaging a thickness of perhaps eight feet, and are reached by adit levels.

The following results were obtained for the year 1885, when a very fair amount of prospecting or dead-work appears to have been carried on in both mines.

Sierra Buttes.—Ninety-three stamps running for first six months and 60 stamps for last six months, being an average of 76½ stamps; 54,479 tons mined, yielding \$380,145, or \$6.98 per ton.

#### COST PER TON.

Mining.....\$4.06  
Milling......56  
Management and dead work.....1.21—\$5.83  
The net cash profit per ton was hence \$1.15.

Plumas Eureka.—Sixty stamps running for entire year, 56,052 tons mined, yielding \$424,791, or \$7.60 per ton.

#### COST PER TON.

Mining.....\$4.36  
Milling......61  
Management......60—\$5.57  
The net cash profit per ton was hence \$2.03.

The Sierra Buttes and Plumas Eureka mines are owned by English corporations under the same general management, and have been operated in a very judicious and economical manner; in these regards their management compares most favorably with that of other foreign mines owned in England.

#### Dakota.

The Homestake, Father De Smet and Caledonia mines are situated near the town of Deadwood, a distance of some 250 miles from the Union Pacific Railroad. A branch of the Chicago & Northwestern road has in the last two or three years been approaching Deadwood, thus diminishing the length of wagon transportation; this branch will reach the town some time during the present year. Wood for fuel and timbers is brought to the mine by means of a narrow-gauge railroad, a distance of 15 or 20 miles. Water for mill purposes is more than usually expensive. Mining labor costs from

\$2.25 to \$3 per day. The lode or deposit worked is from 15 to 70 feet or more in thickness. The ore is hoisted to the surface by steam-power. The deepest shaft has a depth of about 500 feet. Steam is used for power by the several mills.

Homestake.—There are two mills attached to this mine—one of 80 and the other of 120 stamps; these 200 stamps have been in continuous operation for about six years. The results from 1882 to 1885 have been as follows:

Period.	Costs per ton.					Yield per ton.	Profit per ton.	Tons worked.	Cash profit available for dividends.
	Mine.	Milling.	Hauling.	General.	Total.				
1882-3	2.54	1.17	.09	.23	4.03	8.60	2.57	179,074	\$459,757
1883-4	2.71	1.31	.08	.19	4.19	5.96	1.77	191,505	337,977
1884-5	2.04	1.01	.05	.15	3.25	5.73	2.48	213,190	528,668

During this period of three years no charge whatever has been made to construction or capital account, and a very considerable amount of dead-work has been done upon the Homestake property, such as shaft sinking, etc.

Father de Smet.—The mills for this mine have 100 stamps; the large 80-stamp mill was built in 1878. I have by me the reports of this company only for the years 1883 and 1885, when the results were as follows:

Period.	Tons crushed.	Gross yield.	Cash profits available for dividends.	Per ton.		
				Costs.	Yield.	Profit.
1883....	104,100	\$354,554	\$ 95,867	2.49	3.40	.91
1885....	106,855	351,697	155,597	2.12	3.57	1.45

During these years no charges were made to capital. I understand that but very little dead or exploratory work has been done in this mine during the past three or four years.

Caledonia.—This mine has been producing bullion since August 1, 1885. The president reports the following results for the period of nine months, ending April 30, 1886:

48,848 tons crushed, yielding \$224,098, or \$4.58 per ton.  
Costs—Milling.....\$.83  
Mining and general expenses 2.07—2.95 "

Net cash profit during nine months...\$1.63 per ton.

#### Venezuela.

The Guayana gold mines are situated inland from the Orinoco river about 110 miles; the cost of transportation from the river varies from four to seven cents per pound, depending upon the character of the freight and the condition of the roads. The supply of labor is nearly altogether obtained from Barbadoes and other islands of the Lesser Antilles group. Miners and ore-handlers are paid from \$2.20 to \$3.20 per diem (at Barbadoes these same negroes only receive 25 cents per diem for agricultural labor). Outside laboring workmen are paid from \$2.20 to \$2.50 per day. The cost of living at the mines is exceedingly high. The climate, although greatly improved in late years in this respect, cannot be called salubrious; hence very large wages are paid to the higher-grade officials and to skilled mechanics brought from Europe or the United States. Wood is fairly abundant in the vicinity of the mines, but owing to the high price of labor and supplies costs delivered at the mines from \$8 to \$11 for each Spanish cord of (say) 106 cubic feet or a little less, hence being about eight-tenths of an English cord of 128 cubic feet.

El Callao.—The leading mine of the Guayana group is El Callao, which at present has a maximum depth of 750 feet vertical; the thickness of the lode worked has averaged something over five feet. The amount of water pumped from the mine varies from six to ten cubic feet per minute, or (say) a maximum of 75 gallons per minute. The expenses of El Callao company have been as follows for the past five years:

1882.—Sixty stamps running; 22,405 tons reported as crushed (in every probability an over-estimate); yield, \$1,959,063, or \$87.44 per ton.

#### COSTS PER TON.

General administration at Bolivar.....\$4.82

#### AT THE MINE.

General expense, including freight on bullion.....\$ 5.79  
Mining; mine.....\$13.70  
Pumping and hoisting.....5.21—18.91  
Milling.....11.19  
Sulphuret works, etc., built 2.70  
Supplies increased.....1.03—4.63—40.52—\$45.34

1883.—Sixty stamps running; 24,000 tons mined; yield of 24,750 tons crushed, \$2,497,746, or \$100.92 per ton.

Costs per ton—Administration at Bolivar, about.....\$ 5.60  
At the mine.....33.73—\$44.33

For this year \$58,000 was paid for new mining ground, which is not included in above costs. About \$25,000 was the cost of exchange, which is included in Bolivar costs.

1884.—Sixty stamps running; 31,261 tons mined; yield of 30,936 tons crushed, \$3,295,706, or \$106.53 per ton.

#### COSTS PER TON.

Administration at Bolivar.....\$ 5.46

#### AT THE MINE.

Mining.....\$18.27  
New shaft.....2.78—\$21.05  
Milling.....7.25  
General expense.....1.41—20.71—\$35.17

During this year \$50,000 was expended for new mining machinery, etc., which is included in above costs; \$150,000 was expended on account of construction of new mill, and \$112,000 for Union and other outside properties, which is not included.

1885.—Sixty stamps running first six months, and 100 stamps last six months; 46,868 tons mined; yield of 47,223 tons crushed, \$2,116,041, or \$44.81 per ton.

#### COSTS PER TON.

Administration at Bolivar.....\$ 1.53

#### AT THE MINE.

Mining.....\$12.03  
New shaft and machinery.....2.26—\$14.29  
Milling.....4.98  
General expense.....1.11—20.38—\$21.60

During this year \$40,000 was expended for construction of new mill, etc., \$125,000 for purchase in fee of Callao property and wood lands, and \$61,000 for Union mine, neither of which items is included in above costs.

1886.—The costs at the mine for the first six months of this year have been not far from \$16 per ton, thus showing a still further diminution in expenses.

New Potosi.—The Peru lode worked by this company has a thickness of some four and a half feet, being a little narrower than El Callao vein; the mine makes but little water. The mill consists of 40 stamps now in place, built after an antiquated design. The results for the 11 months from February 1st to December 31st, 1884, were as follows: An average of 25½ stamps running; 7456 tons crushed, yielding \$158,502, or \$21.26 per ton; the total costs for this period were \$350,111, or \$46.96 per ton.

I have not at hand returns from the other Guayana mines in the Callao (or Caratal) district, sufficiently detailed to enable me to compare their results with those of El Callao. It is generally supposed that the Guayana expenses of these mines have been from \$20 to \$40 per ton, not including costs of general management.

#### Milling Results.

In the following table is given a comparison of the milling results from the stamp-mills attached to the various mines just described. The last column of the table gives the total costs at the several mines, embracing mining, milling, taxes and general management.

Mine.	Period.	Average No. of stamps.	Tons crushed in one year.	Average No. of tons milled by each stamp per month.	Costs of milling per ton in dollars.	Total costs per ton in dollars.
New Potosi.....	1884-5	25½	7,456	27	.....	\$40.06
Sierra Buttes.....	1885	794	64,408	50	\$.66	\$ 5.82
Homestake.....	1885	60	65,973	78	1.01	6.57
Father de Smet.....	1882-3	290	179,074	75	1.17	4.08
Homestake.....	1883-4	290	191,505	80	1.21	4.19
Homestake.....	1884-5	290	213,190	85	1.01	3.25
Sierra Buttes.....	1885	100	104,100	85	.....	2.12
Sierra Buttes.....	1885	100	106,855	89	.....	2.05
Sierra Buttes.....	1885	60	22,405	31	11.19	45.34
Sierra Buttes.....	1885	60	24,750	34	7.25	35.17
Sierra Buttes.....	1885	60	30,936	43	4.98	31.96
Sierra Buttes.....	1885	80	47,223	40	.....	about \$3
Sierra Buttes.....	1885	80	.....	40	.....	\$15

It must be kept in mind that the foregoing "milling" costs do not include any portion of the charges for general management at the mine or at the home office. The amount of quartz crushed per stamp depends considerably upon the character of the ore and the fineness of the mortar discharging screens. It can, in general, be safely assumed that with the best form of Californian stamp-mill now built 75 tons per month for each stamp can be crushed. With very low-grade ores, such as those at the Homestake and Father De Smet mines, these screens have rather large slots, and nearly 90 tons per month are now crushed by each stamp. The very low crushing capacity of 31 and 34 tons per month at the Callao mill in 1882 and 1883 was due to bad mortars and the general wretched condition of the mill. Since then this 60-stamp mill has been considerably improved, and its capacity is now about 3000 tons per month, or an average per stamp of 50 tons. This is about the maximum work which can be expected from a mill of old design, such as those generally built up to the present time by English makers. The new Callao mill, which has for the past year had 40 stamps and now has 60 stamps, crushes an average of about 76 tons per month for each stamp through pretty fine screens; for May, 1886, however, each stamp crushed 83 tons, which is the maximum work thus far done by this mill. In regard to costs of milling, the Sierra Buttes heads the list, with an expense of only 56 cents per ton; the very low cost of milling at the Sierra Buttes and Plumas Eureka mines results in a considerable degree from the employment of free water power. The cost of milling with steam power at the Dakota mines is now about \$1 per ton or a little less. At these mines it will be remembered that fuel is brought to Deadwood from quite a distance, which makes it expensive. The enormous cost of over \$11 for milling at El Callao in 1882 was due to the bad condition of

the mill; the new mill at that mine now has 60 stamps, and is of the most approved design. The cost of crushing by this mill will probably be about \$2.50 per ton, or perhaps a trifle less. Under existing conditions, this is probably about as low a cost for milling as can be expected in Guayana.

#### Total Costs.

With great veins of quartz, having a thickness of 15 feet and upward, when they are worked upon a large scale under fair conditions in the United States, the total costs of mining, milling, and management now vary from \$2.12 to \$3.25 per ton as shown by the last published reports of the Father De Smet and Homestake companies. In the De Smet mine, however, I understand that but little dead-work has been done in the last few years, and probably not much timbering has been used. On the other hand, with the Homestake a large amount of new work in the mine appears to have been executed, timbering is well done, and, judging from current report, the property is worked in an excellent manner. Now that the mine is in railway communication with Chicago, the costs will probably be reduced to a little less than \$3 per ton. This figure is about as low a rate as can be expected for any similar gold mine in North America when the mine and mills are kept in a proper going condition. For mines with veins from four to eight feet in thickness and favorably located for reasonably cheap power, the cost at the Sierra Buttes of (say) \$6 per ton can be assumed to be a fair figure. For the Guayana mines the present El Callao expense of \$15 or \$16 per ton is the lowest cost thus far obtained, being at the rate of about ¾ oz. of gold per ton. The astonishing decrease in costs at El Callao from \$45 a ton in 1882 to \$15 in 1886 shows what can be done by good machinery and improved methods of management even in a locality as unfavorable for economy as Venezuela. Not much further reduction in the Callao expenses can be expected under present conditions; were however, a railway to be built from the Orinoco to the Guayana mines, the costs of operating them could be very greatly reduced, and they could then be worked at a figure not very much exceeding the expense of working similar mines in the United States.

#### Corean Gold-fields.

An official report to the State Department from George C. Foulke, United States Charge d'Affaires at Seoul, Corea, offers, as a plausible explanation of the rivalry between China and Japan for the control of Corean affairs, a belief in the mineral wealth of that country. It is reported that the Chinese Consul at Wonsan has visited the gold mines in that district, and that Chinese officials and merchants are interested there. It is certain that Chinese and Japanese are crowding into Corea, that trade is increasing imports from China and Japan considerable, exports of merchandise from Corea inconsiderable; that Corea has no coinage or currency acceptable abroad, and it is believed that there is already a flow of crude precious metals out of her ports. There is but little room to doubt that the country is rich in gold. It has been mined for centuries, and the existence, in large quantities, of gold is a matter of common repute in China and Japan, but exact information is lacking. The Government guards its mines jealously, and probably intends to retain possession of them. Attempts on the part of foreigners to obtain concessions for gold mining have failed, except so far as the Chinese have obtained a slight footing. The only practical attempt made by western foreigners was by the firm of Jardine, Matheson & Co., a wealthy commercial firm doing business in China, in 1883-84. They sent a party to explore the country between Seoul and Wonsan, but nothing of importance was accomplished until a practical miner, James Graham, was sent out. He found some excellent prospects in dust and nuggets by pan-washing, and reported that with necessary facilities the mines where he had worked would prove very valuable. Upon the reception of his report the firm sought a concession from the Government, but failed, and several like attempts have met a similar fate. So far as can be ascertained, the Corean methods of working are very primitive, and but little, if any, working of quartz has been attempted. The belief is growing that the employment of modern mining methods would result in a heavy production of bullion. Under present circumstances the export of gold and silver, mainly the former, from treaty ports from 1881 to 1884, inclusive, was about \$2,000,000 in value, so far as can be ascertained, and the export from Wonsan alone for 1885 is put at \$357,000. Rich gold-fields in Corea would be a tempting lure to adventurous Americans and Europeans.

TO DETECT ACIDS IN LUBRICATING OILS.—Acid in lubricating oils can be detected as follows: By analysis in a laboratory, or by putting the samples to be tested in a clear glass bottle with a copper wire running down through the cork air-tight. Stand the whole in a sunny place and leave for two or three weeks; then if on removal verdigris or green rust is on the copper, there is an acid in the oil. This is a rough effective test for engine-room use.





A. T. DEWEY.

W. B. EWER.

## DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square).....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

## SAN FRANCISCO:

Saturday Morning, Aug. 28, 1886.

## TABLE OF CONTENTS.

EDITORIALS.—Geology of a Portion of the Rio Grande Region; A Simple Water-lifting Device, 133. Passing Events; Investments in Mining Stocks; Bonding Mines; Volcanic Eruption in Java, 136. Bullion Production; Mining Accidents; Freaks in Climate; Idaho, 137.

ILLUSTRATIONS.—Sketch Map of the Rio Grande District of Southwestern Texas and Coahuila, 133.

CORRESPONDENCE.—Hints for Lubricating, 134.

SCIENTIFIC PROGRESS.—Mars—The Snow-Capped Planet; Rolling Window Glass; Interesting Experiment with Soap Bubbles; A New Alloy of Aluminum; Effect of Pressure on Cork; Artificial and Sun Heat; Hydrogen in Place of a Vacuum for Incandescent Lamps; Improvement in Gas Illumination; Artificial Sea Atmosphere; A New Alloy, 138.

MECHANICAL PROGRESS.—The Universality of Inventions; Grindstones and Tool-grinding; Firing Under Boilers; To Keep the Temper in Working Tools; Steam as a Heat Conductor; Setting Up Line Shafting; The Loss of Power; Speed and Friction; Railroad Axles; Machine for Cutting Oval Holes, 138.

USEFUL INFORMATION.—Filling Up Cracks; Home-made Candy; A Wonderful Liquor; To Clean Chambray; To Remove Exudations from Brick Walls; Politics; Molding Car Wheels by Machinery; Cleaning Brass; Poison Oak; To Clean Lamp Chimneys, 139.

GOOD HEALTH.—Cold in the Head; Eating Before Retiring; The Mullen Plant; The Demand for Rest; Clothing and Temperature; Heat of Fever; White Teeth; Dying from Exhaustion; Scarlet Fever; Brooding, 139.

MISCELLANEOUS.—Mining Booms; Silver Creek District; Gold is King; Treating Diamondiferous Material, 134. Costs of Mining and Milling "Free" Gold Ores; Cores of Gold-fields, 135. Lixivation of Silver Ores, 139.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 140-41. MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 144.

## Business Announcements.

Quartz Mills—Tatum & Bowen.  
Roller Ore Feeder—Joshua Hendy Machine Works.  
Dividend Notice—Paradise Valley M. Co.

See Advertising Columns

## Passing Events.

Just after our last issue went to press the Governor adjourned the Legislature until Sept. 7th, stating the purpose of the recess to be to give the legislators a chance to participate in the nominating conventions of the two great political parties, and at the same time to visit their constituents and learn their wishes concerning irrigation legislation. This week the Republican State Convention is in session in Los Angeles, but no nominations are announced up to the time of going to press. Next week the Democratic State Convention will assemble in this city. So much activity in political matters always draws attention away from industrial movements for the time being.

The Mechanics' Fair opened in this city on Tuesday. From a hurried trip through the pavilion we conclude that in the matter of mining machinery and general mechanical work this year's fair will be found to be of great interest to our readers. There are some new inventions shown, and some of the standard sort which will be made more familiar to the general public by their exhibition. We expect to present, hereafter, notes of the exhibits, for the benefit of our distant readers.

## Investments in Mining Stocks.

The "honest miner" reads how cheap money is in the financial centers, how it goes begging for three or four per cent bonds, and wonders why it doesn't seek his bonanza in some far-away gulch which might double the investment in a sixmonth. The "promoter" who has stock to sell in a phenomenal mine, "sure to pay 50 per cent a year," wonders equally why he should go begging for an investor. It seems a strange paradox to both, and in some respects it is really a very strange one. In other respects it is not at all to be wondered at.

Lately, the new bonds of a certain railroad, some 6,000,000, were offered for sale, and over \$25,000,000 stood ready to take them. The public had just sunk in that one adventure more millions than the entire cost of a year's mining in the whole State of California. This loss made it once quite as useless to go to New York with a railroad as with a mining scheme. But the public recovers from a railroad loss, because it is generally only partial, while a mining investment they say is generally a total loss. The large stock capital of the Denver & Rio Grande Railroad was largely sold above par but a few years ago. Now it has sunk almost out of sight and it may be safely asserted that this one stock has sunk more money in New York, without paying back a dollar, than has been invested all told in Leadville mines, while the latter has yielded the country near one hundred millions, and more in dividends to individual stockholders than the entire capital stock of that railroad. But the loss on the railroad is forgotten, while a Little Pittsburg and Chrysolite are remembered. The shrinkage on Western Union Telegraph stock, but a short time ago, represented a loss of near \$40,000,000, and on the entire railway list a loss of hundreds of millions. Still the public buys railway and telegraph shares, and rarely touches a mining stock that pays two to three per cent a month. There is a reason for this. The public says the permanency of a given mine is dubious. The absolute quantity of ore in it cannot be measured and made visible. Estimates of what is "in sight" are generally largely exaggerated, and the best of judges are often deceived in their measuring. In flush times many a mine was certified into the hundred thousands which would not pay expenses. This is the general and radical reason of conservative investors for not taking in mining shares as they do other stocks.

And it cannot be gainsaid that mining stocks are in disrepute with the public, for another reason: When a mine is developed, equipped and paying a fairly reliable dividend of two to three per cent a month on the price asked, as some mines are, it would seem that its stock would be greedily taken on such basis, but it is not. After getting facts as to the mine itself that would lead to investment, the fact stares them in the face from the history of all the leading mines on the stock list, that the majority interest manages a mine to suit that interest, without regard to the minority, sometimes paying dividends to enhance the stock and sometimes not to depress it, re-sawing it for the profit of the principal insiders, and no reliable information can be obtained. The writer carried some stock of record for over two years in a leading California company, and in that time never got a word of information about the property. Dividends were heard of only through the papers, but a postal card notified of assessments. No semi-annual or annual report was ever received. No commercial company would think that decent treatment of a shareholder. Many instances might be given. The wonders of the great Quihotoas bonanza were heralded everywhere not long ago, and stock was way up. There was no doubt about the magnitude and richness of the ore body. No reports of bullion shipments are made, and the mystery of Ben Nevis is greater than ever to the outsiders. At all events, the mining interest with the public has got a blow from the Quihotoas stocks, for two reasons. The most astute experts and noted mining capitalists were woefully deceived in the ore body, or they have been stock-jobbing in a way that loses all confidence in mining stocks. When these great and notable movements in mining are so managed as to disquiet the stockholders of the minority interest, there is little hope for the smaller and more inconsequential mining deals with the public.

Frank and open-handed management of the mines now on the stock market is wanted to induce the outside public to invest. Mining men can get information, but outside investors must rely on the directory of the given company. Thousands are willing to risk what they call the gambling feature of mining, and rather like it, but they want to know that any good fortune struck in the mine will be honestly administered for the common benefit alike of all stockholders. It is useless to take the former risk if the latter is to be concealed for a stock-jobbing purpose.

It would seem to be the interest of the majority party in a mine to deal fairly with all. In looking over the list, the price of dividend stock reflects the management. The Calumet & Hecla keeps its market valuation above \$20,000,000, with an eight per cent annual dividend. The Ontario holds its own. The Granite Mountain goes at the rate of \$6,400,000, and \$40,000 monthly dividends. It is known that all shareholders are treated alike. Other notable cases might be mentioned.

Confidence is everything to be secured in mine management. The public will readily invest in mining stocks when assured of the same business-like reports that are furnished by commercial corporations. A well-authenticated mine, ably and honestly managed, the outside public will readily take. At present, the great mining industry has to rely on mining capitalists for its support.

## Bonding Mines.

The bonding of mines in California and the Pacific Coast has become so frequent that a review of the situation may be of interest to our mining readers, as well as intending purchasers.

The hardy prospector, who, as he judges from experience, has found a "good prospect," seldom has the means to make more than a superficial development of the same, and unless "pay ore" is reached in a few weeks, it not infrequently happens that that is the last of the "mine."

More frequently the shallow shaft, made by the prospector and his "pard," or the "open cut," shows encouraging "signs," but not enough to warrant putting up the simplest machinery for reduction.

At this point the "mining man," with more means, or backed possibly by some financial "mine-owner" at "the bay," or elsewhere, comes to the front, and after examination makes a proposition to "bond" the mine, as it is called; that is, an agreement is entered into between the parties to furnish money to make certain developments for a certain length of time, with the privilege of purchasing a part, or the whole, at any time during the bond.

The style and conditions of the bond are such that it frequently happens that a very small omission cuts off an otherwise advantageous bargain to an intending purchaser, after expending hundreds, or it may be thousands, of dollars in prospecting.

A case in point came within our own experience. A mine in California was bonded for \$3000. Work was done on it freely, with the expectation of owning it at the end of the bond. Notice was given to the owner that at a certain day, the last but one of the bond, as it happened, the price would be paid over and he wished the deed ready. All in good time the deed was ready, and the purchaser, with evident satisfaction, handed a handsomely lithographed draft on San Francisco in payment; but the owner "did not see it." The bond was for "gold coin;" and if the gold coin was forthcoming before the bond run out, the deed was ready, and he would wait until then. As it was an impossible thing to do, and as no persuasions or threats could avail, the mine and its improvements came back into the hands of the sharp owner.

Now, as the country is overrun by "quartz sharps" and a few bona fide purchasers, and as many of our old prospectors would bond their mines to an intending purchaser if they were sure they would not be swindled out of them, we have at some pains obtained from a reliable source a *pro forma* bond, which can be varied to suit circumstances, as follows:

This Agreement, made and entered into this — day of —, 18—, by and between —, of the town of —, county of — and State of —, known herein as the first party, and —, of, etc., —, known herein as the second party (or parties), Witnesseth, that the first party is the owner by proper location,

recording and the necessary work thereon in accordance with the laws of this mining district and of the United States of America, of that quartz ledge or lode known as the — (here describe the location in detail), and that the same is free from any debt, lien, or claim; and whereas the second party is desirous of developing the same with a view to purchase: Now this agreement witnesseth that the first party agrees to bond the said mine to the second party for the period of — months from this date for the sum of — dollars, gold coin of the United States, on the following conditions (here insert the conditions as to the work to be done, or other details); and it is hereby agreed that at any time during the life of this bond the second party may demand, and the first party shall make, a good and sufficient bargain and sale deed for said mine, duly signed, sealed and acknowledged, and shall be delivered on the payment of the purchase price, the other conditions of this bond having been previously complied with, free from any debt, lien, or claim thereon. It is understood that the purchase-money may be paid in gold coin, or by certified check, certificate of deposit, or draft for gold coin on any solvent bank in —; but if paid by a certified check, certificate of deposit, or draft, then the deed shall be held in escrow by —, agent for Wells, Fargo & Co. at — (or other person agreed upon), until in due course the check, certificate, or draft shall have been paid, when the deed may be delivered by —, as agent of the first party, to the second party hereto. Should the second party fail in any of the conditions of this bond, then, upon demand of the first party, the second party shall surrender quiet and peaceable possession of the mine and appurtenances, free from all liens, debts, or claims.

It is understood and agreed that the words "first party" and "second party," as used herein, shall include and bind the assigns and legal representatives of the respective parties hereto.

Witness our hands and seals, at —, the day and year first above written.

Signed in duplicate.

(SEAL.)

(SEAL.)

This should be witnessed and acknowledged before a notary public, or a justice of the peace, and recorded in the County Recorder's office. When this is done, a bond, safe and sound for the owner and equally as good for the purchaser, will make "all straight."

If the owner wishes to make himself additionally secure, a bond can be demanded from the second party, that no debts, liens, or claims shall be allowed to attach to the mine while in the hands of the second party, or a notice can be posted on the mine, in a conspicuous place, that the owner, nor mining property, will not be responsible for any debts, liens, or claims of any party other than those created by the owner. [Signed by the owner.]

There is no doubt that many available mining properties would in this way be developed to the advantage alike of both parties.

Some purchasers will only put their money into a developed mine; in that case they must "pay the price;" whereas by investing the same amount in prospecting several mines under bonds, they may realize several valuable mines—say one out of two or three—and thus the individuals, the district and the State be advantaged.

## Volcanic Eruptions in Java.

Herr Fennema, a mining engineer, at Buitenzorg, in Java, has made observations on the recent volcanic eruptions in that island, which are of interest as setting at rest a matter on which some doubt has existed. On the authority of Junghuhn, the general belief has been that in historic times all the volcanoes of Java had thrown out solid matter only, and never those streams of lava which are so characteristic of most eruptions. But a careful examination of Smeru and Lemongau during the catastrophe of April, last year, shows that this notion must be abandoned as incorrect. The former is not only the highest but also the steepest in Java. From 700 to 1400 meters the slope is about 6°, up to 2100 it is 20°, and from 2100 to 3671 meters it is more than 30°. For a considerable way from the summit the striking cone consists wholly of the detritus thrown out regularly by the almost uninterrupted activity of the crater. Up to April, 1885, the existence of torrents of lava was unknown. On the 12th and 13th of that month a stream appeared on the southeastern side, and forced the residents on the plantations lower down to fly. The stream increased for several days, until it reached a height on the mountain side of about 2100 meters from the level of the sea.

The loss of life was due to the avalanche of stones sent down the steep sides of the mountain by the stream. Similarly, at the same time, Lemongau threw out a lava stream, but there was a curious difference between this and the one issuing from Smeru—the latter andesitic in its character, while the former was basaltic.



## Bullion Production.

It seems to be the opinion, not only among many of our own people in this State but among those in other States and Territories, that the mining interests of California are on the wane. Because of the exhaustion of our placer and other shallow gold deposits, and the cessation of hydraulic mining, it is thought that our gold product has fallen off. We hear, every year, statements made in the newspapers of the mining States and Territories of the immense prospective product of the year; but we seldom hear any predictions of California's status. Nevertheless, every year, when the statistics are compiled, it is found that California still maintains her position as second of all in total bullion product and first of all in gold product. And this is the regular thing. There is very little talk about it one way or the other among our citizens. We are hard at work all the time turning out the bullion, and have little desire to "blow our own horns."

With the cessation of hydraulic mining, men turned their attention to the quartz interest of the State. New mines now prospected are old ones reopened. We are all the time developing our gold quartz interest. Moreover, the drift-mining interests of the State are increasing in importance every day. It is a matter of congratulation to the miners of this State to know that, notwithstanding the drawbacks which they have experienced, they still maintain the lead in the gold product of the United States.

The annual report of the Director of the U. S. Mint, just issued, contains the latest statistics of production of precious metals in the United States, for the calendar year 1885. It is as follows:

The production of gold is estimated at \$11,800,000, an increase of \$1,000,000 over the estimate for the calendar year 1884. The production of silver for the calendar year 1885, calculated at the coming rate in silver dollars, is estimated at \$51,600,000, against \$48,800,000 in 1884, an increase of \$2,800,000. Colorado still retains the foremost rank as the largest producer of the precious metals, California maintaining second place. The most notable changes have been in Montana and Idaho, the production of the former having increased from \$9,000,000 in 1884 to nearly \$13,500,000 in 1885, and the latter from \$3,970,000 in 1884 to \$5,300,000 in 1885. Nevada, Utah, New Mexico and Dakota still hold their own, while the production of Arizona has slightly increased.

The coinage executed during the calendar year at the coinage mints consisted of 47,544,521 pieces, of the face value of \$56,926,810. Of this amount 3,002,313 pieces, valued at \$27,773,012, consisted of gold coin, and 31,925,544 pieces, valued at \$28,962,176, of silver coin, the remainder being minor coin. The number of silver dollars coined during the calendar year 1885 was 28,697,767. In addition to the coinage, gold and silver bars of the value of \$27,490,095 were manufactured by the mint and assay offices during the year.

The total value of bullion and coin imported into the United States during the calendar year was \$41,418,129, of which \$8,322,909 consisted of bullion and \$33,095,120 of coin. Of the total imports \$23,645,311 consisted of gold and \$17,772,718 of silver. The total export of gold and silver from the United States during the same year was \$44,697,749, of which \$11,417,207 was gold and \$33,280,542 silver. While the United States lost by net exportation during the year \$15,508,084 in silver, it gained \$1,228,180 by net importation of gold.

The report contains an elaborate review of the coin circulation of the United States. The director's advance estimate of January 1, 1886, is reviewed, as well as the estimates of his predecessor, and some errors in still earlier estimates have been corrected. The deduction from the stock of gold coin of \$15,669,981 is made for bullion in the treasury July 1, 1873, heretofore included as coin, and for an error in the exports of gold coin as reported for 1874 of \$4,654,714, a total of \$20,324,695. This, with \$30,000,000 deducted in his annual fiscal report, makes a total deduction of \$50,324,695 from the estimates made by his predecessor of the stock of gold coin in the United States. The director estimates the amount of gold coin in the United States on January 1, 1886, to have been \$533,485,453, of silver dollars \$218,259,761, and of subsidiary silver \$75,034,111, or a total stock of coin of \$826,779,325. Of the stock of gold coin, the United States Treasury held, over and above outstanding gold certificates, \$75,434,379, and the national banks \$156,353,592, including treasury and clearing-house certificates. One hundred and fifteen State banks and trust companies held on November 1, 1885, \$31,255,788, which left in the hands of the people and other banks \$270,443,603.

Of the silver dollars which have been coined, the United States Treasury owns, not represented by silver certificates, \$72,538,725, and the national banks \$6,940,628. The amount owned by private individuals and other banks, including those in the treasury represented by

certificates outstanding, was \$138,780,408. Of subsidiary silver, about \$27,000,000 was in the treasury and \$47,000,000 outstanding.

The result of his inquiries leads the director to the conclusion either that the consumption of gold and silver in the industries has fallen off since 1883 or that there is less duplicating in the returns than heretofore, as between original and secondary manufacturers.

## Mining Accidents.

The following accident happened to a miner a week or so ago in the mines of the Star district: It appears, says the *Pioche Record*, that the injured man, David Reese, while preparing to load a hole, held in one of his hands a couple of giant powder caps, and in the other a box of caps and a lighted candle. As he was going to set the box of caps down, a piece of the wick from the candle, it is thought, fell on the caps held in his hand, exploding them, and the concussion then exploded the box of caps held in the other hand. There was no person with Reese at the time of the accident, but the noise occasioned by the explosion of the caps drew the attention of men working in other parts of the mine, who went to see what was the matter. On reaching the place they found Reese about four yards from his former position, he having been thrown that distance, over a windlass, by the explosion. He was unable to move and partially insensible. Both hands of the unfortunate man were almost entirely severed from his arms, only hanging by a single cord and a piece of the skin. The right arm was torn off about midway between the elbow and wrist, slanting toward the elbow. The other was a clean cut. There was not a particle of flesh remaining on his hands. A deep gash was found across the thigh of the right leg, and his face was badly burned. With both hands hanging in this way he was taken into Milford.

A frightful accident occurred on August 12th to a miner, William Rambo, in the Silverton district, Colorado, whereby he lost his life. It was occasioned by a premature blast. The scene was in the drift of the Dreadnaught, situated in Arastra basin, which Rambo and his brother Benjamin owned jointly. They had only been working a few days, having recently obtained a renewal of their lease on the McMillan mine near by. They had prepared two holes for blasts, and Ben, leaving his brother to do the loading, went out to the blacksmith shop to sharpen up the tools. When the shots went off Ben paid no particular attention, and when he looked around a few minutes later and saw Billy sitting in his usual place on the dump, he thought no more of the affair until he heard a groan from his brother, and going up saw that his head and breast were lacerated in a fearful manner. Both shots had gone off and the accident must have happened while tamping the charge, the concussion of the first shot exploding the second. He was brought to town the same evening and was buried on Monday afternoon. Mr. Rambo was well known in Silverton as a hard-working citizen.

## Freaks in Climate.

Our correspondent, C. H. Aaron, of Nogales, Arizona, sends the following interesting note concerning peculiar meteorological phenomena in his region:

Here in Nogales we have had, and are still having, abundant and daily rains, which have clothed the hills with verdure such as I have not before seen here; yet, at places not many miles from us, scarcely any has fallen. So capricious is the distribution of the rainfall in this singular country. As I write, the down-pour is almost tropical in its profusion, and two days ago we had the greatest flood I have yet seen here, though according to the stories of old residents, it was nothing to what we are liable to see.

So far, although a couple of roofs have been blown off, only one house has fallen—that of the old-time Californian, Sam. Brannan. This house was built over a cellar which was walled with poor adobes, and on these the walls of the house were raised. The torrents from three ravines met close to the house; the water entered the cellar, the walls of which turned to soft mud, and the house fell in. Fortunately, there was no one in the house at the time. Such floods as they tell about would be disastrous to that portion of the town which is situated on the flat. And now the sun is shining.

The first African city lighted by electricity was Kimberly, with 42 Brush lamps, each of 2000-candle power. The current is also utilized there for the killing of dogs, a step suggesting the execution of death sentences by the same means.

## Idaho.

The "Short Line Mineral Belt"—Silver City—Flint and Other Districts—Concentrates, Etc.

[Written for the PRESS by FRANK W. SMITH, our Traveling Representative.]

Silver City, Owyhee county, Idaho, was at one time almost as familiar to the mining public of the Pacific Coast as the Comstock. It was owing to the stock-gambling mania that prevailed during the palmy days of the Comstock bonanzas and kindred camps that Silver City lost the greater part of her mining kings and moneyed men who were then opening up many good properties in that vicinity. Like hundreds of other deserving camps, Silver City has suffered from the effects of mining cranks with a hobby, and non-mining men attempting to manage mines. Thousands of dollars were spent in hoisting works, stamp mills, and in some instances reduction works—all previous to development or investigation as to there being ore in quantity, or the actual treatment required by the ores. Many of these plants stand to-day rusty and unfit for use. They are monuments warning capital to avoid a district thus equipped and lying dormant. Investigation by mining men results in finding these monumental failures not the fault of the district, but the useless extravagance of by-gone wild-cat stock deals, or ignorant would-be mining men with more sand than sense, and less knowledge of mining than as many cattle.

## Legitimate Mining.

It is a well-known fact that mining is being reduced to a science, and every day the business principles applied have resulted in bringing mining down to a business basis. Old played-out mining camps are almost daily developing dividend-paying properties, and capital with experience seeks deserted fields to work rather than investing in "boomed" mineral belts with rich indications. Quantity, more than quality, is sought after now. Silver City can boast of a record on the stock boards that is anything but an enviable one. It is said that "all's well that ends well." The many big steals spent in great and costly hoisting works can to-day be utilized in developing mines that will pay handsomely if worked with care and economy. The reader can form an idea of the extent the leading mines were worked on their merits by the following instance: One of the leading mines, the stock of which was held far and wide, and often was quoted "way up," placed hoisting machinery and buildings on the mine worth over \$100,000. At one time during the exciting days of the Con. Virginia and California's jump into the hundreds, every dollar in the treasury of this leading mine (\$60,000) was put into a pool, and stock in the twin Comstock bonanzas was bought and held until it went—down. This is not the only instance of "mines dealing in mines." Thus, but few, if any, mines about Silver City were worked on their merits, until lately.

## Individual Mine-owners.

Nearly, if not all, of the paying mines of Silver City are owned by individuals. Very few corporations and but little outside capital, as yet, is invested in mines in and about this once-famous camp. The revival of mining interests hereabouts is slow but sure and profitable. Many great mines equipped with costly and improved machinery are being worked by a small force of men, while the machinery stands idle overhead. Individuals who have faith in the camp in many instances have secured control of the leading big properties and by economical and miner-like management have made the dormant bonanzas producers.

## The Oro Fino Group.

The Oro Fino is a well-known mine to stock gamblers of days gone by. The property is the best equipped in the district. It is located on War Eagle mountain, near the Summit. There appear to be three parallel veins crossing the Summit but a short distance apart—the Sinker, Oro Fino and Dunganon—covering the center vein in the order named from north to south. The Cleveland, Badger and Summit on the east vein, and the New York and Banner on the west vein. The most of these mines are either owned or bonded by T. Regan, of Silver City. The Oro Fino is the center of the group and is equipped with the finest hoisting machinery in the district, the shaft-house, ore bins, boiler-rooms, etc., reminding one of some of Virginia City's leading mines and costing, I am told, \$110,000. A two-compartment shaft, nearly perpendicular, is down 370 feet. A 750-foot adit tunnel from the north crosses the shaft at the 40-foot station. Three levels run north and south from the shaft below the adit tunnel, and showing some 1500 feet of development work done on the mine. The ore body is a quartz, varying in size and grade. It is a free-milling gold ore with but a small percentage of silver. Last season Regan took out \$83,000 with five men; 70 tons yielding \$800 per ton gold. Only \$10,000 in silver out of the \$83,000 was obtained. At present Mr. R. is only working a few men. A small stringer that goes from the Oro Fino southeast into the Badger is being followed and very rich rock is being taken out. The stringer is partially decomposed iron-looking quartz and prospects in many instances as high

as \$1 per pound. The ore is being sacked and will be treated in one of the neighboring mills. The ground now developing is opened through the New York tunnel. The machinery of the Oro Fino is lying idle, but is well preserved and protected by Mr. R. and is to-day as good as when put in. The Oro Fino and the adjoining properties above mentioned would be a most desirable property for a company, as all of the group could be developed through the Oro Fino, which is equipped with machinery in keeping with the necessities of the group.

## Silver City "Concentrates."

The charge for milling ore is \$9 to \$12 per ton.

The Idaho hotel, T. Regan presiding, is one of the best in the Territory.

Florida mountain mines are producing and bringing in ore to Silver City mills.

The Cunningham 20-stamp mill is running on Black Jack ore from Florida mountain.

Scales & Wagner are running on full time with their five-stamp mill and arastras.

R. H. Leonard has a model five-stamp wet process mill running night and day on custom ore.

War Eagle mountain looms up back of Silver City like Mt. Davidson does over Virginia City, Nev.

The Ruth, on War Eagle, is in 700 feet on ledge and opening new ground that will go up into the hundreds.

Denver, Colorado, capital has bought the old Cosmos 10-stamp mill at Silver City and will put in concentrating works at once.

## Flint District.

Nine miles southeast of Silver City is the camp of Flint, now reviving under the influence of capital in the hands of a thorough, experienced and practical Colorado mining man, R. B. Stanton, of Georgetown, Colorado. The parties, Nebraska people who are represented by Mr. S., are men of means and no small experience in mining. Flint was a live camp in '68. The place was then three years old and boasted of a fine plant that cost thousands of dollars and in charge of a no less distinguished laborer than James G. Fair, who I am told was amalgamator and operator of the mammoth works then in full blast. At that time the method in vogue for treatment of silver ores was more of an experimental nature than any settled or established process. The ores of the district required different treatment to the plant then run, which was a 30-stamp mill with an O'Hara furnace for roasting. A large quantity of rich ores was mined and put through a partial treatment. The ore handled averaged over 200 ounces, and had not the Comstock and other then new and booming El Dorados enticed both miners and mining men from the district, the Nebraska people to-day would not have been able to get hold of a group of mines as rich and extensive as those they are now opening. The camp decayed to almost nothing, in fact, only two towering brick smoke-stacks, a dilapidated boarding-house and the frame-work of the old stamp mill was all that indicated the former existence of a prosperous mining camp a few weeks ago when the present company started work. The formations are granite of a porphyritic nature and shale or slate, principally the former. The ore body is a white quartz, varying in width from 2 to 12 feet. The course of the veins (there are a number running parallel) are north and south, dipping to the east at an angle which varies from 20 to 45 degrees. The claims cross the west slope of a mountain high up and lie in about the position indicated by the diagram given below, the Leviathan and its northern extensions being the lowest on the sidehill. Tunnels tapping the Leviathan and the Perseverance and their extensions need only be continued a few hundred feet to tap the Rising Star, and at a greater depth. A glance shows that a tunnel tapping any mine on the lower row or vein can be used to open and work the vein or mine directly above and alongside of it. The description of the property given here is more of a historic nature than of recent development. The group of mines owned by this company consists of 11 mines, four of which are patented. Over 60 men are at work night and day cleaning out old tunnels, shafts and inclines preparatory to properly developing the properties. On some of the claims men are quarrying out and sacking ore that will run from 100 to 800 ounces. In some of the tunnels ore is being taken out and sacked. The ore extracted no doubt has been sufficient to pay the expense of development. Why a company like this one, with their experience and money, should stop to fool with small batches of ore in old tunnels, or put a force of men gophering the surface of the whole face of a claim, and quarry and sack ore at this stage of the proceedings, I cannot imagine. The sketch of development work done by the former management will give the reader an idea of the condition of and the extent of this promising group of mines. If the stockholders of this company open their mines for the future—and to do this they should develop and explore to a certain extent before extracting any ore for shipment or treatment—and be satisfied that they have an abundance of ore get-at-able before they invest in any extensive or costly experimental plants, they will have a Comstock in a short time. Few companies can boast of as good a showing of mines, as fine a location, or as high-grade and extensive deposits as this group shows. A little time, money and a systematic development will

(Concluded on page 144.)



## SCIENTIFIC PROGRESS.

## Mars—The Snow-Capped Planet.

Perhaps the most interesting celestial event of the year will be the opposition of Mars at the end of the present month. There is so much about this remarkable planet that suggests a close resemblance to the earth, and so many of its surface features and of the natural processes occurring upon it are visible with telescopic aid, that every time it comes to opposition, that is, gets into a line with the earth and the sun, the earth being in the middle, a battery of telescopes are turned upon it with eager expectation of interesting views, if not of important discoveries. At opposition, Mars appears even with small telescopic power like a full moon of a ruddy tinge. As the magnifying power is increased, one detail after another of the diversified surface of this distant world comes into view, until it hangs in the field of the telescope a real globe, marked plainly with continents, oceans, and islands, and partially covered with clouds.

The first physical features of Mars that come into view are the snow caps surrounding his poles. The southern pole is now inclined toward the earth, and a small telescope, say of three-inch aperture, will plainly show the circular, gleaming patch of snow that covers the antarctic region of the globe of Mars. The dark ring surrounding the snow field, and sometimes called Philip's Sea, is almost equally distinct, and some of the other seas, or spots that are believed to be seas, can be seen with the same telescope. With a larger telescope more details are visible, and with the largest and best all the various features of Martian geography which are represented on some of the wonderfully complete maps of Mars that have been constructed can be seen. What a surprising thing it is that men have been able to make maps and globes representing in a high degree of completeness the surface of a world never much less than 40,000,000 miles distant from the earth.

Large telescopes, during its time of opposition, show the two tiny moons of Mars, which revolve close to the planet, so rapidly that the inner one goes through all the changes from new moon to old moon in less than a day.

Another interesting thing about Mars which can now be studied is the mysterious network of so-called canals which cover a large portion of the planet's surface, particularly in the equatorial regions. The idea that they are really canals constructed by the inhabitants of the ruddy planet can hardly be entertained when it is known that they are 60 miles and more in width.

One thing seems to be pretty certain: Mars has reached a much later stage of planetary development than the earth, and if it has inhabitants they may possibly have attained a degree of civilization incomprehensible to us. At any rate, it is a wonderful world which now beams as a ruddy star in our winter midnight sky. When the Lick telescope is placed in position at Mt. Hamilton, some new and important observations will undoubtedly be made in regard to this interesting planet.

**ROLLING WINDOW GLASS.**—A proposed method for making window glass by rolling instead of blowing has been described recently in the Pittsburgh papers and commented upon at some length. Though the description of the process is not very clear, it would seem as if the intention of the inventor is to run the molten glass as it comes from the pot between two hollow reversible rolls heated by natural gas by pipes full of perforations placed on the inside of the rolls. As the rolled glass passes through the rolls it is received on the opposite side on an iron plate, also heated, from which it is passed into the annealing furnace. If it is claimed that by this process a glass of uniform thickness and polished ready for the sash can be made, we are inclined to question the claim. If the temperature of the rolls should be any less than that of the glass when it strikes it, it will chill the surface of the glass at once, and it would lose its viscosity and malleability, the properties upon which the process would depend; while were the rolls heated as high as the glass they would be of little or no value. It is also well known that glass by touching iron loses a part of its polish, and this must be restored by "skim melting" the glass, or by polishing it as plate glass is polished. In connection with the above it may be remarked that "ondoyant" is the name given to a new, wavy translucent glass, made in St. Louis, Mo. It is rolled in sheet form, and is of all cathedral colors; one side being wavy and undulating to the touch, and the reverse side approximately smooth. The sheet is about one-eighth of an inch thick, and can be cut with diamond or wheel. When held in the light the beauty of the glass is brought out in its fullness. The diffusion of the rays is admirable. It reflects and transmits the rays equally well, and can be made of almost any shade.

**INTERESTING EXPERIMENT WITH SOAP BUBBLES.**—A, who holds a large reed or pipe, blows a soap bubble say five or six inches in diameter; B, who has a smaller pipe, and is smoking a cigar, blows a bubble one-third or half as large as A's, filling it with smoke. Before the bubbles are shaken off they are pressed together until slightly flattened at the point of contact. In a second or two the smoke from the smaller will spring into the large bubble and remain.

The smaller bubble will disappear. There is no change in size of the surviving bubble. What drives the smoke into the larger bubble? How is the place through which it passes healed? And why does not the bubble increase in size? With a compound oleate of soda and glycerine you can blow bubbles two feet in diameter. Such bubbles have been kept for 48 hours under glass. The man who doesn't provide his children with a clay pipe and wash-basin full of oleate and glycerine, forthwith, fails in his duties as a father of a family.

**A NEW ALLOY OF ALUMINIUM.**—The applications of aluminium are now considerable, and M. Bourbouze, a French physicist, has added to their number by employing an alloy of the metal with tin for the internal parts of optical instruments, in place of brass. The alloy he employs consists of 10 parts of tin and 100 parts of aluminium. It is white, like aluminium, and has a density of 2.85, which is a little higher than that of pure aluminium. It is therefore comparatively light, which is an advantage for apparatus where lightness is desired. It can be soldered as easily as brass, without special means, and it is even more unalterable than aluminium to reagents. The attention of electrical instrument makers should therefore be called to it, especially for apparatus of a portable character.

**EFFECT OF PRESSURE ON CORK.**—In solid substances no appreciable change of volume results from change of pressure; even India-rubber is extremely rigid. Cork, however, appears to be a solitary exception to this law, being eminently capable of cubical compression. The cause of this anomalous and valuable property of cork is its peculiar structure, which renders it in many respects more like a gas than a solid. Cork is composed exclusively of minute closed cells, the walls of which are readily permeated by gases, but are impervious to liquids. The cells are filled with air, which, when pressure is applied, yield readily and expand again when the pressure is removed. The impermeability of the cells to liquids prevents cork from getting water-logged.

**ARTIFICIAL AND SUN HEAT.**—No explanation has been found of the familiar fact that, while both the light and the heat of the sun pass unimpeded through glass, artificial heat is intercepted by this transparent medium. It is strange that the heat of an ordinary fire should pass freely through a layer of rock-salt, when it is unable to penetrate a pane of common glass, and it is worth observing that while the hot rays of the sun pass through glass with such perfect freedom, they cannot find their way back by the same channel. The warmth once inclosed in a hothouse cannot escape by the process that allowed it to enter the building; it must first heat the glass panes in the roof, as it would any other substance, in order to get out again.

**HYDROGEN IN PLACE OF A VACUUM FOR INCANDESCENT LAMPS.**—The well-known fact that the carbon filament of a vacuum glow lamp is gradually dissipated by some electric or thermal effect of the vacuum points to the trial of lamps in which the vacuum is discarded and its place supplied by an atmosphere of hydrogen, nitrogen or other gas which cannot oxidize or burn the filament. According to *Engineering*, Messrs. Siemens Bros. have lately been making lamps filled with hydrogen, and they find that these lamps do not become sooty on the inner surface of the glass. Next to a filament which will remain incandescent in the open air, an envelope which will remain clean and not of itself destroy the filament is a desideratum.

**IMPROVEMENT IN GAS ILLUMINATION.**—An invention which, it is claimed by gas engineers, will revolutionize the present system of gas lighting has just been perfected by Dr. Auer in the chemical laboratory of the Vienna University. Briefly described, the invention may be said to consist in rendering a cotton wick incombustible by impregnating it with a metallic liquid. Thus treated the wick, instead of burning, merely glows, emitting a radiance not unlike that of the electric light. The whole process is very simple, and the great advantage of the invention is that it may be applied to any gas burner.

**ARTIFICIAL SEA ATMOSPHERE.**—As a means of producing an artificial sea atmosphere in houses, the use has been suggested of a solution of peroxide of hydrogen, containing one per cent of ozonic ether, iodine to saturation, and 2.50 per cent of sea salt. The solution, placed in a steam or hand spray diffuser, can be distributed in the finest spray in a room at the rate of two fluid ounces in a quarter of an hour. It communicates a pleasant odor and is said to be as good a purifier of a sick chamber as ever used, besides being a powerful disinfectant.

**A NEW ALLOY.**—The formula of a new alloy is given in *Nature*, which is especially adapted to many important uses in the arts. It melts at the low temperature of moderately hot water, and considerably below that at which the magic spoons of long ago melted in a cup of tea. Its composition is as follows: Bismuth, 48 parts; cadmium, 13; lead, 19; tin, 20. It is said that this alloy will withstand quite a severe pressure.

## MECHANICAL PROGRESS.

## The Universality of Inventions.

We do not often stop to think how little man has or enjoys that is not the fruit of invention. Things which man has long had we have ceased to think of as inventions, and we are apt to apply that term only to modern things—to things the origin of which we know. Yet it will be hard for any of us to name anything which we use or enjoy which is not an invention, or the subject of an invention, in its adaptation to our use.

The air we breathe and the water we drink are provided by nature. But we drink very little water except from a cup or vessel of some kind, which is a human invention. Even if we drink from the shell of a gourd, we are using a thing which, in the shape we use it, is a human contrivance; and the contrivances which man has devised for obtaining water and distributing it have been among the most wonderful and ingenious of any which have occupied the human mind. Bountifully as nature has provided water and placed it within the reach of man, yet we do in fact get or use but little of it except by the aid of inventions.

The air surrounds us at all times, and we cannot help using it if we would; but, if we want it either hotter or colder than we find it, we must resort to some invention to gratify our want. If we want it to blow upon us when it is still, we must set it in motion by some contrivance, and fans among other things have been invented for that purpose. A large amount of human ingenuity has been expended upon devices for moving air when we want it moved, upon fans, blowers and ventilators.

How small a part of our food do we take as animals do—in the form provided by nature—and how very large a share in some form contrived by man! We drink infusions of tea or coffee without thinking that the compounds are human inventions. How large a place the milk of the cow has in the food of man, but how little of it could he have but for a multitude of contrivances! We think of butter as we do of milk—that it is a production of nature; and so it is, but its separation from milk is an invention which has been followed by a host of inventions to effect the separation easier or better.

Sugar is a production of nature, but little known a few hundred years ago. Separated from the plants in which it is formed, it is an invention of man. The savage who first crushed some kernels of wheat between two stones and separated the mealy interior from the outer skin, invented flour, and the human mind has not yet ceased to be exercised on the subject of its improvement.

## Grindstones and Tool-grinding.

Though probably no workshop tool pays better for the care bestowed upon it, or affects the work of the entire shop, more than the grindstone, yet it is almost an exceptional occurrence to find a good stone, properly hung, running true and in perfect order. The shop stone generally has a trough beneath it to hold the water, and being usually left with a portion of its edge immersed, that part becomes softer than the remainder, and the stone wears unevenly. The out-of-doors grindstone soon becomes a worthless wreck from the effects of the weather, the sun's rays warping the wooden frame and making the stone itself too hard for use. Every employer of edge tools should endeavor to get a grindstone that will do its allotted work well and in the quickest time. A good grindstone, to replace one that is hard and flinty, is always a paying investment. A writer on the economic conduct of workshops recommends that a bad grindstone should be broken up, as the best means of saving time and trouble and earning the thanks of those who would otherwise have to use it.

Although the applications of a grindstone are limited, in its sphere it acts to perfection, and does that work which cannot be executed by the planer, lathe or milling machine. No machine or process has yet been devised to supersede the grindstone, and improvement has not added to, nor invention displaced, this primitive tool. True, science has produced artificial compounds which take the place of the original natural stone, and are now often used advantageously, but they are new only in the method of manufacture. Only those who have used a good stone, properly mounted, with its edge running as true as a turned wheel, can appreciate the value of a grindstone, and only such a stone can be applied to fine work. Those who have worked only at a lumpy, badly-kept stone cannot form a just estimate of the value of grindstones as applied to the production of the edges of tools in hardened steel. Artificial grindstones are made by binding together silicious particles with silicate of lime, and the process of manufacture is this: Silicate of soda, which is a kind of water-glass, is first made by dissolving flints with caustic alkali. Silicious sand of fine and even grain is then mixed with the plastic mass, and the whole is molded to the proper shape. In some cases the stone is treated chemically to render it hard; hydraulic pressure is employed to solidify the material. Some stones acquire their hardness by simple exposure to the atmosphere. According to the fineness of the grains of sand used the texture of the stone is modified, and emery may be used in

its stead, resulting in a grindstone of exceptionally good quality; and these artificial stones are in many cases cheaper than the natural stone to quarry and shape, which necessitates the expenditure of considerable time, sometimes with useless results.

**FIRING UNDER BOILERS.**—With a properly constructed combustion chamber under the boiler, and with air admission above the grate bars, the fire-door will not be required to be opened as often as with a boiler set to receive its air supply through the bars only; as in the former a thicker layer of coal can be carried and less slicing will be required, thus producing less clinker, and the air admission is not obstructed by ashes and clinker. For, as a rule, the fewer times the fire-door is opened the better; not that the introduction of the coal in large quantities is to be recommended, but because each time the furnace-door is opened there is a rush of cold air into the furnace, which tends to cool the combustion chamber and to bring on leakage of the boiler seams from the contraction arising from cooling.

**TO KEEP THE TEMPER IN WORKING TOOLS.**—It seems to me that after tools are properly hardened we ought to consider how to keep the temper in them when they are doing heavy cutting. There seems to be no effective way of getting water, or some cooling mixture, on the tools to keep the heat down. In the case of turning wrought iron, the point of the tool is buried in the metal, therefore the common custom of dropping water on the outside above the tools can do very little good. The place where the water is required is underneath the surface of the cut where the tool is acting, and the only way to get at this is to force the water in a fine jet from the under side.—*Journal of Progress.*

**STEAM AS A HEAT CONDUCTOR.**—Steam is as bad a conductor of heat as air as long as it does not condense, but in condensing steam will conduct heat to a cold surface at an almost infinite rate, for as the steam comes up to the surface it is virtually annihilated, leaving room for fresh steam to follow, which it will do, if necessary, with the velocity of sound. If, however, there is the least incondensable air in the steam, this will be left as a layer against the fresh steam. Experiments have shown that 5 or 10 per cent of air in the steam will virtually prevent condensation.

**SETTING UP LINE SHAFTING.**—Where line shafting is driven from one end it would pay to reduce its diameter, as the amount of power carried by it decreases. It is evident that if we put 100-horse power into a shaft at one end and take off 10-horse power from each 12 feet length, there will be only 90-horse power given into the second length, 80 into the third, and so on. Then, as the resistance to torsion varies with the cube of the diameter, we can readily cipher up how much the shafting might be reduced at each coupling.

**IRON WILL,** it may be almost certainly assumed, have a very prolonged life if exposed to statical strains alone within its elastic resistance. In a long-continued state of repose under stress it perhaps gradually becomes crystalline, but with nothing like the same rapidity as when exposed to vibration. That the natural tendency of iron is to pass from a fibrous to a crystalline state is well known, and the process of transition is rapid in proportion to the amount of vibration brought to bear upon it.

**THE LOSS OF POWER.**—Start at your engine, and follow up your line of shafting, and figure up how many tons of excessive weight you have been carrying thereon, which, to keep in motion, has been at a cost of from one to five horse-power per ton weight, according to alignment of same; then follow back and cipher your loss by slipping belts, and you will be surprised to find the sum total to be more than one-half the amount of power you are using.—*Power and Transmission.*

**SPEED AND FRICTION.**—I have been asked the question, "Does friction increase with speed, or decrease?" Both. Where the speed is slow, increasing it may decrease the friction per turn; but where the speed is fast, it may be found that increasing speed increases the friction per turn also. There are two sides to almost every question, and particularly so in this case. The more viscous the lubricant, the greater pressure can be carried upon the bearing.—*Grimshaw.*

**RAILROAD AXLES.**—A special committee on railroad axles has reported that iron axles are safer than steel axles; that all cranks should have the webs hooped; that as iron cranks appear to fail after running some 200,000 miles, and steel after 170,000, it is highly desirable that they should be taken off and not again used on passenger engines, and that crank axles, properly constructed, are as strong as straight axles.

**MACHINES FOR CUTTING OVAL HOLES** for manholes and handholes are now in use in English boiler shops. It is stated that the machines will cut holes in 20 minutes that would require a day's work by a good man. This is a very great saving in large shops, and such machines should find sale here.



## Lixiviation of Silver Ores.

## Effect of Caustic Lime.

C. A. Stetefeldt, of New York City, read the following before the American Institute of Mining Engineers:

In my paper on Russell's process (*Transactions*, vol. xiii, p. 54), I mention under Sec. 10 the deleterious influence of caustic alkalis in lixiviation. Mr. Russell's recent experiments have thrown more light upon this subject, and fully explain why, in many cases, the extraction of silver by hyposulphite solutions has hitherto been a failure. If a silver ore that contains calcium carbonate is subjected to a chloridizing roasting, a part of the lime is converted into caustic lime, its quantity depending (outside of the percentage of calcium carbonate) upon the character of the ore. With an increase of sulphurets of the base metals in the ore, the formation of caustic lime will be lessened. This caustic lime reacts upon the silver in the ore in two ways:

1. If caustic lime comes in contact with silver chloride at red heat, metallic silver is formed. As this reaction necessitates a close juxtaposition of the particles concerned, it will vary materially in degree, according to circumstances, and may effect, especially with low-grade ores, only a small percentage of silver. Besides, in case the metallic silver is not actually melted, it will be readily dissolved by the extra solution. Hence, the damage done by the roasting process itself may be very slight.

## On Moistening the Roasted Ore

On the cooling-floor, and then leaching it with water, and subsequently with a solution of sodium hyposulphite, calcium hydroxide is dissolved, and reacts on silver chloride with formation of silver oxide. If the ore on the cooling-floor is sprinkled with water while still red-hot, it is reasonable to suppose that silver oxide will be converted into metallic silver. In leaching with water, calcium hydroxide is only in part removed (100 parts of water at 15° C. dissolve 0.1368 parts, and at 100° C., 0.0752 parts, of calcium hydroxide). That the caustic solution will decompose chlorides and sulphates of the heavy base metals, it is hardly necessary to mention.

In applying the sodium hyposulphite solution, the remainder of the calcium hydroxide is quickly dissolved, calcium hyposulphite and caustic soda being formed. The latter now reacts much more energetically on account of greater concentration, and seems to do the principal damage in the final result of the lixiviation process.

With our knowledge of chemistry, the above is the only statement of reactions I am able to give for this case. If we now take into consideration that silver oxide is easily dissolved by a sodium hyposulphite solution (for one equivalent of silver dissolved, one equivalent of caustic soda is set free), and that metallic silver yields to Russell's extra-solution, the question may well be asked: How can caustic lime seriously effect the final result of lixiviation, even taking it for granted that a caustic hyposulphite solution is an inferior solvent for silver chloride and other silver combinations? The fact, however, remains; and since Mr. Russell has found at Lake Valley, New Mexico, a simple remedy to overcome this serious difficulty, it is doubtful whether the true chemistry of the case will ever be investigated.

## The Principal Facts

Observed by Mr. Russell at Lake Valley are as follows:

1st. If the roasted ore, while still red-hot, was cooled by freely applying a spray of water, the final result of lixiviation was depressed about 10 per cent, as compared with treating ore that had been allowed to become comparatively cold before moistening it.

2d. In leaching the ore with water, a caustic briny liquid was obtained, holding in solution several ounces of silver per ton of ore. Two pounds of sulphuric acid per ton of ore was sufficient to neutralize the caustic and to give an acid reaction to the solution, so that the silver could be precipitated from it as cement-silver by iron. By heating the solution, the precipitation of the silver was rendered practically complete in 12 hours.

3d. If, after leaching with water, the charge was treated in the usual way—that is, first with ordinary and then with extra solution, the extra solution was of no benefit whatever; it failed to dissolve any silver left in the ore after passing through the ordinary solution.

4th. If, after leaching with water, the extra solution was applied at once, the extraction of the silver was increased from 20 to 25 per cent, as compared with the treatment by ordinary and extra solution.

Here, evidently, the cuprous hyposulphite at once neutralized the calcium hydroxide, and prevented the solution from becoming caustic. It remains to be seen whether an admixture of a soluble salt of one of the heavy base metals, or of sulphuric or hydrochloric acid, to the first wash water, or perhaps to the water used in moistening the ore on the cooling-floor, would produce the same or even a better effect than the extra solution. Our ordinary book chemistry leaves us entirely in the dark on most intricate questions of hydrometallurgy, and actual experiment remains our sole reliable guide.

## USEFUL INFORMATION.

## Filling up Cracks.

The query, "Can cracks be permanently hid by any process of filling them?" we fear must be answered in the negative.

The shop mixture which comes nearest to doing it is a putty and filling composed of dry whiting and English filling, or ocher, half-and-half, wet up stiff with japan and quick-rubbing varnish in about equal parts, and ground through the mill. Keep oil or oil paint out of the cracks.

A priming coat is necessary to liven up the dead paint, and give the putty and filling something to cling to. Let this first coat be mixed of dry lead, mixed stiff in japan and a trifle of rubbing varnish, and thinned with turpentine. Use the lead freely, but wipe it well out of the cracks. After 24 hours, putty with some of the filling used stiff, by adding dry whiting or dry white lead. After 48 hours, sandpaper any superfluous putty, dust off well, and go on with the filling or rough coats. Add to the filling say one-fifth of its bulk of ground pumice-stone or silica, which must be thoroughly stirred through the mass.

Thin with turps, and apply freely, yet smoothly, giving the finishing strokes crosswise of the direction of cracks, if they are so well defined as to break more regularly in one direction than another. Apply two coats a day, and five or six coats in all, and give three to four days to harden.

In "rubbing out" leave a good body of the filler over the wood.

Wash clean, wipe dry, and allow 24 hours for the moisture to dry out. Use quick-drying colors and varnish. The plan is to avoid elastic material as far as possible, so that the cracks and the layer of material immediately above them may be hard as flint, which insures that it cannot shrink, or be penetrated by the after coats, nor will it be liable to change from heat or moisture.

HOME MADE CANDY.—For making candy the best of granulated sugar should be used if confectioner's sugar is not, though it is but a trifle more expensive. Home-made candy not only affords amusement in the making, but is sure to be pure and wholesome. A new recipe is given for making nut candy, that has been tested. To two cups of granulated sugar and one of boiling water, add one large tablespoonful of butter. Boil till it readily candies when dropped in cold water. Then remove from the fire and stir in nearly two cups of Brazil nuts, cut up small, and one tablespoonful of Royal lemon flavoring. Pour out upon three large buttered plates to cool. Always use a silver spoon in stirring candy. Home made candy is a very desirable adjunct to the dessert, and consoles the children when deprived of the pastries and puddings that prove so attractive to them.

A WONDERFUL LIQUOR.—The African traveler, Dr. Giovanni Succi, who is at present in his native town, Forli, claims to have discovered a liquor which renders the human body independent of food and drink. In order to prove his assertion he placed himself under a medical committee who were to see that he took no nourishment for 10 days, after having drunk a few glasses of his liquor. At the end of that time the physicians pronounced his pulse perfectly normal, and in order to show that his strength had not suffered, Succi, before breaking his fast, walked from Forli to Forlimpopoli, a distance of four miles, in 47 minutes. He then placed himself at the disposal of the medical faculty of Bologna, whose opinion in the matter is not yet known. Wonderful indeed—if true.

TO CLEAN CHAMOIS.—Chamois may be cleaned in a weak solution of soda in warm water. Rub plenty of soft soap into the leather, and allow it to soak for two hours. Then rub it well until it is quite clean and rinse it well in a weak solution composed of soda, yellow soap and warm water. If rinsed in water only, it becomes hard when dry and unfit for use. After rinsing wring it well in a coarse towel and dry quickly; then pull it about and brush it well, and it will become softer and better than most new leathers.

TO REMOVE EXUDATIONS FROM BRICK WALLS.—The simplest and least expensive method for removing saltpeter exudation from brickwork, when the efflorescence is in position where the sun and wind do not have free access, is to wash it off with diluted hydrochloric or common muriatic acid of commerce. About half a pound of the acid is used with an ordinary pailful of water, the application being made with a sponge.

POLITICS.—The time may come when politics will mean all that is noble and good; when a small boy will break an apple in two and give his little sister the bigger half; when a tramp will work and a stray dog won't bite; but the day will never dawn when the fly can tickle a drowsy man's nose without getting itself disliked.

MOLDING CAR WHEELS BY MACHINERY.—The first car wheel ever made in this country by machinery was recently turned out by the Dickson Manufacturing Company at Wilkes-barre, Pa. The wheel, complete in all respects, was made in less than one minute. The ma-

chine by which the work was done is the invention of James J. Carr, of Wilkesbarre, and it seems destined to revolutionize the business of molding car wheels. By this machine more than 600 wheels can be completed in 10 hours. By the old process it requires two men one day to make 18 wheels, and then they are not complete, as the axle holes have still to be bored when the wheels leave the molders' hands. A company has been formed in Wilkesbarre, and a large amount of capital subscribed, to establish works at that place to enter largely into the manufacture of car wheels under the Carr patent.

CLEANING BRASS.—The Government method prescribed for cleaning brass, and in use at all the United States arsenals, is claimed to be the best in the world. The plan is to make a mixture of one part common nitric acid and one-half part sulphuric acid in a stone jar, having also ready a pail of fresh water and a box of sawdust. The articles to be treated are dipped into the acid, then removed into the water, and finally rubbed with sawdust. This immediately changes them to a brilliant color. If the brass has become greasy, it is first dipped in a strong solution of potash and soda in warm water; this cuts the grease so that the acid has free power to act.

POISON OAK.—I have heard so many complaints from both old and young who have suffered from the effects of poison oak that I will give a very simple remedy that is said to never fail in curing the most aggravated cases: A handful of quicklime dissolved in water and used as a solution. Three or four applications will suffice and a cure be effected.—*Polly Larkin in Pet. Courier.*

TO CLEAN LAMP CHIMNEYS.—To make lamp chimneys beautifully clean, wash them in warm soapsuds, turn scalding water over them, wipe dry with a soft cloth, and rub with a piece of newspaper. This will give a nicer polish than can be obtained in any other way. Windows treated in the same way will be found to look much nicer than if simply washed and rinsed.

## GOOD HEALTH.

## Cold in the Head.

A cold in the head is believed by many to be "catching." In such case it must be caused by a germ which is introduced from hot, unventilated rooms, when we are weak or tired or exhausted. To break up a cold in the head it should be attended to in its earliest stages. If allowed to run two or three days it generally runs its course, in spite of all treatment. The most effectual means in the very first stages is a vigorous effort of the will. The effect of this is to establish more securely the equal circulation of the blood, which is most important. Another method is to inhale steam from boiling water, as hot as can be borne, through the nasal passages for about half an hour twice daily. This remedy is valuable in every stage of the disease. The method of applying it is as follows: Sit in an easy chair before the fire; throw a shawl loosely over the head, so that it may be folded over the head and held with one hand, leaving plenty of room for the steam. Now, with a spirit lamp boil a pint of water in an inhaling cup, with a rubber tube attached to the nozzle to convey the steam to the region about the mouth and nose. The only caution necessary is to be careful not to let the vapor escape to near the nasal passages, when there is danger of scalding them. A tinsmith will make the apparatus, or it can be bought of the instrument-makers. Still another method is to drink hot water. The Turkish bath in the first and last stages of a cold is a most excellent remedy; in the middle stage it does not do so much good. There are many drugs used to break up a cold, among them quinine, laudanum, etc., but we prefer the simple remedies before named. Most important of all is to guard against colds. This is best effected by daily cold bathing and friction, by abundant exercise, the proper ventilation of rooms and suitable clothing. To all delicate persons colds are but the beginning of lung troubles, which are dangerous in the extreme.—*Herald of Health.*

EATING BEFORE RETIRING.—The ancient prejudice against eating just before retiring is strongly and justly condemned by modern science, experience having shown it to be unfounded. There are exceptions to the rule, but few people are injured and many positively benefited by a slight repast before retiring. A glass of milk and a biscuit or cracker is better than any hypnotic drug to put one to sleep, and in most cases may be taken without fear of "nightmare" or any other form of distress. Going to bed "on an empty stomach" is a good way to invite sleeplessness and ultimate derangement of the digestive organs and general health.

THE MULLEIN PLANT.—A good deal has been written lately about the mullein plant and its efficiency as a cure for consumption. Extracts and decoctions of this plant (*Verbascum thapsus*) were recently exhibited at the Cork Exhibition, but the judges would not pass any verdict, as the chemical and physiological properties have not yet been investigated. It is under the synonym of cow's lungwort, popu-

larly looked upon as of value in diseases of the respiratory organs. In reference to the use of the above, Dr. Quinlan, of Dublin, writes to the *British Medical Journal* that three ounces of the green leaves should be boiled for 10 minutes in a pint of new milk. The liquid is then strained, sweetened to taste, and drank while warm. This dose can be repeated twice or three times a day. This high authority has no doubt of its efficacy as a curative in the earlier, and a palliative in the later, stages of pulmonary consumption. Care should be taken to use the leaves of the great mullein, known by its thick mucilaginous and woolly leaves.

THE DEMAND FOR REST.—There is an old saying that has frightened a great many people from taking the rest that nature demanded for them, "Nine hours are enough for a fool." That may be, and not too many for a wise man who feels that he needs them. Goethe, when performing his most prodigious literary feats, felt that he needed nine hours; what is better, he took them. We presume it is conceded by all thoughtful persons that the brain in very young children, say three or four years of age, requires all of 12 hours in rest or sleep. This period is shortened gradually until, at 14 years of age, the boy is found to need only ten hours. When full-grown and in a healthy condition the man may find a night of eight hours sufficient to repair the exhaustion of the day and new create him for the morrow. But if he discovers that he needs more sleep he should take it. There is surely something wrong about him; perhaps a forgotten waste must be repaired. His sleep evidently has not been made up, and until it has and he can spring to his work with an exhilaration for it he should sensibly conclude to let his instinct control him and stay in bed.—*Domestic Monthly.*

CLOTHING AND TEMPERATURE.—When we have to wear the customary dress clothing at night let us beware of draughts or sudden changes of temperature. Going from a room on one flat to one on another, especially if overheated by dancing, is dangerous in this way. It is rarely that houses are so thoroughly heated that no chill is felt when the apartments are exchanged for the hall or the staircase. Troublesome as it may be, the only safeguard is to carry with us some form of light wrap which can be thrown over the head, neck and shoulders. When we go out into the open air from a crowded entertainment, wraps should be as light as is consistent with thickness and warmth. An important point of a hostess' duty is to see that her guests' overcoats and coats are kept in a warm place, where there is no possibility of a wet mackintosh being thrown down on the shawl which a delicate visitor will wrap about throat and chest. A wrap which is thoroughly dry and warm not only feels comfortable, but acts as a greater security against outside chill.

HEAT OF FEVER.—The heat of fever is caused by the destruction of the tissues of the body, beyond their normal limit, and by the retention in the system of the heat that is produced. There is probably less heat produced in fever than when we are at work, but in the latter case it is used up. In fever, the heat accumulates in the body, so to speak; there is a stoppage of the process of using it up. Heat in the body is used up in two ways; first, in the visible work we do, and secondly, in the invisible work in the building up of our tissues. In a fever, the production of heat goes on, but as it is not consumed it accumulates. In treating fever, experience teaches that the application of water to draw off the heat is most beneficial. The principal point is to learn how to apply it so as not to weary the patient.—*Herald of Health.*

WHITE TEETH.—There are no such things as white teeth, as can be proved by contrasting those called white with snow, raw cotton or marble. Roughly, teeth can be divided, as regards color, into blue, gray and yellow, with hundreds of different shades. The apparent whiteness is due to the complexion and hue of the lips; and the "glistening ivories" of the negro are, as a rule, so exceedingly yellow that they would disfigure a white person. It is the black skin, hair and eyes that make them look white.

DYING FROM EXHAUSTION.—A leading physician says that a patient who is lying dying of exhaustion is generally dying of starvation. We give him beef tea, calf's foot jelly, seltzer and milk—that is, a small quantity of the sugar of milk and some fat; but the jelly is the poorest sort of food, and the beef tea is a mere stimulant. The popular belief that beef tea contains "the very strength of the meat" is a terrible error; it has no food value.

SCARLET FEVER.—A girl from Bath, Me., had scarlet fever while at boarding-school. She recovered and went home, and a trunk containing clothing worn while she was ill was put away in the garret. Six months afterward two little children playing in the garret opened the trunk and took out some of the clothing. In a week both were taken very sick with scarlet fever, and one died. No other persons in the neighborhood were ill.

BROODING.—The worst thing you can do is to brood over your troubles. If you cannot stop it in any other way, compel yourself to stop by a heroic exercise of the will.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Adador.

**MIDDLE BAR TUNNEL.**—*Ledger*, Aug. 21: For some time past the work in hand at the big tunnel at Middle Bar has been the sinking of a winze from the tunnel level. This winze has reached a depth of over 40 feet, and we understand good ore has been met with all the way. It is not merely a stringer of quartz, rarely exceeding six inches in thickness, as has been the case with most of the rich deposits met with in this district. The ledge now being operated in the tunnel level is over four feet wide. Indeed, the prospect of a permanent paying mine being developed at this point is more flattering than ever. The depth now reached is about the water level of the river, and the theory entertained by many that the broken character of the gold-bearing formation as met with near the surface, would, below the water line, give place to a solid and well-defined ledge, seems in a fair way of realization.

**MOORE.**—From all accounts the prospects of this mine turning out a good paying property are very encouraging. The ledge encountered on the lower level continues to open out well, both in size and quality. It is doubtful whether the present mill will be started again. It is considered altogether too small. Senator Jones is expected out soon, when the proposition of building a 40-stamp mill will be acted upon.

**SOUTH SPRING HILL.**—The era of dividends has dawned upon this splendid property, and likely to stay for a long time. A dividend of 25 cents per share was declared a few days ago, aggregating \$30,000.

## El Dorado.

**MINES BONDED.**—*Republican*, Aug. 19: D. Coffin, superintendent of the Rogers gravel mine at Smith's Flat, and some San Francisco parties have bonded the Jeffries-Secomb and the Goyan-Combellac gravel mines. These mines lie south of the Linden and Cedar Springs mines, and the new company propose to give them a thorough prospecting during the time they have them bonded. There is plenty of ground in the two mines for a big bank of gravel, and it is to be hoped they will find the same channel that was in the Cedar mine.

## Los Angeles.

**SAN GABRIEL.**—*Times*, Aug. 19: Among the most noted mines now being operated in this district may be mentioned the Martha-Swansea consolidated mines, comprising a group of some 12 mines or six ledges of two locations each, and is the joint property of Messrs. E. K. Alexander and W. D. Root, of this city. These ledges have a trend nearly due north and south, crossing, in running north, the summit of the Sierra Madre range along the western slope of Old Baldy. Over 1000 feet of shafts, tunnels and other workings have been made during the past three years on the first of these series of ledges, to prospect and to some extent determine the character and value of the property. The company is now driving a working tunnel, to cut the entire series of ledges at right angles, at a depth of from 1000 to 1500 feet, and draining them to that depth, a great desideratum, as the ledge fissures carry an immense volume of water. This water, which will amount to fully 100 inches, is worth, for irrigating purposes, when piped to the valley three miles below, \$1000 per inch. The ledges are in the shape of an inverted letter V, widening with depth at the rate of one foot in seven. Their width at the outcroppings varies from three to six feet, and in their course cut the stratification of the country rock at nearly right angles, and which is the best evidence that can be adduced of their being true fissure veins. The country rock is granite, but in its approach to the ore bodies and when forming the foot-wall, it changes to metamorphic or transition rock. For the hanging wall we have porphyry of a deep red color 40 feet thick. Assays of the ore at various depths range from \$10 to \$160 per ton in silver, with a large percentage of nickel. A company stands ready to put up reduction works of 20-stamp capacity for one-half of the entire property, on a showing of \$1000 between wall and wall, and which is to be determined by this tunnel, which is now near completion. The Wilson Electro Reduction Works, with dynamo, will be used, and it is claimed that \$3 silver ore can be worked to a profit. The San Gabriel Valley Railroad will pass within five miles of these mines, at a distance of 20 miles from this city. Near by, and just across the canyon, is the Kelsea mine, famous for the large amounts of native silver taken from it in years past. This mine is owned by a New York company, represented by Mr. A. S. Robbins, of this city, who is also a large owner. The company are now preparing to resume operations, after a year's suspension. The old and well-known Winston mine is also in the immediate vicinity, and has a force of men at work under the direction of Mr. Peter Taylor, of old-time mining fame. The mine takes its name from the late Dr. Winston, formerly Health Officer of this city. His heirs still retain his interest. Mr. I. W. Hellman, President of the Farmers' and Merchants' Bank, is also a large owner.

## Mariposa.

**MINING ENTERPRISE.**—*Gazette*, Aug. 21: Captain Diltz, who has been engaged the past month in surveying a route for a water ditch to his mining claim on Sherlocks, came into town on Thursday evening. That water sufficient for all mining and milling purposes upon his mine for at least seven to nine months of the year is one of the inevitable blessings he, by his indomitable will and energy, is bound to have. The survey is completed and has terminated most satisfactorily to all who have an interest in that section of country which abounds with rich mines. That the route is feasible and water can be obtained is no longer a question. This new survey is a continuation of the old Snow creek ditch, commencing at its terminus near Malone's, or the old mill-site of Clark's saw mill; running northerly down Bear creek and passes westerly around the mountain in the neighborhood of Colorado, and headwaters of Saxton's creek, and the Lacy mine; thence to Long Gulch, where a tunnel of

14 rods between Long and Mill Gulch will be found necessary to run. This will save a distance of 186 rods around, and a gain of six feet in height leading to the mine. From this point to the Diltz mine is about two miles, making the actual distance of the new survey eight miles, 290 rods. The terminus of this canal will be 100 feet above the highest point on the mine, giving a fall of 700 or 800 feet on the north side, and 400 or 500 feet on the south, thus affording this great mine an advantage of power by water force, when the contemplated work is completed, greater than is had or enjoyed by any mine known to this section. The old Snow Creek ditch, which is about eight miles long, was built and is owned by J. H. Malone, which, added to the proposed continuation, will make it 17 miles in length. It is expected by the owners of the respective properties to consolidate the interest of each into one enterprise, with a view of disposing of the same to a company of capitalists, with whom negotiations are at present going on, or being considered. Capt. Diltz and J. H. Malone are the two oldest and best experienced miners we have in the country, and should they be able to carry out their views in regard to the latest work in which they are engaged, they will be considered the greatest of benefactors to a valuable mining interest in this county.

## Nevada.

**NOTES.**—*Grass Valley Tidings*, Aug. 19: The Boston mine, on Wolf creek, is now looking better than ever, and is showing well and producing fine milling rock both from the 180 and 320 foot levels. On the 180 level the workings are to the south of the shaft, while on the 320 level quartz is being stoped on both sides of the shaft. Some of the rock taken out will mill \$100 per load, while the average per load from the whole mine will go \$60 per load. The quartz shows well in free gold and carries plenty of good sulphurets. The Peabody mine, situated between Gold and Church hill, has been prospected more or less for several years, and is now being worked under lease by Charles Mill & Company. Their work has been mainly done on the 180-foot level, from which they have run a drift northerly 230 feet, giving backs of from 60 to 70 feet. The ledge all along this drift shows in size from eight inches to two feet, all good milling, yielding from \$18 to \$20 per load. The mine is worked cheaply, the hoisting and pumping being done by water-power, the water being obtained from the South Yuba Canal Company. The prospects of the Peabody are better now than they have ever been before, and that the property will be reliable and lasting there is good promise.

**MORNING STAR.**—*Grass Valley Union*, Aug. 16: On Monday Capt. Frank Richards went over to Iowa Hill to visit the Morning Star drift mine, in which he and other Grass Valleyans are interested. This mine has been heretofore mentioned in the *Union* as having obtained rich prospects by making a raise from the tunnel into the gravel channel and then drifting along the channel for a distance of over 400 feet. The last gravel taken out yielded \$13 to the carload, and one man could take out two loads of gravel per day. At one point where the up-raise was the tunnel was in 1900 feet, and it was found necessary to continue this tunnel 500 feet to bring it under the channel where the rich pay was found, in order to secure practical and economical working. To this end a contract was let to John Hobson, of Iowa Hill, to run 500 feet of tunnel, and he has had a force of men upon it for some months. The rock is found exceedingly hard, as many as 50 drills being used in putting down a single hole. Of late the ground has been a little more favorable, but yet only about six feet of drift is made in a week. There has been 160 feet of drift run under the contract, and it is hoped to complete the full 500 feet by the first of the new year. The work is tedious and expensive, but the rich prospects obtained are full of encouragement, as when the channel is opened up a large output of gold will certainly be realized.

**THE PITTSBURG.**—*Transcript*: Superintendent Samuel Granger is crowding work at the Pittsburgh quartz mine on Gold Flat. The Pittsburgh has produced many thousands of dollars in years gone by, and was still yielding liberally, when in January, 1881, the water came in so fast at the 800 level that the machinery could not keep it under control. The stockholders, instead of putting in heavier pumps, became disheartened and quit. Recently it was determined by them to resume in the face of all difficulties. By last Saturday night the water was lowered to the 800 level, a six-inch plunger pump accomplishing the labor. A four-inch pump is to be put in from that level down to the 900, or the present sump, and with that once in operation the bottom will soon be clear of water. As soon as this is all done (which will be during the present week) drifting will begin on both lower levels. A tank holding 44,000 gallons of water, and fed by the South Yuba ditch, has been erected on the hill at a point where it gives 190 feet of fall. A Pelton wheel has been put in and was started Sunday. All of the pumping and most of the hoisting will be done by water-power hereafter, greatly reducing expenses. The steam-power will be used only occasionally for hoisting purposes.

## Siskiyou.

**SAWYER'S BAR.**—H. Stanislawsky in *Yreka Union*, Aug. 19: Inasmuch as quartz mining is engrossing more attention on the Pacific Slope of late than for years past, allow me, through the mediumship of your press, to impart to your readers a few facts concerning the New Eldorado, recently discovered on Knownothing creek in Siskiyou county. The above-named creek is one of the affluents to the South Fork of the Salmon river. About three miles above the forks and four miles below Fyfield's store we travel up Knownothing creek five miles, which brings us to Laflon & Co.'s mines. We entered one of their valuable properties on which they have a drift 150 feet, tapping their perpendicular shaft at the 50-foot level. The ledge at this depth is 2½ feet in width, standing perpendicular and encased in slate and porphyry, with three-inch gorge on slate side. The rock works from \$60 to \$80 per ton. One mile further up said stream brings us to Radelfinger and Funk's mines. They have four mines, the Gold Run, Jennette, Big Blue and Gilt, all fine properties incased in slate, porphyry and granite, and standing at angles from 60 to 80 degrees. Gold Run is 3½ feet in width, showing free gold across the entire ledge, with numerous spurs dipping toward the main ledge and varying from 4 to 12 inches in thickness. From this ledge

Messrs. Radelfinger & Co. worked 2300 pounds of ore in an imperfect little tub, put up only to test the ore preparatory to putting up a good arastra, which realized them \$264.50. The Jennette is their favorite. Said ledge is seven feet in width at 40-foot level, incased in granite and slate with fine gouges on either side. If this is not a true fissure vein, none ever existed on this earth. Granite being the mother rock of the earth and slate its companionable sister. A ledge found in such a contact—if mineral-bearing at the surface—will continue so to the bowels of the earth. The formation in which a ledge may be found is of more importance to the miner than the ledge itself. How many have wasted fortunes in the hopes of "striking it" at a certain depth, when the formation has been inconsistent with the indication. The casing of a ledge, regarding the continuity and texture of the same, is as important to that ledge as the soil is to the plants that grow on its surface. The Gilt is two feet in width and will work \$80 per ton, with a contact of slate and porphyry. The Big Blue is from 40 to 60 feet in width and will work from \$6 to \$10 per ton. Taking the cluster of mines as a whole, found on Knownothing creek, we predict at no distant day they will be rated among the most valuable plants on this coast. The ore is auriferous, fine-grained and lively, free from sulphurets and pyrites and other refractory metals, and all that is needed for speedy development is capital to roll the stone from the sepulcher of hidden millions. However, the gentlemen who own these properties are working them with arastras, and anticipate erecting mills next spring.

## Shasta.

**MINING ITEMS.**—*Shasta Co. Democrat*, Aug. 18: Conant's five stamps on the Uncle Sam are pounding out the "yaller truck." Yesterday, Jack Conant brought to town the first chunk of bullion milled from the Uncle Sam. Several very promising gold quartz locations have been recently made on Oak Run, east of Millville, the croppings of which prospect handsomely. The Black Bear mine on Squaw Creek, one of the claims Conant sold to Reiley & Matthews, is developing hugely. Several mining men who have seen this property lately think it one of the biggest and best mines in the State. The vein is said to be 12 feet wide and the ore will mill an average between \$20 and \$25 a ton. Almarin B. Paul, a mining man, representing San Francisco capital, is in the county inspecting mining property in the various camps. This is his second visit here. Mr. Paul has been engaged in mining enterprises in California for over 30 years past, and gives it as his opinion that Shasta is destined to develop into one of the richest quartz-mining counties in the State. He further says that Squaw Creek presents the richest undeveloped surface prospects he has ever seen in any district on the coast.

**CENTRAL CO.**—*Anderson Enterprise*, Aug. 14: While in Shasta the other day, we were credibly informed that the above-named mining company had just caused a new boiler to be put up instead of the small one heretofore used by them. The ledge is said to be from 6 to 12 feet in width, and the rock is good milling ore. The mill now has a capacity of about 16 tons per day and night. The mill will be in operation next Monday. This immense ore deposit is in Old Diggings, and is owned by Bell, Hopping et al. The rock yields about 1½ per cent sulphurets, which go from \$250 to \$300 per ton. The present owners of the Central have expended a great deal of hard coin in getting their mill and mine in a shape to make money out of it, and they certainly richly deserve what, in our opinion, they will be sure to have—success.

## Tehama.

**MILL RUNNING.**—*Cor. People's Cause*, Aug. 21: Work in our mines is progressing slowly. The mill recently completed on the Eureka mill-site is running pretty regular. It is the general opinion that the mill will do good work, provided a competent person is placed in charge. The objection advanced by parties who have had considerable experience in milling quartz is that the screens used are too coarse—being No. 5 slot screen—and that there are too few plates. Mr. Williamson, who placed the machinery in position, undoubtedly understands his business. The Pound Cake company had 20 tons crushed at this mill two weeks since, the result being almost satisfactory. After a run of about 60 tons from the Mammoth a cleanup was made showing about \$10 to the ton. This encourages the owners in the belief that they have a rich mine. The Bully Chooop company are taking out considerable rich ore, about 50 tons of which they intend to have crushed in the Eureka mill. This company has taken out 20 or 30 thousand dollars in former years.

## NEVADA.

## Washoe District.

**BEST AND BELCHER.**—*Enterprise*, Aug. 21: The crosscut west on the 600 level has made but 14 feet advancement on account of considerable other work being found necessary easing timbers, owing to the swelling of the ground; total length of crosscut, 144 feet. Material, vein porphyry with seams of clay and quartz. The construction of the heavy damming bulkhead on the 2500 level, north of the Osbiston shaft, is progressing as fast as the ponderous nature of the work will allow. The east crosscut was advanced 34 feet, making a total length of 82 feet. Material, hard blasting porphyry.

**CHOLLAR.**—On the 3200 level the main south lateral drift has been extended 40 feet, making a distance of 150 feet from the center of the Combination shaft station. In the shaft during the last week or two the valves of the big hydraulic pump have had to be overhauled and repaired. This was because of the wear and tear produced by the dirty, gritty water caused by the recent heavy cloudburst on Mount Davidson.

**KENTUCK.**—Daily yield 40 tons from above the 800 level. The Pelton water-wheel on the 700 level continues doing excellent work, hoisting from the level below. When the Crown Point mine resumes operations on the 1st of next month, the winze connection between the 1400 and 1300 levels can be completed in a very short time, furnishing a good air circulation as well as means for getting at the large amount of low-grade ore at that point.

**HALE AND NORCROSS.**—On the 3200 level the two crosscuts west, north and south of the deep winze station are being pushed ahead, and both

show very good streaks of ore. In fact, a very promising ore vein is being developed to the westward of the main lateral drift. This main drift is being continued north toward the Savage, with its face in good working ground, showing streaks and bunches of good ore.

**SAVAGE.**—The face of the main south lateral drift on the 600 level, as also the crosscuts west from it, show a large amount of good pay ore, but hoisting to the surface has been suspended on account of the ore bins being full.

**MONTE CRISTO.**—The repairs to the hoisting machinery will be completed so as to resume work in the shaft Monday, running the drift west on the 150 level to intersect the main ore vein.

**CON. CALIFORNIA AND VIRGINIA.**—During the last two weeks the ore shipped to mill has averaged over \$20 per ton, with some streaks which ran considerably higher. The ore is evidently better at the north end, but less in quantity. Exploration and development work progresses well on the 1400, 1500 and 1650 levels as usual.

**MEXICAN AND UNION.**—On the 700 level the north drift in Union is making good progress in favorable working ground, and is now in 184 feet. Crosscut No. 2 in Mexican is in 144 feet. A drain is being cut in the floor of the main north lateral drift of these two mines to carry off the seepage of water.

**GOULD AND CURRY.**—On the 450 level or working station, 150 feet above the 600 level, the lateral drift north was extended but little, owing to having considerable casing and repairing of timbers to be done. The drift northeast from the head of the incline was extended 20 feet.

**CROWN POINT AND BELCHER.**—The repairs and resetting of the incline engine are being pushed to completion as speedily as possible, and it is now definitely stated that this work will be completed ready for the resumption of work in the mines on the first of next month.

**POTOSI.**—Diamond drill hole No. 7, a short distance south of the Chollar south line, has been run to the distance of 225 feet eastward, and shows a splendid large vein of pure white quartz, carrying mineral giving very low assays.

**SIERRA NEVADA.**—On the 520 level the north lateral drift No. 2 has been extended 52 feet, making a total of 530 feet. Material, vein porphyry, clay and quartz seams.

**OPHIR.**—On the 1465 and 1300 levels the exploration drifts to the southwest and south are making good progress in favorable working ground.

**ALTA.**—The main lateral drift south from the west drift is following the Keystone vein. Cross-cutting the vein will be indulged in next week.

**YELLOW JACKET.**—Daily yield, 100 tons, which is all the Brunswick mill can run at present, owing to the low stage of water in the Carson river.

## Esmeralda District.

**ASSAYS.**—*Walker Lake Bulletin*, Aug. 19: The Esmeralda Con. Co., in addition to work upon its other mines, has commenced operations on the Durand. In the new winze being sunk from the lower workings, some very rich ore has been struck. Indications in the mine are very encouraging. The company's pay day was on the 10th, when all claims were promptly paid. Mr. Ann, resident director, left for San Francisco on Monday and expects to return in about a week. It is rumored that Wagner, of the Miner's mill, has purchased an interest in the "85," and that arrangements are being perfected to secure and start up the Silver Hill mill. Work on the Antelope and other mines is progressing favorably.

## Eureka District.

**ADAMS HILL.**—*Eureka Sentinel*, Aug. 17: A *Sentinel* reporter visited Adams Hill yesterday morning and found from 40 to 50 miners delving away in a number of the properties. The principal work being done at the Bowman is the sinking of a new two-compartment shaft, each four by four feet in the clear. It appears that work was prosecuted in the old shaft to a depth of 332 feet, when it was found that the ore first discovered in the upper levels all pitched to the northeast. On the 300 level it was not encountered until a drift 450 feet was run. The work of extraction under these circumstances was deemed impracticable, and Supt. McAulay finally decided on a new shaft 900 feet northeast of the old one, which has been sunk to a depth of 93 feet. When it gets down a distance of about 600 feet the old ore body will, no doubt, be again encountered. Immediately below the surface a body of low-grade ore was passed through that has every indication of being at least 100 feet long and 30 feet wide. The company's property consists of five original claims—the Bowman, Europa Con. (three properties combined) and the Rasine, all of which are patented. The Oriental & Belmont mine, undoubtedly a good property, adjoins the Bowman on the northeast; but no work is being done in it at present. On the north lies the War Eagle, owned by James Slain, who every now and then makes a shipment of ore. The Wide West mine is being worked by Joe Molino, Alec Frazier and a couple of others. Occasional ore shipments are made. Three tributaries find employment in the Lone Pine. Messrs. Whittenberg, Spencer and Swick are working in the Macon City with fairly good results. The Marguerita mine, owned by "Jim" Haynes, shipped last week 22 tons of good ore, and there are upward of 40 tons on the dump ready for shipment. Active work is being prosecuted in several parts of the mine. Five men are employed. No work is being done in the King Lear. The new double-compartment shaft in the Paul Pry mine was sunk some time ago to a depth of a little over 100 feet, when several prospect drifts were run. The Silver Lick embraces five original claims, four of which are patented. Twenty tributaries are at work in the property, all of whom are taking out ore. As a rule the ore is very good. In value it runs about half in gold and half silver, and the shipments made furnace from \$40 to \$500 a ton. The mine never looked better. Supt. Davis is prosecuting work vigorously.

## ALASKA.

**SOMETHING ABOUT THE COUNTRY.**—*Eureka Sentinel*, Aug. 15: John Strandberg, an old-time miner of Eureka district, returned yesterday to the Base range from Alaska, where he went during the early part of last spring and remained a couple or three months. He has great faith in the mineral



resources of the country and says it is his belief that Douglass and a neighboring island (the name of which latter we are now unable to recall) can alone furnish within the next 20 years enough gold to supply the wants of the nations of the world. What is needed on these islands are mills similar to the Treadwell to work the ore, which is abundant but of low grade. Men of limited means there have little show. What is also required is capital, and until more large mills are constructed it is a good section for the impecunious to stay away from. The miners working for the Treadwell Company are chiefly Indians and Chinamen, the former being strong, and hard workers are the preferred class. The mill hands are principally white men. Mr. Strandberg says prospectors who go to Alaska generally land at Juneau City and there outfit for Stewart river, a section that is known to be rich in placers. The river is a tributary of the Yukon and is distant from Juneau about 1000 miles. The trip consumes about a month, and is difficult to make, especially with an outfit. It is believed that by next spring a line of small steamers will be run to within 30 miles of the place, when a great rush will no doubt be inaugurated. The last party of miners who returned to Juneau from the placers produced coarse gold in good quantities, and said they would willingly have paid \$100 per sack for flour at their claims, but their supply of provisions becoming exhausted they had to suspend work and return for more. In the winter time, and until June, the weather in that section is extremely cold, but during July and August the snow disappears except in gulches, where it drifts very deep. It is a mistake, Mr. Strandberg says, for prospectors going to Alaska to outfit in San Francisco, except in the way of clothing, blankets, and a few special articles required in mining. Provisions and certain other supplies can be purchased very reasonably in Juneau. Flour, for instance, is sold at that town for \$2.50 and \$3 per hundred weight. Freight from San Francisco there is but \$8 a ton. The fare is \$40 steerage and \$60 cabin.

## ARIZONA.

**GOLD MINE.**—Prescott *Courier*, Aug. 19: Mr. A. E. Foote, late clerk of the Supreme Court of the Territory, has purchased one-half interest in the May Flower gold mine, in Castle Creek district. The mine is well developed and contains an abundance of very rich free-gold-bearing ore. It is located but three miles from a stamp mill and adjoins the location of the Colorado Mining Co. An assay made by Prof. Stahl yesterday shows \$42.52 in gold and \$2.84 in silver. Workmen have recently been taking out rich ore which is stored on the dump. We regard the May Flower as very valuable property. It was located January 1, 1882, by Charles Thompson, who has occupied it and worked it since.

## COLORADO.

**ABOUT IDAHO SPRINGS.**—Denver *Tribune-Publican*, Aug. 19: It is reported that a good body of mineral has finally been struck in the Rover lode, Fall River. This property belongs to some Denver & Rio Grande Railroad men, and we hope they will realize their fondest hopes in working it. Last Tuesday was pay day at the Freeland and Plutus. Secretary True had his hands full for the day dealing out "filthy lucre" to the boys. From \$15,000 to \$20,000 is paid out monthly by these two mines, which helps to make good times around Idaho Springs. Stop them and you would notice the difference at once. Gilpin county has done something she should have done years ago—organized a tramway company. The capital stock is \$50,000. The track will be a 30-inch gauge, and the cars, to be drawn by locomotive, will hold a cord of ore each. Work will begin at once, and the road pushed to completion. Running from the mills at Black Hawk to all the principal mines on Gunnell Hill, Quartz Hill and Nevada, it cannot help but be of great benefit to that district. Contracts have already been made with the success of the enterprise at the start. We had the pleasure of meeting Henry Balsinger, part owner of the Hubert mine, Central. The Hubert is one of the boss mines, and is turning out some \$20,000 to \$30,000 monthly. Col. Bush and Mr. Burke, of Denver, own a half interest in this property, while Balsinger and his father own the other half. Henry showed us a specimen about the size of your two hands, covered with crystallized gold—a recent strike in the mine. Through the courtesy of Mr. Ben D. Allen, manager for Mathews & Webb's Sampling Works, we are enabled to give the following reliable figures, taken from the books, for the seven months commencing January 1st and ending August 1st: These works purchased ore which contained the following values: 133,217 ounces of silver, 10,394 ounces of gold, 289,416 pounds of lead and 29,654 pounds of copper. The value of these purchases foots up the handsome sum of \$358,532. At this rate the output of this end of the county will be largely in excess of last year, providing silver doesn't continue going down for the next five months. For the month of July alone there was purchased ore to the value of 28,361 ounces in silver, 1886.87 ounces in gold, 65,870 pounds of lead and 1050 pounds of copper. Of course the low price of silver will cause a shrinkage in the output all over the State. There is considerable ore shipped by the miners and some other samplers direct to Denver, but being unable to obtain reliable information of these shipments we do not publish them.

**ABOUT THE MINES.**—La Plata *Miner*, Aug. 14: Ore shipped for the week ending August 13th, 360 tons. Mr. Theo. Grabowsky has completed 100 feet of drifting on the Paul. G. B. Inge is working a full force on his Ice Lake Basin properties. The Iowa has opened up a large body of ore already, and the prospects are very bright. There is a big deal on foot in Red Mountain properties, but the particulars are being kept awfully close. Tom Trippe has the lease on the Round Mountain lode, and began work this week with a large force of miners. The breast of the Grand Prize tunnel is in a hard, flinty quartz, worth \$50 a foot, and progress is consequently very slow. Two shifts are hoisting the water from the Copper King, and ore will again be coming down from that property in a few days. With the exception of the Royal Tiger, every mine in Arastra basin is being worked by lessees, which speaks well for that district. The Belcher keeps up its lick by sending five tons of good ore down every day. The Belcher is one of the reliable mines of the camp. Sheridan ore, at the rate of 75 tons per

day, is coming over the range. This amount will be increased five tons within the next 15 days. The sale of the famous Bill Young mine, at Mineral Point, was made this week to Denver parties. A big body of high-grade ore has been opened in the new drift. The Mountain Queen resumed work again yesterday morning. A shaft is to be started at the lowest point on the ground and continued down indefinitely. The following Red Mountain properties are putting in machinery or have their plants on the road: Jay Eye See, Candice, Paymaster, Cora Bell, Little Annie and Robinson. The Brooklyn has been bonded to Jos. Wilkinson. A 700-foot tunnel was started yesterday morning, which will cut a point under the shaft at a depth of 400 feet. Shaft is down 100 feet. The ore from the Queen of Cement ran exceedingly well for the first shipment, and will pay handsomely for working. Dave Williams has returned to the mine to begin sacking, while George Bradford will attend to the business at this end of the string. Manager Kisingbury, of the Hawkeye, reports that good progress is being made at the mine. The trail is about completed, and a shaft started on the ore body. Already a considerable pile of ore is on the dump and a shipment will be made soon. Theo. Ressoche is making things lively around the Manchester Boy. The shaft is down 60 feet, and already indications of ore are seen. Specks and bunches of galena are making their appearance among the yellow iron, and it is thought that ore will be encountered by the time 80 feet is reached. Two shifts are being worked, and machinery will be put in should water be encountered. The Howardsville concentrator, at Howardsville, is making a very successful run on Green Mountain ore. The concentrates are remarkably clean and the slimes free from mineral. The *Miner* is glad to note that at least one concentrator in the country is a success, and the only reason the several others are not is in the fact that they are, and always have been, badly managed. Manager Garland is the right man in the right place. The Silver Lake mine, in Arastra Gulch basin, to obtain the lease on which there has been considerable contention on the part of our miners for several months, has at last been secured by J. H. Robin and B. W. Thayer. The mine has an immense body of ore in sight, and will, in a short time, become one of the most important producers of the country. Work will be started up on Monday morning with a force of seven men for the present. The crosscut being run by the Mathews Bros. to strike the Plutus is being pushed rapidly to completion. The total length of the tunnel is in the neighborhood of 300 feet, and the vein will be cut at a depth of 250 feet. The Plutus is the extension of the Uncle Sam, and is being developed from the Cascade basin slope. The surface croppings show a fine streak of galena ore and some very high-grade gray copper. Messrs. Mathews, the owners of the property, have been working a considerable force of miners since the opening of spring, and they think not more than six or eight feet further will have to be run to tap the lode. Should the vein improve from the surface down in proportion to the depth gained, the mine will be one of the best properties in this section.

## IDAHO.

**EAST FORK.**—Cor. Ketchum *Bulletin*, Aug. 18: The Philadelphia Company are shipping lumber to flume their ditch, running to the concentrator, and are expecting to put hoisting works in the North Star mine. Should they do so, work will continue all winter with a pretty large crew of men. Wm. McQueen, from Salt Lake City, has taken hold of the Legal Tender mine, on North Fork, discovered this summer by Bruce Reed, and is working a crew of five men in going down to see if this is not a rich mine. Ed. Le Fort owns the claim adjoining, and hopes they will strike it rich. The Pride of Idaho is looking better than ever, and is taking out high-grade ore. James W. Davison deserves to make money, as he is one of the most energetic and enterprising men we have here on East Fork. S. S. Piffin & Son are working their mine, the Leader, on the other side of the creek, and are just shipping 100 sacks of high-grade ore. Dave Thuhner is still working hard on his lease on the Independence and expects in a few weeks to be happy, as he is quite sure to strike a rich body of ore. The Courier mine is running a new tunnel, under the management of James Judge, Jr., and there is no doubt but that they will soon strike something that will gladden the hearts of the company, as Mr. Judge is an old, experienced miner.

## MONTANA.

**THE WEEK.**—Butte *Inter-Mountain*, Aug. 21: As predicted last week, a noticeably better feeling prevails in business and mining circles, though several companies are still running with the margins on the wrong side of the ledger. In proportion to the amount of ore treated, the producers of custom ore are perhaps working with better results than any other class of miners. As an evidence of this it may be stated that for the month of July the Butte Sampling Works received and shipped an even \$100,000 worth of ore, the great bulk of which was produced from comparatively undeveloped mines. The big mills and smelters are going ahead with their accustomed activity. At Anaconda we hear of new appliances, new methods of treatment, increased capacity and reduced cost of production. The Orford smelter is also increasing its plant so that it can calcine more ore. The Clark smelter is running to perfection and using up a great deal of high-grade silver ore to enrich the copper matte. The Parrot and Colorado Works are not making much noise; but they are making plenty of copper, and that is better. The Montana smelter is closed; but it is closed for some reason other than the lack of ore or ability to make copper at a profit. As for the mills, they are making a grand struggle for existence. Some are making money, some are holding their own, and some are losing a little. The main hope of the companies now is to keep expenses down and find a higher grade of ore than they have heretofore been treating. Prospecting in the lower levels is therefore active. In the Alice, at a depth of 800 feet, there is a regular streak of good ore, and it is being vigorously explored, in the hope that it will lead to a large body of the same kind. If silver would only rise to a dollar, the Alice people could realize plenty of money, for such an advance would make a difference of nearly \$10,000 per month in

their earnings, or enough to pay the usual quarterly dividend. In the Lexington the 1000-foot station has been reached and explorations are being pushed. The crosscut has been driven to the ledge, and drifting will show before long whether the company can continue to make silver at 90 cents or not. At present the mill is working up considerable custom ore, and it is reported to be doing well. The Moulton mine is reported in good shape, and the mill keeps ahead of expenses, though its profits have been greatly curtailed by the silver decline. The Silver Bow mill is doing well on the product of the Belle of Butte, and the Dexter is dropping its stamps on ore from the Butte Original. During the week silver has held its own, and copper has advanced about \$15 per ton for Chili bars—a most encouraging advance, and one which there is every reason to believe will continue. The curtailment of production can have no other result. On the whole, the outlook is much more satisfactory than it was three weeks ago.

**A NEW FIELD.**—Cor. Butte *Miner*, Aug. 14: At a point some 25 miles northwesterly from Thompson Falls there empties into Clark's fork of the Columbia river a noisy, broad sheet of water, fed from the snows of the Kootenai mountains, called, without regard to its physical aspects or local characteristics of its valley, Vermilion creek. Some two miles above its confluence with Clark's fork a belt of auriferous veins has been exposed on the flanks of the mountains by partial erosions of the magnesium slates from the underlying granite. The granite rocks thus exposed show numerous veins of gold-bearing quartz, carrying largely of the metallic sulphides, oxides and carbonates of iron, inclusive of brown and black hematites. The gold is disseminated in the quartz in variable amounts from a few colors to as high as \$105 to the ton; that is to say, the comparative allotment of gold to each vein has some analogy to the diverse and unequal distribution of ready cash among humanity in general, some being affluent, many comfortably "heeled," and a still greater number being paupers. The veins, of course, are not all rich, but quite a number would be largely productive if judiciously handled, a fair percentage would yield profitable returns, and the majority, as everywhere else, would be too poor to work. The field, however, for exploration for valuable mines extends over a large area of mountainous territory, and affords to the prospector quite exceptional opportunities for acquiring valuable property. It also offers to capital the inducement of safe and cheap investment in the prospects already opened. The local features of the camp are particularly interesting to the mining geologist. Another item that may interest some of your old placer miners is the fact that portions of the creek-bed were worked in an early day for gold, not, however, on bedrock, and the probabilities are that if the ground was worked on modern methods it would return no insignificant profit. This opinion is inferred from the fact that money was taken out when the costs and difficulties were greater than now, and for the additional reason that fair prospects can now be had either in the bed or in the banks of the creek for several miles above its mouth. The venture would only be successful to parties having the means to construct a bedrock flume and work the ground on a large scale. Every cubic foot contains more or less gold, and the question of profit resolves itself into one of handling a maximum of ground at a minimum outlay.

## NEW MEXICO.

**WHAT IS DOING.**—Silver City *Enterprise*, Aug. 20: M. H. Twomey has been here this week waiting for pumping machinery to arrive. He has a contract to sink the shaft 300 feet more on the St. Louis mine in the Burros, and run drifts for prospecting at various levels. The shaft is already down 300 feet, and the water is 190 feet deep. The Gray Hawk group, in Silver Creek district, adjacent to Cooney in the Mogollons, is producing large quantities of fine ore. The output is packed across to the locality of the Peacock mine, where it is stored and will be kept until such time as an opportunity can be gained to make a thorough test of it at the mill named. This, it is hoped, will be before long. The mine at Gold Gulch, in which E. L. Guldin bought an interest lately and which he is working upon a lease, is reported as looking finely. The ore streak is developing, and now shows in width sufficient to justify expectation of a continuous output when stoping shall be commenced. Some ore recently tested, and which previously was thought to be too low grade to handle, returned by assay sample from 58 to 112 ounces silver per ton. Mr. Guldin contemplates making a shipment soon. The operators of the Deep Down mine at Pinos Altos, Messrs. Lewis & Co., are finding more of the very rich free-gold ore which occurs so frequently in pockets throughout the black iron, manganese and galena that fills their vein. Some of the specimens are unusually rich, even for the Deep Down mine. Much of the same sort of material is found in the deep workings of the Atlantic mine, now operated by Peter Wagner. It is found as usual in pockets scattered through the average stuff of the mine. John M. Wright and R. S. Talbot are in St. Louis on business connected with the Peerless mine. The outcome of their visit is expected to be the resumption of work upon the Peerless under a new order of affairs, as the difficulties which stood in the way are reported to have been amicably arranged. It is understood that the company has two well-known mining men in contemplation for the position of manager, one, Platt McDonald, formerly of Black Hawk, being favored by the local owners, and the other, Mr. Comstock, formerly superintendent of the Hornet mine at Eureka, being favored by the St. Louis shareholders. In either choice the company will do well and the mine be worked to the best advantage. The Mogollons continue to be the center of attraction from the point of new discoveries and newly opened mines. In St. Louis, where there are large Mogollon interests held, there is more or less excitement all the time concerning the developments made in what are known as the St. Louis properties, and which are headed by the Sheridan and Laclede mines. Rich and extensive ore bodies are reported from both within the past week or two, and the stock of the companies is held firm at good prices. Should continued development of these mines prove as satisfactory as what has already been accomplished, there is abundant reason to hope for New Mexico's biggest boom to be located in the Mogollons.

## OREGON.

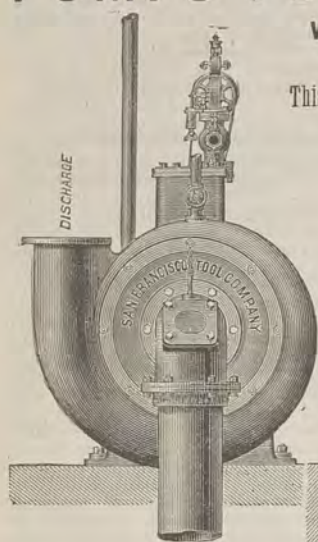
**WORK DOING.**—Jacksonville *Times*, Aug. 20: Placer miners in Josephine county have finished for this season. Jacob Miller, of Portland, is inspecting the mines of Josephine county. The Griffin ledge in Slate creek precinct, Josephine county, is prospecting well. Quartz is now being taken out of the New Eldorado mine, owned by McKenzie, Chale & Co. Ray & O'Donnell are still taking quartz out of their mine on Gold Hill, which pays well. Walter Simmons has finished cleaning up at his placer mines on Galice creek and did well. Wimer & Son, of Waldo, have finished cleaning up and shipped a large quantity of gold-dust. Work is progressing day and night at the Hope ledge on Wagner creek, where the Medford mill is being operated. J. E. Harvey informs us that Frank Mee and Thos. Carr have struck good prospects in their quartz mine on Foot's creek. The wingdam Dan Fisher, Robt. Hardman and Wm. Stuart are building in Rogue river, near Fort Lane, is about finished. The Eastlick Brothers cleaned up 153 1/4 ounces of dust from their mine at Oro Fino, Siskiyou county, Cal., a few days ago, or about \$25,000. Martin Laist and Chris. Kretzer picked up a nice nugget of gold and silver, with which was mixed some quartz, a few days ago. It was worth \$100. Baume, Klippel & Co.'s engine and other machinery for their quartz mill on Shively gulch arrived from Portland this week and will soon be in operation. Wm. Naucke, Beach & Platter, N. DeLamatter and other merchants of Josephine county, have each shipped a considerable amount of gold-dust this season. Albright & Taylor have commenced prospecting a promising ledge in the Jackson creek district, Robt. Elliott, an experienced miner, being in charge of the work. Some very rich quartz has been struck in the Green Bros.' ledge on Galice creek by the parties who have bonded their mine, and who are running tunnels to test it thoroughly. L. D. Brown, of Portland, returned to Gold Hill last Tuesday morning and is looking after his mining interests in that section. It is claimed that his new mill will be in running operation before long. It is said that the 30 tons of quartz from B. A. Knott's ledge in Blackwell district, recently crushed by L. D. Brown's mill, return \$18 to the ton, though this report is not confirmed. However, enough is known to establish the fact that it is a well-defined mine and can be made to pay handsomely. Frank Payne, of the East Portland foundry, has about completed all necessary arrangements for the establishment of reduction works on a small scale in that city. He has just finished a 6-stamp mill for crushing ore and is now engaged in making the other appliances necessary for the enterprise. It is understood active operations will begin within a few weeks. A Gold Hill correspondent states that Elder Whitney, who has extensive mining interests in Jackson county, is at Gold Hill. He is about to experiment on reduction works of his getting up; also that Mr. Brown, who put up a five-stamp mill on the celebrated quartz ledge of John Swinden, has sold one-half interest in the mill to Mr. Haskell, of Walla Walla. They are adding five more stamps to the mill.

## UTAH.

**LITTLE COTTONWOOD.**—Cor. *Tribune*, Aug. 18: The Frederick mine has been running in full blast for some time, and everything is working in a business-like manner in that mine, under the management of Martin K. Harkness. The Flagstaff is running all right again, after being idle for a few days on account of the disarrangement of some part of the compressor. Engineer Osterwald has been working night and day in order to pump the water out of the mine. Foreman John Bryant has been faithfully working for the success of the Flagstaff Mining Company. It is claimed that the Flagstaff mine is a regular outlet of water from the Eclipse mine, on the opposite side of the hill, in the Big Cottonwood district. The Vallejo mine still holds out as an ore-producing mine. Superintendent Robert Howarth, of the Emma Hill Mining and Tunnel Company, has received the long expected engine for the purpose of ventilating the Buffalo tunnel which is now 1200 feet in length. The New Emma, the backbone of Alta City, is running night and day with all possible speed and skill under the management of George Cullins, who has surmounted all the difficulties in the development of that celebrated mine. Mr. Cullins is much pleased with the appearance of the ground in the shaft. You need not be surprised to hear of a big strike in the New Emma at any day. The dump shows that the miners are not far from a big ore body, which will solve the question of deep mining in this district. Foreman John Stillwell and the friends of the company here are equally happy with the bright prospect in the New Emma. F. Haight, with a good force of men, is still working the Old Emma dump with success. For the better working the jiggling apparatus, he has bought a small engine, which has been in operation for some time and gave entire satisfaction. David Hepburn and William Green have still retained the lease on the old underground working of the Old Emma. They have built a flume 700 feet in length. They intended to take the waste from the old underground working of the Old Emma through the Equitable tunnel, where connection was made years since, to the surface at the flume, thence to the jiggling below in front of the New Emma dump, where is a good supply of water. Mr. D. C. Murphy is building a safe and comfortable cabin on the Murphy mining claim for the purpose of working the same. The Centennial, the property of our worthy citizens, James A. Varnes and Judge C. W. Bennett, is looking well. The City Rock still holds plenty of good ore in sight and some ready for shipment. The Evergreen is still classed among our ore-producing mines, under the management of Supt. Groesbeck and his irrepressible foreman, Joseph Smith. There will be another shipment of ore from the Evergreen in a few days. The Prince of Wales mine, the miners' friend, the property of Walker Bros., is still sending her regular quota of ore to the smelters, under the watchful eyes of Supt. and Foreman John Wasley. The Cla mine, the property of a Salt Lake company, and the management of Nelson Sandburg, is looking O. K. A good quantity of ore has been taken from the Clara. I understand that the company is about to start a tunnel 100 feet below the present workings for the purpose of tapping the ledge deeper. There will be room enough to give employment to 20 or 25 miners.

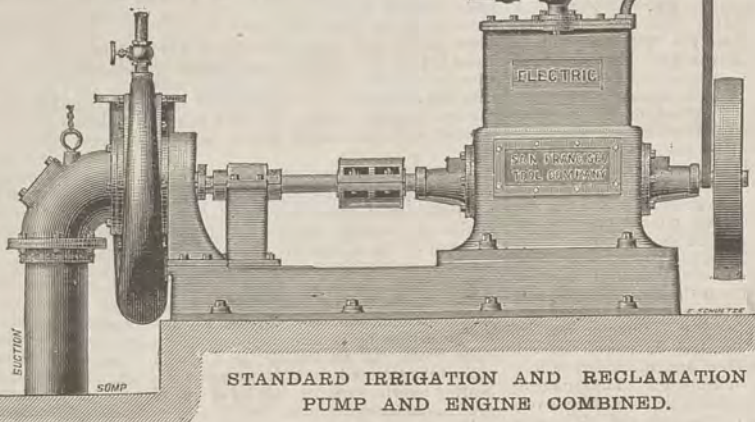


# PUMPS FOR RECLAMATION, IRRIGATION, AND DREDGING.



WILL BE ON EXHIBITION AT MECHANICS' INSTITUTE FAIR.

This Pump has thrown, on a Test, 234,000 Gallons per hour, On a Lift of 10 feet.



STANDARD IRRIGATION AND RECLAMATION PUMP AND ENGINE COMBINED.

PIT, VERTICAL, BULKHEAD, TURBINE, CENTRIFUGAL AND LOW-LIFT PUMPS.

WE MANUFACTURE ALL KINDS OF

Machine Tools, Including Engine Lathes, Drilling Machines, etc.

Horizontal, Single Acting, Compound Condensing, and Automatic Steam Engines.

Cast Iron Sectional Boilers, Horizontal and Vertical Tubular Boilers, Water Valves, Water and Steam Fittings, Hydraulic Jacks, etc.

Mill Rolls Ground and Corrugated. SEND FOR CIRCULAR.

**SAN FRANCISCO TOOL CO.**

Works, First and Stevenson Sts., San Francisco, Cal.



SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

**BEST SOFT LAKE SUPERIOR COPPER USED.**

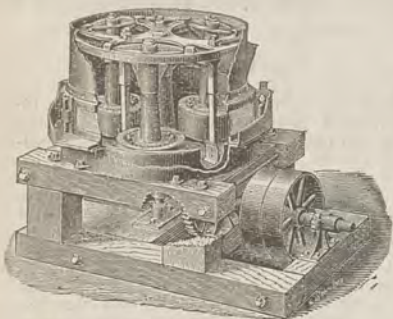
3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.**

**E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



Centrifugal Roller Quartz Mill.

**F. A. HUNTINGTON,**

MANUFACTURER OF

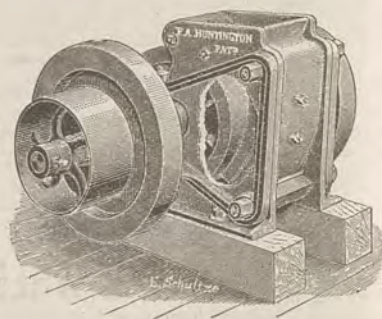
**Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS,**

Mining Machinery of Every Description,

**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

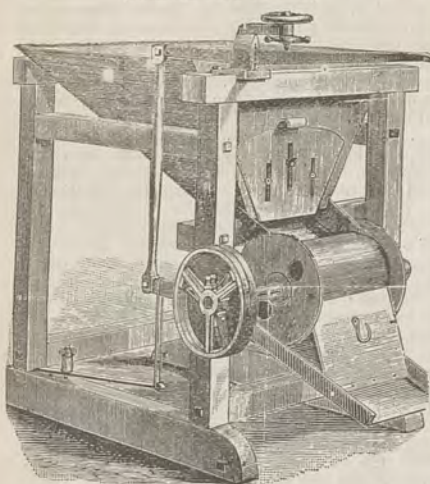
No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

## THE ORIGINAL Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Challenge" Ore Feeders for any character of ores; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ores.

Prices furnished upon application to

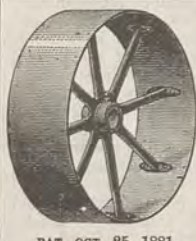
**JOSHUA HENDY MACHINE WORKS,**  
39 to 51 Fremont St., San Francisco.

**INVENTORS, TAKE NOTICE**

**L. PETERSON, MODEL MAKER,**  
258 Market St., N. E. cor. Front (up stairs), San Francisco,  
Experimental machinery and all kinds of metal, tin and Brasswork.

**Chicago Prices Beaten!**  
ESTABLISHED 1860.  
**S. F. PIONEER SCREEN WORKS,**  
221 & 223 First St., cor. Tehama, S. F.  
**J. W. QUICK, Prop'r.**

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chees, Cement and Smut Mills, Separators, Revolving and Shot Screens. Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).  
Orders Promptly Executed



PAT. OCT. 25, 1881.

## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

**CLOT & MEESE,**

Sole Licensed Manufacturers of the

**Medart Patent Wrought Rim Pulley**

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

**SHAFTING, HANGERS AND APPURTENANCES.**

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 & 131 Fremont Street,

San Francisco, Cal.

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.

## GOLD MINES.

FOR SALE—QUARTZ, AND HYDRAULIC PLACERS; extraordinary bargains; immense vein, five miles long, sixty feet wide, free milling, ten-dollar rock. Also vast area of rich placers, hundreds of feet deep, gold from top to bottom. Plenty wood and water; rare opportunity. For full particulars, address

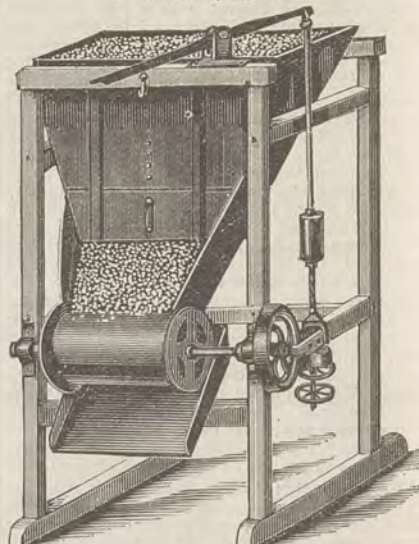
**CHAS. F. BLACKBURN,**  
Via Birch Creek. Blackburn Mine, Idaho.

## California Inventors

AND FOREIGN PATENT SOLICITORS, for obtaining Patents and Caveats. Established in 1860. Their long experience as Journalists and large practice as Patent attorneys enables them to offer Pacific Coast Inventors far better service than they can obtain elsewhere. Send for free circulars of information. Office of the MINING AND SCIENTIFIC PRESS and PACIFIC RURAL PRESS, No. 252 Market St., San Francisco, Elevator, 12 Front St.

## THE ROLLER ORE FEEDER

[Patented May 28, 1882.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

**Golden State and Miners' Iron Works.**

Sole Manufacturers,

237 First Street, San Francisco, Cal.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorsey, 529 Commercial St., S. F.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

**MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.**

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 48, No. 2 Wall Street.

UTAH OFFICE—SALT LAKE CITY, UTAH.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,  
JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

**Metallurgy and Ores.**

**SELBY  
SMELTING and LEAD CO.,**

416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY  
And Assay Office.**

Highest Prices Paid for Gold, Silver and  
Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

**Standard Shot-Gun Cartridges,**  
Under Chamberlin Patent.

J. KUSTEL.

H. KUSTEL.

**METALLURGICAL WORKS,**  
318 Pine St. (Basement),  
Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my  
Process.  
Assaying and Analysis of Ores, Minerals and Waters.  
Mines Examined and Reported on.  
Practical Instruction given Treating Ores by im-  
proved processes.

G. KUSTEL & CO.,  
Mining Engineers and Metallurgists.

C. H. AARON,

**ASSAYER AND METALLURGIST,**  
NOGALES, ARIZONA,

Will attend to business in connection with mines in So-  
nora or Arizona.

WM. D. JOHNSTON,

**ASSAYER AND ANALYTICAL CHEMIST.**  
514 Kearny Street,  
SAN FRANCISCO, - - CALIFORNIA.  
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

**JOHN TAYLOR & CO.,**

IMPORTERS AND DEALERS IN

**ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,**

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - - San Francisco.

We would call the attention of Assayers, Chemists,  
Mining Companies, Milling Companies, Prospectors, etc.,  
to our full stock of Balances, Furnaces, Muffles, Crucibles,  
Scorifiers, etc., including, also, a full stock of  
Chemicals.

Having been engaged in furnishing these supplies since  
the first discovery of mines on the Pacific Coast, we feel  
confident from our experience we can well suit the de-  
mand for these goods, both as to quality and price. Our  
New Illustrated Catalogue, with prices, will be sent on  
application.

Our Gold and Silver Tables, showing the value per  
ounce Troy at different degrees of fineness, and valuable  
tables for computation of assays in grains and grammes,  
will be sent free upon application. Agents for the Patent  
Plumbago Crucible Co., London, England. Also for E.  
G. DUNSTON'S Silver Plated Amalgam Plates. The  
plates of this well-known manufacturer are thoroughly  
reliable, and full weight of Silver guaranteed. Orders  
taken at his lowest prices.

JOHN TAYLOR & CO.

**Nevada Metallurgical Works.**

NO. 28 STEVENSON STREET,  
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869.

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the  
most suitable Process for Working Ores.

Special attention paid to Examinations of  
Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.



The California  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

**FLOUR AND OTHER MILLS.**  
Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco,

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

**MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.**

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 48, No. 2 Wall Street.

UTAH OFFICE—SALT LAKE CITY, UTAH.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,  
JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.



UNCLE Sam has found it at last!  
A sure remedy for Torpid Liver,  
Sick Headache, Habitual Constipation,  
Chills and Fever, and all affections of the  
Kidneys and Liver. This is a New Com-  
pound, and one trial will convince you  
that it is the Cheapest and Best Remedy  
in the Market for Diseases of Kidneys,  
Liver and Stomach. If you want a pure  
vegetable compound, that is positively  
guaranteed to contain no mercury, go to  
your Druggist, and get a Bottle of the  
Arkansaw Liver and Kidney Remedy.  
Price, \$1.00 per Bottle.

For Sale by all Druggists.

**KNIGHT'S WATER WHEEL**

For Mills, Pumping and Hoisting.

OVER 300 IN USE!

**All Estimates Guaranteed.**

SEND FOR CIRCULAR.

EDWARD A. RIX & CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco.

RICHARD C. REMMEY, Agent,  
Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of  
all kinds of  
Chemical Stoneware  
—FOR—  
Manufacturing  
Chemists.  
Also Chemical Brick  
for Glover Tower.

NATIONAL ASSURANCE CO.,  
OF IRELAND.

ATLAS ASSURANCE COMPY.,  
OF LONDON.

BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.

H. M. NEWHALL & CO.,  
GENERAL AGENTS,  
809 & 311 Sansome St., San Francisco, Cal.



THE CONSUMERS' COMPANY.

**VULCAN B B AND AJAX.**

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

**Vulcan Nos. 1, 2 and 3,**

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN BB POWDERS are Unequaled for Bank  
Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**

218 California Street, San Francisco, Cal.

**THE GIANT POWDER COMPANY**

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

**GIANT POWDER or DYNAMITE,**

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and  
GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

**JUDSON POWDER IMPROVED.**

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast-  
ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and  
saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

**BANDMANN, NIELSEN & CO.,**

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

**THE SCIENTIFIC PORTABLE FORGE**

**AND  
BLACKSMITH HAND BLOWERS.**

GUARANTEED

The Lightest Running! The Strongest Blast!

The Most Durable!

ADAPTED TO ALL KINDS OF WORK,

AND MADE IN STYLES AND SIZES TO SUIT.

**THE FOOS MANUFACTURING CO., - - Springfield, Ohio**

**THOMAS PRICE'S ASSAY OFFICE,**

CHEMICAL LABORATORY,

**BULLION ROOMS and ORE FLOORS,**

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed  
of in the Open Market to the Highest Bidder.



## Idaho.

(Continued from page 137.)

put the properties in a condition that regular bullion shipments and quarterly dividends will be the order of business at their office. Mr. Stanton, the superintendent, is well known in Colorado mining circles, and his experience in managing Clear creek bonanzas with the foundation he has to work on here will enable him to add to his laurels as a successful mining superintendent and make a paying and profitable system of mines out of this group for the fortunate owners.

## The Flint Group.



## EXPLANATION.

1. Leviathan.
2. Perseverance.
3. Belfast.
- 4 & 5. Star of the Evening.
6. Rising Star.
7. Rising Star North.
8. Sherman.
- 9 & 10. Not company mines.
11. Venus.
12. Garfield.
13. Rising Sun.
14. Argus.
15. Reduction works.

The above diagram will assist in giving the reader an idea of the position of the mines of the company. The distance between the main parallel veins is about 400 feet, more or less. Claims 9 and 10 are owned by Silver City people, and have a good showing in the way of ore body. Other locations, north and south of the group, are being opened up, and a number are showing excellent indications of being paying properties. If the management of the above group of mines opens the properties in the manner he contemplates, the future of the district will be an assured one and the income of the company, no doubt, a big one; but if he fools away time and labor in taking out and shipping ore instead of developing, the result will not be as satisfactory in the end.

## Perseverance and Leviathan.

These two claims are the two extreme eastern locations on the lower or western vein. Two tunnels, 10 feet apart at the surface, start in on each side of the dividing line, one on each claim, tapping the vein of both mines—the breast of the tunnels being some 60 feet apart where they cut the vein. A drift was run in on ore 100 feet south on the Leviathan, and the ore overhead stopped out. The vein matter in these claims varied from 2 to 12 feet wide, and run very high. Below, no ore was taken out worth mentioning. The ground is easily worked, and but little water to trouble with. A crosscut opened the vein and connected the end of the tunnels—this, also, all in ore. North of the Perseverance tunnel, 125 feet of a drift was made; an angle in the ledge left the north end of the drift some 30 feet west of, and parallel with, the vein. The new management has had the ground surveyed, and is now cross-cutting to the vein. That portion of vein that drift was run in on was stopped out above, but not below, so far as known. A tunnel will be started 80 feet below the twin tunnels of these mines, and will tap the Leviathan, and can be run north through the Perseverance; the tunnel will be continued until it taps the Rising Star, which it will do at a depth of nearly 300 feet. This tunnel will drain the four mines, and render the excavation of ore and waste from them but trifling in cost.

## Rising Star and Rising Star North.

These mines lie parallel with and directly east of and up the hill from the Leviathan and Perseverance, the veins being only about 400 feet apart. An 80-foot level above the Leviathan and Perseverance tunnel and on the end line between the two "Stars" has been run in 60 feet from the surface cutting the vein, which shows 11 feet thick at the end of the tunnel at a depth of 90 feet below the surface. South from the tunnel's end some 375 feet was opened by a tunnel into the Rising Star, and at the end of the tunnel a shaft some 300 feet deep, all in ore, was put down in years gone by. The ore above this 375-foot tunnel has been mostly all removed and the dirt and waste filled in. The new management in cleaning out this tunnel found a good bunch of ore overhead and below the tunnel about 250 feet from the surface tunnel's end that will run 485 ounces. How extensive this ore body left below the drift, no one knows. The cleaning out and re-timbering of these mines and getting them in shape to handle in a business-like, systematic manner is no small job, nor can it be done short of a good sum of money. The tunnel below the Perseverance and Leviathan to tap the Stars and tap the bottom of the 300-foot shaft down in the east end of the Rising Star will put the two Stars and the Perseverance and Leviathan in condition to develop to advantage and enable the company to extract ore in larger quantities and at less than one-half the cost of hoisting and working the mines through a shaft.

## "The Rest of 'em."

The Belfast, Star of the Evening, Rising Sun, Venus, Garfield, Sherman and the Argus, in addition to the above described, make the 11 claims of the company. The last seven mentioned are virgin properties with ore in sight in every one of them, while on a number of them, men are quarrying ore on the surface and sack-

ing the high-grade first-class ore, and storing the lower grade for concentration. The Star of the Evening shows up especially well, and work toward the extensions indicates that the large ore body will be found elsewhere as well as on this fine prospect. Considerable development has been done on the Garfield and Sherman by former owners, but not to an extent nor in keeping with the showing had as far as worked.

## The Plant.

The location for the concentrator is an admirable one, being below all the mines and but a short distance from the most remote. At present only a limited capacity of crushers and rolls, with two Golden Gate concentrators, will be put up by the company. The foundation for the plant is being laid so that the capacity can be increased to any extent desired. To begin with, 80 tons in 24 hours will be the capacity of the concentrators. The crushers, rolls and machinery have arrived and will be placed in position as rapidly as the foundation can be prepared. The property owned by these Nebraska folks is such that it can be made a lasting and a paying one if properly worked; or it can be successfully managed in a big stock deal. If the former course is pursued—and such appears to be the aim of the management—the benefits will not be confined to the stockholders but will extend to the entire district. In the event that a big deal should be made the end would be like many others have proved heretofore, and the drawback to this now reviving and deserving district would be sad to contemplate. I have every confidence that this district will be worked on its merits, and know that if it is so worked it will not be found wanting.

## Flint "Concentrates."

Wood and water are abundant. Laborers are paid 30 cents per hour. A "bit" gin mill opened up in camp recently. The sidehills are alive with miners and woodmen.

Flint has a sawmill. It is owned by the company.

It costs about \$45 per ton to ship ore from Flint to Denver, Col.

Colonel T. J. Jobs, a member of the Georgetown (Col.) bar, is a resident of the camp.

Kuna Station, on the Short Line, is 55 miles. Daily stage from Kuna to Silver City; fare, \$8.

Miners and carpenters are paid by the hour—receiving 35 cents per hour for 10 hours each day.

The two towering brick stacks, erected in '68, will be used by the company for their plant now going up.

No new men are being hired by the company. Miners in search of labor will not do well to come here at present.

The many tents on each side of the gulch, used by miners, give the place the appearance of a military encampment.

If Flint improves during the next few months at the pace it has during the past month, there will be an opening for some Democratic office-seeker, as the camp needs a postoffice.

Manager Stanton, of the Flint Group, is President of the Denver Society of Civil Engineers, and was the builder of the "Loop" of the Colorado Central, at Silver Plume, Clear Creek county, Colorado.

## Wagontown District.

There is some talk that the T. W. Jones 20-stamp mill at Wagontown, nine miles south of Silver City, is about to be changed into a concentrator by Colorado capitalists.

The miners of Wagontown district are pushing development on their best claims and gobbling up additional localities. Many of them are property poor and would give moneyed men a chance to develop for an interest.

The Webfoot, Ohio, Garfield and other mines near Wagontown, owned by Messrs. Adams & Jones, have been developed to an extent that has proved a number of them to be fine properties if handled by a company with capital.

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
G. W. INGALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
R. G. HUSTON—Montana.  
GEO. McDOWELL—San Luis Obispo and Santa Clara Co's.  
FRANK W. SMITH—Utah and Colorado.  
M. S. PRIME—Alameda Co.  
A. S. LUCE—Nevada and Placer Co.'s.

NEW MILLS.—The Frisbee-Lucop Mill Co. have shipped mills to Meadow Lake and to Columbia, Tolueme Co. Last Saturday they shipped two mills to the Quartz Hill Mining Co., Siskiyou Co. This company has ordered three more mills, which are now on the way from the East, with one large mill for the Golden Eagle Mining Co., of Butte Co. These mills are evidently rapidly gaining favor with mining men.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS. ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Con Amador M Co.	California.	13.	15.	July 15.	Aug 16.	Aug 31.	F. B. Latham.	327 Pine St
Con Imperial M Co.	Nevada.	23.	10.	Aug 5.	Sept 8.	Sept 25.	C. L. McCoy.	329 Pine St
Chollar M Co.	Nevada.	21.	50.	Aug 24.	Sept 2.	Oct 20.	C. E. Elliot.	309 Montgomery St
Eureka Con M Co.	Nevada.	10.	1.0.	July 28.	Sept 6.	Sept 25.	E. H. Wilson.	328 Montgomery St
Forty-Nine M Co.	California.	3.	05.	July 8.	Aug 9.	Aug 30.	A. L. Perkins.	310 Pine St
Horshoe M Co.	California.	10.	02.	July 27.	Aug 30.	Sept 15.	T. R. Covey.	Grass Valley
Hale & Norcross M Co.	Nevada.	91.	50.	July 16.	Aug 13.	Sept 8.	J. F. Lightner.	303 Montgomery St
Indian Spring Drift M Co.	California.	6.	03.	July 26.	Aug 30.	Sept 30.	L. H. Sharp.	213 Sansome St
Loreto M & M Co.	Mexico.	9.	40.	Aug 5.	Sept 6.	Sept 29.	C. T. Bridge.	224 California St
Mount Como M Co.	Nevada.	1.	10.	July 7.	Aug 14.	Sept 8.	M. Horwinski.	331 Montgomery St
Mayflower Gravel M Co.	California.	3.	25.	July 1.	Aug 9.	Aug 31.	J. Morizio.	328 Montgomery St
Mount Con M Co.	Nevada.	1.	1.00.	Aug 25.	Oct 2.	Oct 23.	G. Frier.	309 Montgomery St
Nevada M & M Co.	Nevada.	1.	1.00.	Aug 25.	Oct 2.	Oct 23.	G. L. Brander.	309 Montgomery St
New Coso M Co.	California.	19.	20.	July 13.	Aug 27.	Sept 13.	J. I. Hunt.	5 Pioneer Place
North Banner Con M Co.	California.	14.	11.	Aug 7.	Sept 9.	Sept 27.	T. J. Mitchell.	Grass Valley
Occidental M Co.	Nevada.	7.	30.	Aug 9.	Sept 13.	Oct 4.	A. K. Durbrow.	309 Montgomery St
Pilgrim M Co.	Idaho.	6.	01.	Aug 7.	Sept 17.	Oct 16.	A. Halsey.	328 Montgomery St
Panaiteta M Co.	Mexico.	2.	20.	July 14.	Aug 20.	Sept 10.	M. Hergstein.	330 Sutter St

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Ala-k-a M Co.	California.	A. Judson.	320 Sansome St.	Annual.	Sept 7
Brush Creek M Co.	California.	A. Judson.	320 Sansome St.	Annual.	Sept 7
Con Amador M Co.	California.	F. B. Latham.	327 Pine St.	Annual.	Sept 7
Trinity M Co.	California.	J. M. Selfridge.	528 California St.	Annual.	Sept 2

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Holmes M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	25.	Mar 20
Mono M Co.	California.	G. W. Sessions.	359 Montgomery St.	25.	Mar 10
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	25.	Aug 25
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Aug 16
Young America M Co.	California.			40.	May 20

## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING AUGUST 17, 1886.

- 347,563.—CAR AXLE—J. Bourne, Jr., Portland, Oregon.  
347,479.—MOTOR—B. Elmore, Redding, Cal.  
347,705.—MOTOR—L. S. Goldman, Pasadena, Cal.  
347,592.—ELECTRIC BELT—Ira Gray, S. F.  
347,484.—CANDLESTICK ATTACHMENT—George Griswold, S. F.  
347,615.—SMOKE-CONSUMER—John Keane, S. F.  
347,721.—GANG PLOW—E. E. Krause, Rio Vista, Cal.  
347,722.—CULTIVATOR—E. E. Krause, Rio Vista, Cal.  
347,439.—BATH APPARATUS—W. F. Lambert, S. F.  
347,431.—VERTICAL SHAFT BEARING—I. P. Lambing, Ione, Cal.  
347,433.—ELEVATOR—A. J. McAdam, S. F.  
347,435.—KING-BOLT—T. A. McGovern, Bolinas, Cal.  
347,438.—ROCK DRILL—E. Moreau, S. F.  
347,368.—HOSE AND PIPE COUPLING—P. J. O'Connor, S. F.  
347,644.—STEAM ENGINE OR PUMP—W. C. Simon, Portland, Oregon.  
347,524.—SHOE FASTENING—J. T. Senteney, Blacksburg, Cal.  
347,455.—CARTRIDGE-LOADER—C. Wonacott, Murphys, Cal.  
347,333.—CAR AXLE—J. J. Kelly, S. F.  
NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

## Mining Share Market.

Little of interest occurred on the Comstock last week. Sandy rumors of improvement in both Hale & Norcross and Alta seemed to have an elevating influence on stocks in the respective mines, but the first mentioned improvement did not hold out or rush up fast enough, and the second was seemingly a small contest for the control at the annual meeting of the company, which took place in San Francisco August 19th. Now the stock is "a little off" again.

Another diamond drill hole is being run on the groo level of the Potosi east, near the Chollar line, says the *Enterprise*. It has already penetrated a distance of 225 feet, showing a very large ledge of pure, white quartz, carrying comparatively little in the way of the precious metals. Yet of such quartz, veins in the great body of the Comstock bonanzas are born. The 600 level of Savage continues looking and promising well in good ore. Some improved quality of ore has been coming from the lower levels of Consolidated California and Virginia, but nobody knows as yet what sort of an extent it is capable of.

The incline engine at the Crown Point shaft will not be repaired and completed before the 1st of next month, at which time it is definitely proposed to resume operations in both the Crown Point and Belcher mines. The low water in Carson river, causing some mill stamps to hang up for want of the requisite motive power, is a serious detriment to our mining interests and prosperity.

The usual progress of exploration and development is being made in all the principal working mines.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:  
Germania, August 17, \$5994 22; Hanauer, 17, \$11,490; Stormont, 17, \$2920; Hanauer, 18, \$5600; Queen of the Hills, 18, \$8000; Lexington, 18, \$22,768; Silver Bow, 18, \$18,659; Hanauer, 21, \$27,800; Crescent, 21, \$6330; Germania, 21, \$3212.29. The banks of Salt Lake City report the receipt for the week ending August 18th, inclusive, of \$118,039.70 in bullion and \$78,675.70 in ore, a total of \$196,715.40.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not know if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Aug. 5.	WEEK ENDING Aug. 12.	WEEK ENDING Aug. 19.	WEEK ENDING Aug. 26.
Alpha.	.65	.85	.60	.80
Alta.	.55	.85	.50	.75
Andes.	.25	.20	.30	.20
Argenta.				
Belcher.				1.00
Belling.	1.25	1.65	1.05	1.55
Best & Belcher.	1.25	1.65	1.05	1.55
Bullion.	.20	.40	.20	.30
Bonanza King.				.20
Belle Isle.				.20
Bodie Con.	2.60	2.85	2.45	2.90
Benton.		.05	.10	.15
Bodie Tunnel.		2.40	2.50	
Bulwer.	.80	.90	.75	.85
California.	1.35	1.60	1.45	2.10
Challenge.	.15	.25	.20	
Champion.				
Chollar.	1.25	1.75	1.00	1.15
Confidence.	2.25	2.75	2.50	2.25
Con. Imperial.	.10	.15		.05
Con. Virginia.	1.35	1.60	1.45	2.10
Con. Pacific.				.20
Crown Point.	.95	.85	.95	1.00
Day.				2.55
Eureka Con.	2.25	2.35	2.30	2.50
Eureka Tunnel.				
Exchequer.			.15	.20
Grand Prize.				
Gould & Curry.	1.15	1.55	.95	1.20
Goodshaw.				1.10
Hale & Norcross.	1.80	2.40	1.20	1.70
Holmes.	2.15	2.50	1.25	1.75
Independence.				
Julia.				
Justice.	.35			.40
Martin White.	2.25	2.35	2.30	2.60
Mono.	2.25	2.35	2.30	2.60
Mexican.	.65	.85	.60	.70
Mt. Diablo.	.00			.125
Northern Belle.				
Navajo.	.70	.85	.70	.75
North Belle Isle.	.60	.65	1.00	1.25
Occidental.		.65	.75	.60
Ophir.	1.05	1.45	.85	1.35
Overman.		.15	.10	.25
Potosi.	.70	.95	.55	.60
Pinal Con.				
Savage.	3.45	3.80	2.20	3.50
Seg. Belcher.				2.85
Sierra Nevada.	.65	.80	.55	.70
Silver Hill.				.65
Silver King.				
Scorpion.				
Syndicate.	.20	.15	.20	.10
Union Con.	.50	.70	.50	.65
Utah.	.80	1.10	.75	.90
Yellow Jacket.	1.00	1.25	.90	1.10

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., Aug. 28.	200	Holmes.	1.25
900 Alta.	100	Mexican.	.65
330 B. & Belcher.	50	Mono.	.75
840 Bodie Con.	100	Navajo.	.75
1170 Bulwer.	2575	N. Belle Is.	1.50
500 Benton.	150	Occidental.	1.25
300 Bullion.	1170	Ophir.	1.35
300 Chollar.	700	Overman.	.30
870 Con. Va. & Co.	530	Potosi.	.50
420 Con. Imperial.	2000	Savage.	2.50
130 Crown Point.	950	Sierra Nevada.	.60
100 Con. Pacific.	150	Scorpion.	.05
30 Eureka Con.	250	Syndicate.	.20
300 Exchequer.	150	Utah.	.80
400 Gould & Curry.	850	Union Con.	.60
650 Hale & Nor.	145	Yellow Jacket.	1.00



## New York Metal Market.

Telegraphic advices dated August 26th give the following New York prices:

BORAX—6¼@7¼c.  
 BAR SILVER—91½ per oz.  
 COPPER-LAKE—\$10.25@10.50.  
 IRON—No. 1, \$17@18.00; No. 2, \$15@16.00.  
 LEAD—\$4.75@4.80.  
 QUICKSILVER—50½@52¢ per lb.  
 The following is the latest by mail from the "New York Metal Exchange Market Report":  
 COPPER—Easier, closing fairly steady at 10.20c @10.35c spot Lake, 10.45c@10.65c late futures. Transferable Notices (Lake) offered at 10.20; Transferable Notices (Chili Bars) offered at 1.39 1/5.  
 LEAD—Nominal at \$4.75@4.80c. Transferable Notices (Domestic) issued at 4.75.  
 TIN—Steady, closing at \$21.60@21.75. Transferable Notices issued at \$21.65c.  
 SILVER—New York, 91½ per oz. London, 42¼d. MAKER'S PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18@18.50; No. 2, \$17.00@17.50; Grey Forge, \$15.00@16.00. Hudson River, Grade No. 1, \$18@18.50; No. 2, \$17.00@17.50; Grey Forge \$15.00@16.00. Southern, Grade No. 1, \$18.00@18.50; No. 2, \$17@18.50; Grey Forge \$15@16.  
 Prices generally rising for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.00@22.25; Billiton Tin, \$22.00@22.25; Banca Tin, \$21.15@21.50; Baltimore Copper, \$9.25@9.40; Orford Copper, \$9.35@9.65; P. S. C. Copper, \$9.35@9.65; Foreign Lead, \$4.75@4.95; Foreign Spelter, \$4.70@4.75.

## Ore Feeders.

We call attention to a new advertisement, which appears in this issue of our journal, of the "Original Roller" Ore Feeder, manufactured by the "Joshua Hendy Machine Works," of Nos. 39 to 51 Fremont St., this city.

We herewith subjoin a copy of a letter shown to us by a representative of those works, which speaks for itself:

BUNKER HILL GOLD MINING CO.,  
 AMADOR CITY, CAL., July 12, 1886.

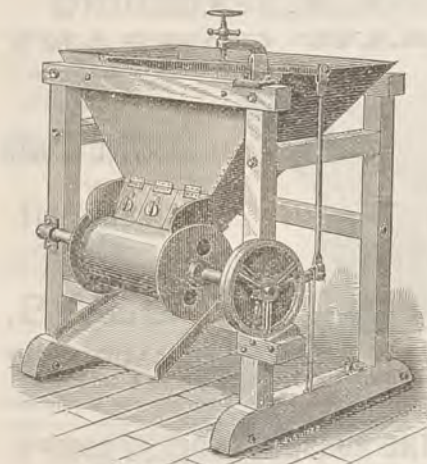
To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: We have used the "Challenge" and "Roller" or "Templeton" Ore Feeders in our mill for the past three years, and I am free to say that I consider the "Challenge" far superior to the "Roller" Feeder, in that most important of all things in a quartz mill, namely, the regular feeding of ores to the batteries. If the "Roller" Feeder is regulated to feed finely pulverized ore, the coarser ore will choke the outlet of the Feeder, and no one can reach the batteries. If, on the other hand, it is regulated to feed coarse ore, then the fine ore when it comes will sluice right through and fill the batteries. The "Roller" Feeder requires constant attention. Yours truly,  
 (Signed) N. W. CROCKER, Supt.

## DIVIDEND NOTICE.

OFFICE OF THE  
 Paradise Valley Mining Company  
 San Francisco, California.

At a meeting of the Board of Directors of the above-named Company, held August 24, 1886, Dividend No. 8, of Twenty-five (25) Cents per share, was declared payable on Wednesday, the 25th of August, 1886, at the office of the Company.  
 W. LETTS OLIVER, Secretary.  
 OFFICE—No. 328 Montgomery St., San Francisco, Cal.

**DEWEY & CO**  
**PATENT**  
**SOLICITORS.**  
 252. MARKET ST. S. F.  
 ELEVATOR 12. FRONT ST. S. F.

THE ORIGINAL  
Roller Ore Feeder.

This form of Ore Feeder is well adapted for its peculiar work.

In reference to a similar form of "Roller" Feeder, which is being manufactured and offered for sale in this city, and of which a cut appears in this journal, we have to say that the Superintendent of the Bunker Hill Gold Mining Company states that the "Challenge" is far superior to the "Roller," he having had both of them operating side by side. We shall be pleased to show this letter, upon application, to any one interested.

We are also manufacturers of the "Challenge" and "Stanford Improved."  
 Prices furnished by the  
**JOSHUA HENDY MACHINE WORKS,**  
 39 to 51 Fremont St., San Francisco.

## H. P. GREGORY &amp; CO.

Nos. 2 and 4 California St.,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

## MACHINERY

SOLE AGENTS FOR

J. A. FAY &amp; CO.'S WOODWORKING MACHINERY.

FRANK &amp; CO.'S WOODWORKING MACHINERY.

NEW HAVEN MANUF'G CO.'S MACHINISTS' TOOLS.

BEMENT &amp; SON'S MACHINISTS' TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND EXHAUSTS.

SHIMER MATCHER HEADS.

BRAINARD MILLING MACHINES.

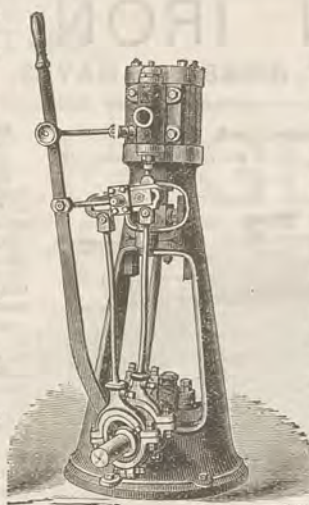
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS.

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISHERS.



WILLIAMSON BROS' HOISTING ENGINES.

ATLAS ENGINE WORKS ENGINES AND BOILERS.

PAYNE'S VERTICAL AND HORIZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS.

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECTORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

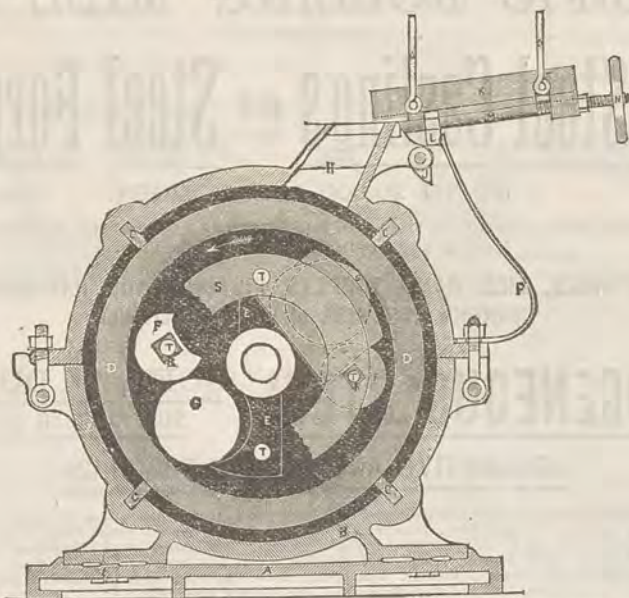
## YACHT ENGINES.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

## MILL SUPPLIES AND LUBRICATING OILS.

## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.

Certificates as to performance of the Mills, and any information required, furnished on application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 &amp; 106 Washington St., NEW YORK.

OR PACIFIC IRON WORKS, SAN FRANCISCO.

## Educational.

W. E. CHAMBERLAIN, JR.

T. A. ROBINSON.

**PACIFIC**  
**Business College,**  
 320 POST ST.  
 SAN FRANCISCO.

Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Evening Sessions during the entire year.  
 Call, or send for CIRCULAR to  
 CHAMBERLAIN & ROBINSON, Prop's.

## Field Seminary for Young Ladies,

1825 Telegraph Avenue,

Oakland, California.

Address MRS. R. G. KNOX, Proprietor, or MISS FRANCES A. DEAN, Principal.

THE FIFTEENTH YEAR WILL BEGIN

Wednesday.....July 28, 1886

**HEALD'S** BUSINESS  
**COLLEGE,**  
 24 Post St. S. F.  
 Send for Circular.

A Great Repository of Practical and Scientific Information.

One of the Fullest, Freshest, and Most Valuable Handbooks of the Age. Indispensable to every practical man. Just Ready. Price, \$2.00. Free of Postage to any address in the world.

## THE Techno-Chemical Receipt Book:

Containing several thousand Receipts covering the Latest, Most Important, and Most Useful Discoveries in Chemical Technology, and their Practical Application in the Arts and the Industries. Edited chiefly from the German of Drs. Winckler, Eisner, Heintze, Mierzinski, Jacobsen, Koller, and Heinzerling, with additions by William T. Brant, Graduate of the Royal Agricultural College of Elders, Prussia, and William H. Wahl, Ph. D. (Heid.), Secretary of the Franklin Institute, Philadelphia; author of "Galvanoplastic Manipulations." Illustrated by 78 engravings. One volume, over 500 pages, 12mo., elegantly bound in scarlet cloth, gilt, closely printed, containing an immense amount and a great variety of matter.

Price, \$2.00, free of postage to any address in the world.

ABSTRACT OF CONTENTS: Adulterations, Imitations, etc. How to Detect Them; Alloys; Artificial Gems, Pearls, and Turkish Beads; Bitters, Cordials, Elixirs, Liqueurs, Ratafias, and Essences, Extracts, Tinctures, and Waters Used in their Manufacture, and the Manner of Coloring them; Blasting Compounds, Blasting Powder, Dynamite, Gun Cotton, Gunpowder, Nitro-Glycerine, Fulminates, etc.; Bleaching; Boiler Incrustations; Bone, Horn, and Ivory, to Bleach and Dye them, and make Imitations and Compositions; Bronzing and Coloring of Metals; Building Materials; Artificial Building Stone, Mortars, etc.; Cocoa and Chocolate; Celluloid, Caoutchouc, Gutta Percha, and Similar Compositions; Cements, Pastes and Putties; Chemical and Techno-Chemical Expedients, Preparations; Cleansing, Polishing, and Renovating Agents; Colored Chalks, Crayons, Pencils, and Inks for Marking Linen, etc.; Confectionery; Copying and Printing; Damascening Steel; Decoration, Ornamentation, etc.; Dentifrices and Mouth Washes; Dyeing Woolen and Cotton Goods, and Yarns, Silk, Straw Hats, Felt Hats, Kid Gloves, Horsehair, etc. Mordants; Electro-Plating, Galvanoplasty, Gilding, Nickeling, Silvering, Tinning, etc.; Enamels and Enameling; Feathers, Ostrich, Marabouts, etc., how to Wash, Restore and Dye; Fire-extinguishing Agents and Means of Making Tissues; Wood, etc. Incombustible; Fireworks; Food and Food Preparations; Freezing Mixtures; Fruit and other Syrups; Fuel and Heating, Heat Insulation (Non-conducting coverings); Fusible Colors used in Porcelain Painting; Glass, Composition of the various kinds of, Colors for, and Processes for Enameling, Engraving, Gilding, Silvering, Pulverizing, Filing, Bending, etc. Glazes for Earthenware; Glass and other Signs; Glue, Manufacture of; Household and Rural Economy; Illuminating Materials; Imitations, Substitutes, etc.; Indigo, Indigotine, and Alizarine; Inks, Lithographic, Printing, and Writing; Jeweler's Polishes; Lacquers and Varnishes; Leather, Tanning and Dyeing, including Furs, etc.; Liquors and Beverages; Beer, Brandy, Gin, Whisky, Wines, etc.; Lubricants for Machines; Waxes; Marine Glue; Matches; Metal Industry; Mustards; Oils and Fats, Animal, Vegetable, and Mineral; Oil Paintings; How to Cleanse, Pack, and Varnish them, and to Restore Gilt Work; Paints and Pigments. Grinding and Mixing Colors, Graining, Imitation of Marbles; Paints and Washes for Various Purposes, etc. Paper and Paper Materials, Manufacture, Staining, etc.; Glass, Sand and Emery Paper; Perfumery, Aromatic Vinegars, Cosmetics, Extracts, Hair Oils, Pomades, Powders, Washes, Fumigating Articles, etc.; Pharmaceutical preparations; Photography; Plaster of Paris Casts which can be Washed; Preserving Meat, Milk, Vegetables, Vegetable Substances, Wood, etc., and Preservatives; Sealing Wax and Wafers; Sho-Blacking, Dressings, etc.; Sizing and Dressing for Cotton, Wool, Straw, etc.; Soap, Hard and Soft Soaps, Medicated and Toilet Soaps, etc.; Soldering and Solders; Sugars, Glucose, etc.; Textile Fabrics and Tissues; Tobacco, Smoking Tobacco, Snuff, Stenuative Powders, etc.; Vinegar. Manufacture of Ordinary and Fine Table Vinegars; Washing and Scouring, Manufacture of Washing Blue, etc.; Waste and Offal, Utilization of; Water-Glass (Soluble Glass) and its Uses; Water-proofing Compounds; Wax and Wax Preparations; Wood Gilding, Polishing, Staining, etc.; Yeasts, Manufacture of Pressed Yeasts, Bakers' and Brewers' Yeast, etc.; Addenda. Alloys; Antiseptic and Preservative Agents; Artificial Eyes, Manufacture of; Asbestos and its Uses; Bleaching; Bookbinding, Gilding, and Ornamenting; Bronzing; Gilding, Silvering, etc.; Building Materials, Celluloid, Imitations, Substitutes, etc.; Cement Work; Cleansing, Polishing, and Renovating Agents; Colors, Enamels, Cements, Glue, Varnishes, Water-proofing Substances, etc.; Copying; Explosive Agents; Glass; Horn Combs, Manufacture of; Lubricants, Blacking, etc.; Metal Industry; Miscellaneous; Oils and Fats; Paper; Straw, Bleaching and Dyeing of; Strength of Materials; Willow-Ware; Index.

A circular of 32 pages, showing the full Table of Contents of this important book, sent by mail free of postage to any one in any part of the world who will furnish his Address.

HENRY CAREY BAIRD &amp; CO.,

Industrial Publishers, Booksellers & Importers, 810 Walnut Street, Philadelphia, Pennsylvania, U. S. A.



NOTICE TO  
**MINING MEN,**  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.

Engineers' Tables of Progress

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, etc., address:

**INGERSOLL ROCK DRILL CO.,**

REPRESENTED BY

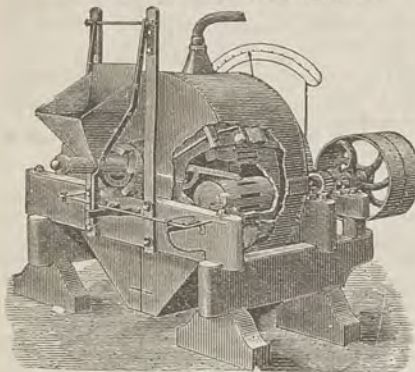
**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

**Tustin's Pulverizer**  
WORKS ORE WET OR DRY

FULTON IRON WORKS, S. F.



MANUFACTURED BY

**HINCKLEY, SPIERS & HAYES,**

**MACHINE TOOLS,**  
PRESSES AND DIES,  
PUNCHING and SHEARING  
MACHINERY.

**F. A. ROBBINS,**

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and  
Dies, 20-inch Engine Lathes,  
12-inch Shapers.

Punching and Shearing Machinery for  
Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.  
Gear Cutting a Specialty.

221 and 223 First St., San Francisco.



WATER TANKS! WINE TANKS!  
**CALIFORNIA WINE COOPERAGE CO.**

FULDA BROS., Proprietors,

30 to 40 Spear St., San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**  
316 California St., San Francisco.

## FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

MANUFACTURERS OF

San Francisco.



BABCOCK & WILCOX BOILERS.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure  
or Compound, Stern or Side-wheel En-  
gines.

MINING MACHINERY—Hoisting En-  
gines and Works, Cages, Ore Buckets,  
Ore Cars, Pumping Engines and Pumps,  
Water Buckets, Pump Columns, Air Com-  
pressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for  
Dry or Wet Crushing, Amalgamating  
Pans, Settlers, Furnaces, Retorts, Con-  
centrators, Ore Feeders, Rock Breakers,  
Furnaces for Reducing Ores, Water Jack-  
ets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MA-  
CHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines  
and Boilers, Dredging Machinery, Pow-  
der Mill Machinery, Water Wheels.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

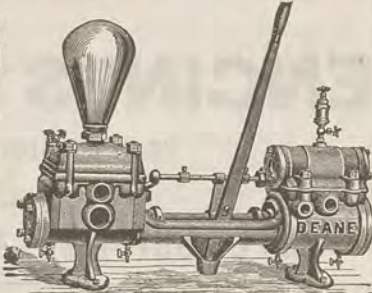
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

...MANUFACTURERS OF...

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.

—ALSO—

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

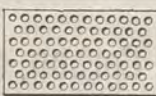
ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**

## FRASER & CHALMERS.

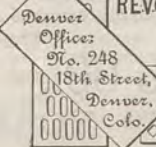


CHICAGO, ILL.  
U. S. A.

General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

PERFORATED METALS FOR  
REVOLVING and SHAKING-SCREENS,

JIGS & STAMP BATTERIES.



Denver  
Office:  
No. 248  
18th Street,  
Denver,  
Colo.



NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.



Mexico  
Office:  
No. 11  
Calle  
de Suarez  
Chihuahua,  
Mexico

UTAH OFFICE—SALT LAKE CITY, UTAH.

## Iron and Machine Works.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

—BUILDER OF—

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines

Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. **ORDERS SOLICITED.**

### UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kind of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front Street, Between N and O Streets,  
SACRAMENTO, CAL.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON

THORNTON THOMPSON

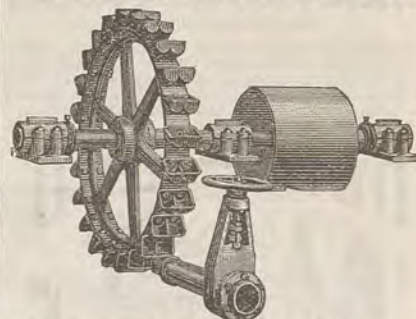
THOMPSON BROTHERS,

**EUREKA FOUNDRY,**

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

### PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED  
by the Idaho Company at Grass Valley, Cal., and  
gave 90 2 per cent., distancing all competitors. Send for  
Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street  
San Francisco, Cal.

### N. W. SPAULDING

### SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

## Saws.

SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Cata-  
logue. 17 and 19 Fremont St., San Francisco.

### THE RUSSELL PROCESS COMP'Y.

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

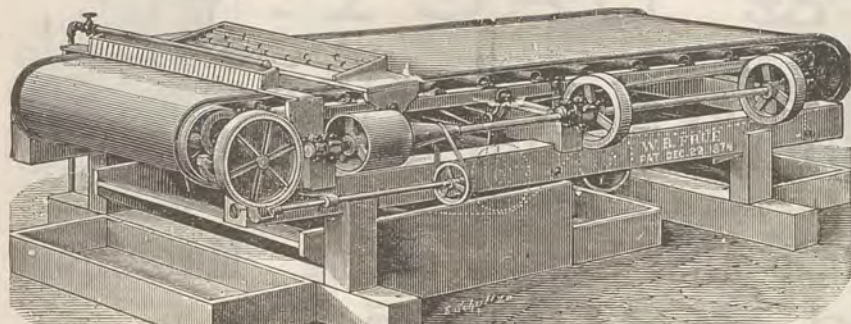
A Good Opportunity for a Ma-  
chinist.

A variety of good Tools, Patterns, etc., with business  
for sale cheap by a party retiring from business. A  
splendid opportunity for an enterprising mechanic.

Address A. B. C., care of this paper.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS.**  
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept 18, 1883. Patents applied for.

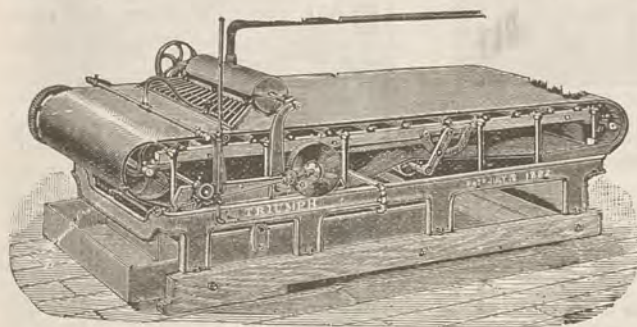
N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

# \$1,000 CHALLENGE ACCEPTED, PRICE, FIVE HUNDRED AND FIFTY DOLLARS (\$550.00).



**THE  
"TRIUMPH" ORE CONCENTRATOR.**

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE, placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent

L. R. MEAD, Secretary.

# THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

## BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. **NOTE.**—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

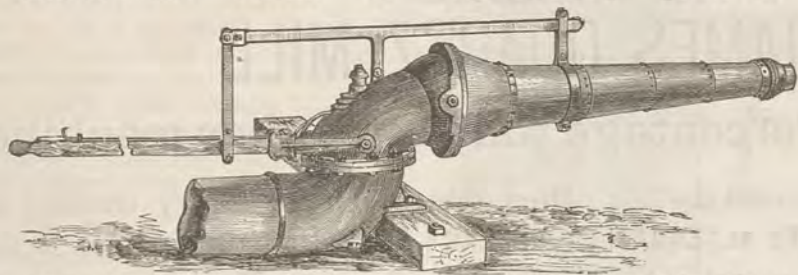
SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company

Send for Circular and Price Lists.

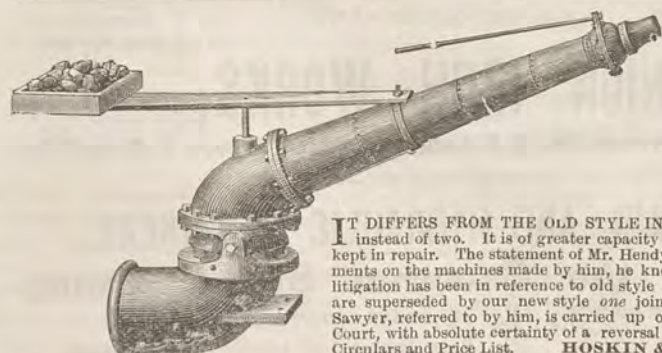
## IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the **IMPROVED FORM OF HYDRAULIC GIANTS**, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,  
39 to 51 Fremont St., San Francisco, Cal.



This cut represents our  
**IMPROVED  
HYDRAULIC  
MACHINE.**

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.

HOSKIN & CO., Marysville, Cal.

## QUARTZ BREAKERS! San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice

TUBBS & CO.

611 and 618 Front St., San Francisco.

## Pulverizers Combined.

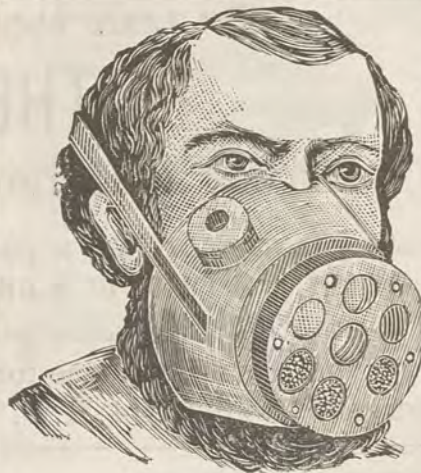
To Run by Hand or Power.

Mining Machinery of Every Description; Drawings, Plans and Specifications.

E. I. NICHOLS, 316 Mission Street, S. F.

## PATENT LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning  
and Salivation



The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, Threshing and Stock-driving, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,  
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.

## THE JENKINS STANDARD PACKING



IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the Jenkins Standard Packing can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing," and is for sale by the Trade generally.

Manufactured only by

For Sale by DUNHAM, CARRIGAN & CO., San Francisco, Cal. | JENKINS BROS. 71 John St., New York

## CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

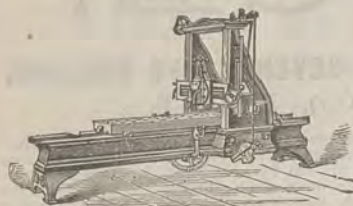
DEWEY & CO., { No. 252 MARKET ST. } PATENT AGENTS.  
Elevator 12 Front St.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



Putnam Planer.

# PARKE & LACY.

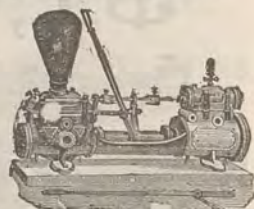
.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.

Knowles Steam Pump  
The Standard.

### PACIFIC IRON WORKS

1850.

1885.

**RANKIN, BRAYTON & CO.,**  
BUILDERS OF...  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

### WATER JACKET SMELTING FURNACES

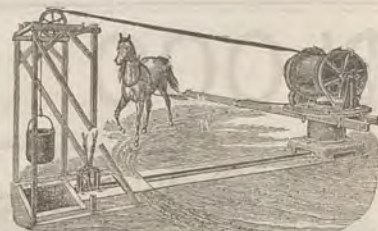
For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.

### WATER JACKET SMELTING FURNACES

### THE DUNCAN CONCENTRATOR

Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



### BAKER'S MINING HORSE POWER.

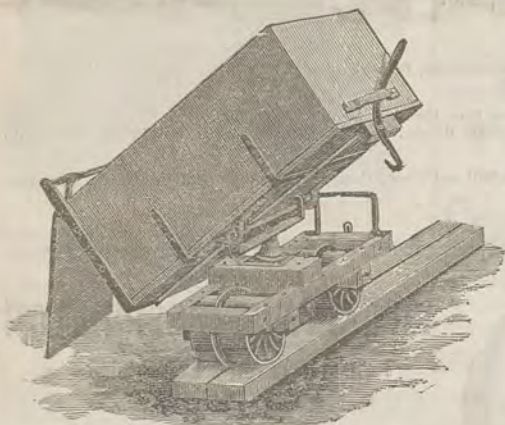
Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700-pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE of CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.

### HOISTING WORKS.

## TATUM & BOWEN,

34 &amp; 36 FREMONT ST., Donahue Block, SAN FRANCISCO.

91 &amp; 93 FRONT ST., PORTLAND, OREGON



JAMES' PATENT ORE CAR.

Ore Car, . . . . \$ 40.00  
Rock Breaker, . . . . 100.00  
Quartz Mill, . . . . 350.00

### THE JAMES QUARTZ MILL

Saves a Higher Percentage than any other machine.

Its action is a reciprocating motion of four separate and distinct Dies attached to a heavy casting in such a way that the WHOLE WEIGHT and FORCE OF BLOW ACTS ALTERNATELY ON EACH DIE. In this respect it resembles the Stamp Mill, and in point of amalgamation is superior to any machine in use. There is no wear, except on Shoes and Dies, and there is no expense for setting. Weight, 3000 pounds. Capacity, 6 Tons in 24 hours through No. 40 Screen. Requires 4 H. P.

**JOHN A. ROEBLING'S SONS CO.**  
**WIRE ROPE**  
GALVANIZED SHIP RIGGING, MINING, TILLER,  
ELEVATOR, TINNED, & COPPER ROPE, SASH CORDS.  
LARGEST WIRE ROPE WORKS IN THE WORLD.  
**IRON & STEEL WIRE OF EVERY KIND.**  
TELEGRAPH WIRE, HARD & SOFT COPPER WIRE  
INSULATED FOR ELECTRIC USE.  
WIRES OF IRON & COPPER. FENCE WIRE,  
SWEDISH IRON WIRE, CRUCIBLE STEEL WIRE.  
TRENTON, N.J. & 14 DRUMM ST. SAN FRANCISCO, CAL.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.  
J. O. B. GUNN, Secretary.

### UNION IRON WORKS,

Office, Cor. Market &amp; Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

### STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

### UNION IRON WORKS,

Successors to PRESCOTT, SCOTT &amp; CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, SEPTEMBER 4, 1886.

VOLUME LIII.  
Number 10.

## Water-jacket Smelting Furnaces.

In our issue of August 21st we gave an illustration of one of the water-jacket smelting furnaces used on this coast for smelting oxidized and other copper ores. In the present issue we continue that class of illustrations and show a front and half-sectional view of another furnace, known as the Raschette copper furnace. In the construction of the same, improvements have been introduced which now represent the most advanced practice in copper smelting. Instead of depending on a number of small round furnaces, a rectangular furnace 32 inches wide, 72 inches long, was erected, as shown in Figs. 1 and 2. The construction is as follows:

There are two water-jackets, the upper one, *B*, in Fig. 1, supported by the pillars, *L*, the lower one, *A*, resting on the bed-plate carried by the pillars, *K*. The crucible, *C*, is lined with brick and clay, like those of the round furnaces, and can be cleaned by the falling of the drop-doors, *D*. *H* are the tapping-notches; *M*, the cinder-notches; *F*, the tuyeres supplied with blast from the blast-main, *E*; *R*, blow-off cocks in the lower water-jacket. The water for the upper jacket enters through the system of pipes, *Q*, more distinctly shown in Fig. 2, and is discharged through the pipes, *P*, into the gutter, *K*, which also carries off the spent water from the lower jacket, *A*. The upper part of the furnace is surrounded by the shell *O*, and contains a charging-bell and hopper, which is elevated or lowered by the levers, *V*. This charging-bell has now been removed, and in its place a simple charging-hopper has been substituted like the hopper used in the furnaces of the Grant Smelting Works, at Denver, Col.

The character of ore smelted in this furnace is entirely similar to that smelted in the furnaces of the Arizona works.

The capacity of this Raschette furnace is about 60 tons per day, and a saving of about 10 per cent of the fuel above that used in the operation of round furnaces has been noted. It requires no more men to operate this furnace, and on the whole there should be a decided saving in the cost of the treatment of ores, as compared with the smaller round furnaces. At the rates ruling for labor and fuel in the Clifton district, the cost of treating ore in this furnace is about \$8 a ton.

## Mining Accident Funds.

In Great Britain they have in various districts mining accident funds, which are devoted to the relief of those injured in mines, or the widows of those killed. At some places these funds have increased largely. The Hartley colliery fund, for instance, now amounts to about \$100,000. A scheme is now being considered for centralizing mining accident funds by a committee. Before a disposition of the money can be made, the scheme will have to be submitted by the various colliery districts, which will enable the Home Secretary to make a just and equitable division. To centralize these funds and enable the miners to have a reliable relief fund which they can bring before the Home Secretary to secure a portion of the surplus, it is now proposed to establish a Permanent Miners' Relief Fund. All surplus funds could then be added to the Miners' Accident Fund and invested in the names of trustees. Both employers and colliers are expected to contribute to these funds.

## Gold-washing in Italy.

Washing for gold has been practiced from time immemorial in Piedmont, in the beds of some of the torrents which flow from the Alps to the Po.

According to Pliny and other ancient writers, upward of 5000 persons were engaged in this occupation at one time. In modern times, however, it has only been practiced on a small scale, and principally in the beds of the torrents Orco, Malene, Dora Baltea and Ticino.

Of late years, the existence of these aurifer-

ous meters of stuff per day of 22 hours. The buckets are 22 in number, and are capable of excavation to a maximum depth of 8 meters.

## A Maritime Exhibition.

An international maritime exhibition will take place at Havre next year. Ships and appliances that will be admitted are as follows: Sailing or steam ships of all nations (men-of-war and merchant vessels); fishing boats, pilot boats, life boats, yachts, pleasure boats, and boats for

Fig. 1.—Side Elevation and Vertical Half-section.

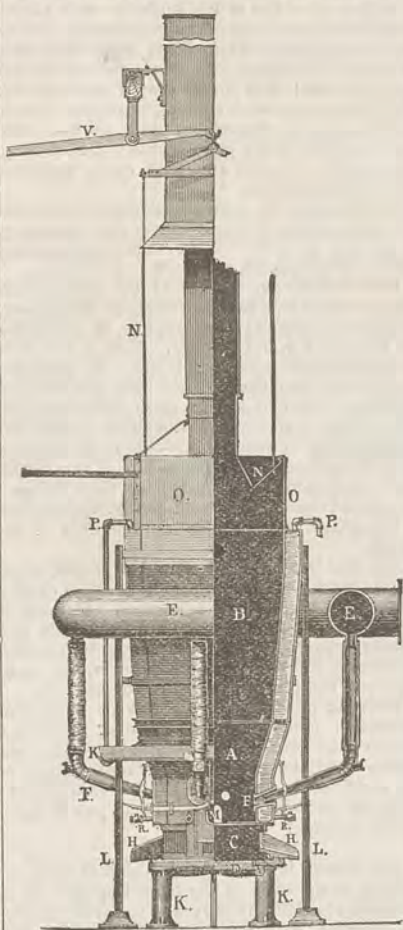
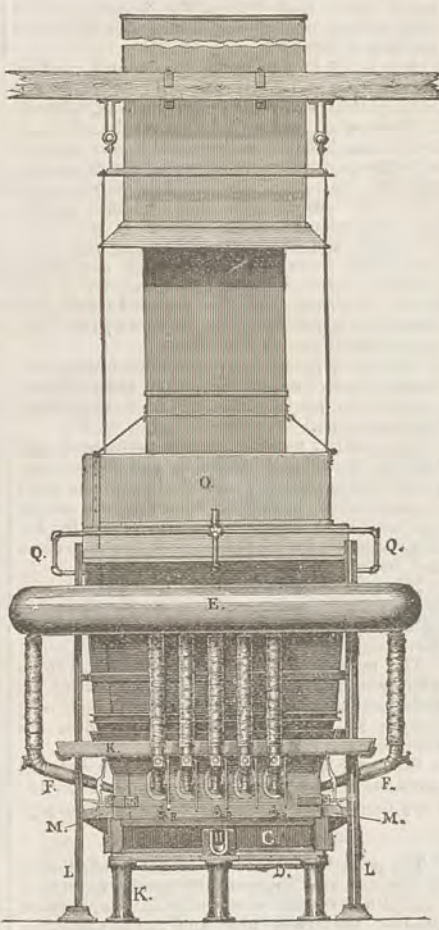


Fig. 2.—Front Elevation.



RASCLETTE COPPER FURNACE.

ous sands has been more fully investigated, and have been found to extend at the foot of the Alps from Legin and St. Maurizio on the west to the Dora Baltea on the east, and bounded on the south by the Po, covering an area of about 250,000 acres.

The depth of this gold-bearing deposit varies from 5 to 8 meters; and although the amount of gold these sands contained cannot be said to have been ascertained with any degree of accuracy, there appears to be every reason to believe that the estimate of 0.40 grains per cubic meter is not an exaggerated one. (0.01286 Troy ounces; 0.2572 dwts.)

A company—the "Societa dei Giacimenti Auriferi di Pienionte"—have recently commenced operations in the bed of the torrent Orco, near San Benigno, and a few weeks ago inaugurated a powerful steam dredger, named the "Regina Marghousa," which has been constructed especially for the excavation and washing of these sands; it is of 50-horse power, and is capable of raising from 2000 to 2500 cu-

bic meters of stuff per day of 22 hours. The buckets are 22 in number, and are capable of excavation to a maximum depth of 8 meters.

Owners or captains are to give names of builders and fitters, date of launch of ship, dimensions and all particulars concerning hull and engines. Prizes will be given both for construction of vessels and their fittings. Ships must remain at least a week in the exhibition dock.

In view of the fact that there is now so much rivalry between this country and England in the matter of yacht models, it is to be hoped that a number of the various types of both countries will be exhibited at Havre. There are many good points that each might adopt if seen where comparisons could be made. For steamships no doubt Great Britain will excel at this exhibition, but the United States ought to make some kind of a showing, as she is a maritime nation, even though our navy is not quite up to the mark.

## Care of Mine Cables.

There is probably no more important feature in the economies of a large mine than the care which is given to the mine cables. Upon their condition depends often the lives of the men who trust themselves in the cage or in the mine. One would think, therefore, that the cables would receive the greatest attention and care. And so they do, each large mine having a rope-man, whose duty it is to make a daily inspection of the cable, repair it, lubricate it, tar it, and report its condition to the superintendent. This rope-man is responsible for the condition of his ropes, and his position is therefore an important one. It occasionally happens, however, that the spirit of economy prevails to such an extent that the superintendent insists on running longer than the man who has it in charge and knows its condition thinks proper, or the rope-man tries to keep patching up his old material to save ordering a new cable; therefore we occasionally, though not often, hear of serious accidents from breaking cables.

The cables, in order to preserve them from the effects of dampness and heat, must be lubricated and tarred. In very hot and wet shafts or inclines the cables do not last as long as in cool, dry ones. In using tar in hot shafts, the tar runs and makes more or less dirt. Under some circumstances the tar when old gets brittle and chips off. In some large mines the ropes are changed once every month or two months, the one removed being put in thorough order before being put in use again. Too great care cannot be taken of these important portions of mining operations. There are several patented systems of cleaning and preserving cables, and almost every rope-man at a large mine thinks his method the best.

## Gold in Germany.

The following figures give the gold production of Germany for a number of years:

	lbs.	lbs.
1849	5.72 1863	101.20
1850	8.36 1864	92.62
1851	20.68 1865	77.88
1852	29.92 1866	231.22
1853	42.90 1867	186.56
1854	28.38 1868	253.22
1855	34.54 1869	173.80
1856	19.14 1870	149.82
1857	32.34 1871	181.06
1858	33.44 1872	720.50
1859	45.10 1873	639.00
1860	34.80 1874	863.22
1861	62.70 1875	731.06
1862	21.56 1876	618.86

The gold occurs in lead and copper ores in very minute quantities. The gold produced in Prussia, which is a very small quantity, is obtained by an interesting process. The peroxide of iron, obtained in roasting the arsenical gravel, is impregnated with chlorine gas, washed with water, and the gold contained precipitated with sulphuretted hydrogen. The resulting sulphide of gold is roasted, washed with hydrochloric acid, and smelted with borax and nitre.

GRANITE MOUNTAIN.—In our article last week on "Investment in Mines," we mentioned the Granite Mountain mining stock as selling at the rate of \$6,400,000 on \$40,000 monthly dividends. This was taken from an old report. The dividends are now \$100,000 per month, and the stock is firmly held at \$40 per share, and there are 400,000 shares, which makes a valuation of \$16,000,000. Trustworthy reports and honest management account for this solid, confident appreciation of this stock.



### The Mechanics' Institute Fair.

The annual exposition of the Mechanics' Institute is now in progress in the grand pavilion in this city, and will continue to be the center of attraction in the city for a month. The space is well occupied with a great variety of industrial and art materials, natural productions of every kind, etc. It is too late to prepare any sketch of the fair for this week's PRESS. Let our readers note the fact that it is now in readiness for their visits. For those who cannot come we shall record our notes of the exhibition hereafter.

The opening exercises at the Grand Opera-house began at 2 o'clock Tuesday afternoon, Aug. 24th, with a grand opening overture by the orchestra under Charles Schultz. Rev. Joseph P. Macaulay made a short prayer, after which there was more music by the orchestra.

#### Ramon E. Wilson's Address.

P. B. Cornwall, President of the Mechanics' Institute, in a brief address introduced Ramon E. Wilson, who spoke as follows:

*Mr. President, Ladies and Gentlemen:*—For the twenty-first time the friends and patrons of the Mechanics' Institute assemble to celebrate the opening of its annual industrial exhibition. This large concourse of people is a most fitting tribute to the ceremony, and it speaks stronger than language can express the feeling and sentiment of the community as to its success.

#### Origin of Industrial Exhibitions.

Industrial exhibitions are now fully recognized as a method of assisting the development of industries and material progress. As exhibitions purely, they are of comparatively recent date. For the purpose of effecting sales of the productions placed on view they have an origin which antedates modern history.

This latter class were called "Fairs," held at stated intervals both in Asia and Europe, in the earliest period of civilization. They are supposed to have derived their origin in religious gatherings, which first gave an opportunity for the exhibition and sale of wares to large numbers of people. The Greeks and Romans have left accounts of many such.

We find in some of the earliest text-books of the law that these institutions had become so important that special courts were established for the consideration and determination of questions of law and equity arising at them.

Fairs were instituted in France and in Southern Europe some 1000 years ago. Among the more celebrated of those early times was that of St. Denis, instituted by Dagobert, A. D. 629, and Aix-la-Chapelle and Troyes in about A. D. 800. In A. D. 826 they were introduced into Great Britain by Alfred the Great. At the end of the tenth century they had become well established and very common throughout Northern Europe.

In Great Britain patents were issued by the king, permitting the establishment of annual fairs. Some of these have become famous. The English fair at Weyhill is noted for its display of sheep; that of St. Faith's is distinguished by the numbers of Scotch cattle bought and sold, and everybody has heard of the Donnybrook fair, so long celebrated for the jollity and pugacity which distinguished its visitors.

In France the fairs of St. Denis were discontinued. Beaucaille and Gibray have been in existence for centuries.

Fairs are still held in Holland and are enjoyed by the people as important holidays.

Germany is known as the modern home of this peculiar institution, the principal ones being those of Leipzig, Frankfurt-on-the-Main and Brunswick.

In Russia the fair is the largest in the world, lasting 25 days, and the sales amount to many millions of dollars.

In Asia the fair held at Mecca, when the annual pilgrimage takes place, is the most extensive. One of equal magnitude is held in India on the Ganges, where a million people assemble annually.

On the Western Continent no such great assemblages, with but rare exceptions, are known. In early times fairs were held at the City of Mexico, frequently attracting many thousands of people.

In later years these fairs have been less required as a means of promoting commerce, owing to the facilities afforded buyers and sellers by the modern means of transportation and travel, which permits trade to be carried on with regularity and convenience throughout the year. The necessity of accumulating products of manufacturing and transporting them in quantities to the fairs, to be wholly sold in a few days, no longer exists. Their production is continual and their sales go on uniformly and promptly at all seasons.

This change in the methods of commerce has led to the institution of the industrial exhibitions, at which the object is not to procure the sale of exhibited articles, but to make visitors familiar with their character and value, and to inform them of the places of manufacture and sale, with the ultimate result of bringing the purchaser to the manufacturer and merchant, and by a course of object-teaching educating the masses in the progress of the age and the growth and development of the country.

The first of these exhibitions is supposed to have been held in France. Similar ones were

held in Great Britain by the Royal Dublin Society nearly a half century ago. The American Institute of New York commenced holding its exhibitions a little later, and still later, just a quarter of a century ago, the first exhibition of the Mechanics' Institute of San Francisco was held. They have continued annually ever since, and it has now become one of the permanent institutions of the country.

#### The Mechanics' Institute.

The Mechanics' Institute was organized in January, 1855.

Its founders declared its objects to be to cultivate a social feeling of friendship, mutual improvement, the dissemination of information and useful knowledge by the establishment of a library of circulation and reference, and the erection of buildings for any scientific, mechanical or literary purpose.

Right worthy objects they are. What a wonder it must be to those schemers now living to see the most perfect realization of their designs. What a contrast between the library of 40,000 volumes now upon the shelves, devoted to and representing every subject to which the human mind has given thought or tongue utterance, and the "library of circulation and reference" in San Francisco in 1855.

Ten years later they must have accumulated a library, for in the year 1865 was inaugurated the first of its industrial exhibitions. It would be a curious and instructive spectacle could we arrange the fair of 1865 side by side with the fair of 1886.

Not unlike many other things, the "glorious climate of California" has had its influence upon this institution, and although it was born amid the fogs and trade winds of San Francisco, and has its local habitation here, it has grown to such magnitude that it exerts a power over the development of all that is strongest and best throughout the whole commonwealth. Its capacities and capabilities will not decrease, for its fountain source is a pure spring unpolluted by selfishness and undisturbed by narrowness.

Its 31 years' growth has been unassisted by a single dollar from the public treasury, not a dime by gift, nor a penny from endowment, and not even a lottery.

It is indifferent to sects, creeds and parties. Its members and coadjutors are now composed of all parties, sects and denominations, without distinction of creed or political sentiment, until now it stands entirely above and secure from all convulsions of political contests, not dependent upon the success of one party or another, but all equally willing and anxious to form the pillars of its support, while it operates in a different sphere and extends its exploring vision far beyond the arena of party measures or political action, penetrates the mysterious work of God in the government of the material world, and draws down permanent accessions to the common stock of human enjoyment.

Its history presents a phase, not unlike that in the lives of some men, who have become great in the many walks of life through their own exertions.

The public, recognizing the permanent and abiding character of its works and the self-sacrificing enthusiasm with which its pioneers press on the enterprise, that its achievements are for the benefit of the country, has gradually become impressed with the sense of its importance and yielded co-operation.

It is now the great vanguard of the pioneers of substantial and practical improvements in all the useful occupations and employments of life.

The men who founded it, as well as those who have succeeded, and who now direct its policy and affairs, have never sought their own glory in its establishment nor their own advancement in its growth.

Who will not delight to cherish the warmest emotions of gratitude for these veteran patriots? They deserve the thanks of the whole country.

#### The Influence of its Fairs.

The primal object of this great institution is to expound and illustrate the laws of nature, as exemplified by the various industries, and to produce therefrom new and useful things for the practical application and use of the human race. This it accomplishes by the aid of volunteers from the ranks of science and art and all the departments of industry. It demolishes the barriers which obstruct the progress of the age, breaking down the inclosures of Nature's storehouse and letting mankind in to the enjoyment of constant accessions of novelties and wonders.

Its great productive forces, as applied to mankind, are emulation and stimulation.

Within its capacious receptacle are the products of the fields, the factories, the shops, the farm, the manufacturer, the mechanic, and the inventor. Hither they all come with the productions of their skill, to witness the grand tournament of genius, the great trial of inventive strength, to compete for premiums, and through them for the patronage of the public. Emulation, constantly excited as it is by these exhibitions, and urged on to increased exertion, results in the production of fabrics and works of handicraft which can only be excelled by the continued application of the same stimulating process. The products of skill, labor and ingenuity are brought to the immediate view or critical examination of thousands of observers. It is a better advertisement than daubs of paint on all the fences in the country.

These fairs are the grand exchange of the ingenious and enterprising producers of the country. Here they are brought together,

many of whom would not otherwise ever meet, and interchange ideas.

The farmer comes to see what improvements have been made in agricultural implements. He finds them all in active operation, and has an opportunity to test their merits.

His wife comes with him. The latest devices in incubators, washing machines, churns, and the innumerable things which tend to lessen the work of the farmer's wife, are spread out before her. And perhaps the daughter comes too. Her mind is speedily stored with the beautiful things she sees among the finer arts and works of handicraft, which she utilizes to make the country home more home-like and attractive.

Hither comes the miner. He stops not to look to the right or to the left, but goes straightway to the rear, where all is noise and bustle. Here he finds the newest inventions for crushing ores—concentrators, separators, pumps and labor-saving drills. By their aid he finds that he can unlock the doors which lead to nature's repository, the storehouse of its precious metals. Mines upon which have been expended the fortunes of men without material results are again opened and made to yield up their hidden treasures. Hither comes the artisan, the carpenter, the mechanic, the blacksmith and the various workers in wood and iron, who find new tools and devices with which to lessen the burdens of their daily labor.

Hither come the vineyardist and the orchardist. By walking from one end of the long tables to the other, upon which are placed the various products of the tree and the vine, one can, without expense of time or money, make a visit to almost every county in the State and note with profit to himself what might take years of experience to learn, the various effects of soil and climate upon production.

Hither come the manufacturer and merchant, the one to display his products and the other to learn that he need not go beyond the boundaries of the State to find material to supply his customers.

Hither come the artist, sculptor and skilled handicraftsman to show to the wealthy and refined good people of our State that they need not go to New York, or Paris, or Rome, to buy good pictures; that mantles with carvings and tiles, rugs, carpets, furniture, portieres, pianos, wall-paper and decorations and all the other many articles which go to beautify the dwelling-place can be bought, and that clever workmen can be had at home.

Hither come the representatives of every class of human work, of man's labor and ingenuity, to use and compete with each other in the struggle for development, prosperity and success.

Hither come the masses of the people, who have no time to inform themselves from books or papers. The days and nights of exhibition are to them a grand holiday. It is a rest from the cares and burdens of life. It provokes energy and ambition. They see what would otherwise never be seen by them, and are taught what they would never otherwise know—the improvement of machinery—the encouragement given to commerce, the perfecting of rural economy—that men are rewarded for their labor—and the advancement, development and growth of the wealth, intelligence and comfort of the people.

And last but not least come the ladies, without the presence of whom no industrial exhibition can or ought to be a success. Homage is their due, for always they are the earliest and firmest friends of whatever tends to elevate, ameliorate and perfect the happiness, the comforts and the prosperity of the human race.

Who can measure the amount of pride and exultation felt by the exhibitors? Who can measure the amount of laudable ambition engendered by the complimentary observations of the multitudes who gather at these exhibitions? Who can measure the renovating power upon public opinion?

#### The Future.

The remark is sometimes heard that each exhibition is the same as the preceding one. Such speeches are thoughtlessly and carelessly made. As evidence of it, the very people who make them buy a season ticket and come to the fair every night so long as it lasts. The public does not think so, for yearly the coffers of the institute are increased, its exhibitions are enlarged and the value of its prizes, premiums, medals and awards enhanced.

The Mechanics' Fair has become one of the solid and permanent institutions of the country and the pride of its citizens.

How could it be otherwise? There is no tract of country on the face of the earth that can compare with our own State and coast as a birthplace for everything that is promoted by agriculture or the outgrowth of inventive genius—the pillars which form the foundation of every industrial exhibition and upon which repose the prosperity of the human race.

There is enough material on hand and in sight to keep this exhibition alive and useful for generations to come; nor will it be exaggeration or arrogance to say that within the lives of those here to-day the entire block of land, now owned by the institute, will be covered by one roof, filled with evidences of the inexhaustible resources of the State.

Some doubt this. It is said that the soil, like the human frame, will wear out and refuse, after a time, longer to yield to cultivation. That all of the available precious and other metals have been taken out; that, in view of the wonders already wrought, the secrets of nature are well-nigh exhausted. They ask

what is there left to do? The elements have been pressed into service and made to perform labor. Oceans have been contracted and their opposite shores brought within a few days of each other; the wind and the wave have been trained to the car of industry; steam has been imprisoned, and its angry efforts to escape have been applied to the generation of power; vision has been protracted through the aid of glass until it has penetrated the firmament and scrutinized its structure, and the lightning has been enslaved and city is made to talk with city at the speed of sunbeams.

Think of the immeasurable distance between God and man, and that the power to create is infinite with the Creator of the endless divisibility of particles of matter, and into the phenomena and laws of nature, and the answer must come, there is food for thought and enough for idle hands to do for all time.

California is blessed with a rich, deep and varied soil, a genial climate, a vigorous and intelligent class of men, unequaled in the spirit of enterprise, industry and perseverance, a splendid system of public instruction, and exalted by moral and religious institutions. Her earth teems with rare and useful productions, embosoming inexhaustible mines of metals and bearing mighty forests.

Commanding all these resources, no one need be solicitous of the future.

The rising generation need not be awed by what has been done. Let it turn its attention to the subject of irrigating the arid regions of the State, the reclamation of the millions of tule, marsh and overflowed lands lying in the great valley and bay region; to devising methods of increased production of fruits, vegetables and cereals, variety of production, the improvement in the breeding of cattle, horses, sheep and swine; improvement in machinery which agriculture naturally develops, a means of extracting from the mountains of gravel the gold therein, without polluting the highways which empty into the valley basins below, and to make a key which will unlock Nature's laboratory, wherein are stored more riches than have yet been found.

The friends of "the good old way" are getting to be very few. The spirit of progress is continually pointing out a "new way."

That is the spirit inculcated by these exhibitions.

Friends, join hands in laying deep and everlasting the foundations of this institution. It has already done ineffable credit to its projectors—let it be venerated by a grateful posterity, and let us hope that it shall continue to do good, and last as long as our Golden Gate is open to the commerce of the world.

The address of Mr. Wilson was followed by a laughing song, "Manon Lescant," by Miss Ellen Coursen and the Young Ladies' Choral, after which Fred Emerson Brooks read an original poem. The exercises closed with a cornet solo by Mr. Mahood, a chorus from *Lucia di Lammermoor* by the Choral, and music by the orchestra.

### New Concentrators in Arizona.

The concentrators of the Arizona Copper Company are now completed. The works are located adjacent to the smelters, and are about ready for operation.

The Clifton *Clarion* says: The arrangement throughout is convenient and everything has been done to make the works compact, secure and as far as possible self-operating. The ore to be concentrated is taken by car from the bins and dumped on screens which separate the fine and coarse, allowing the two classes to pass into separate bins. The fine ore, not needing crushing or rolling, passes automatically to the elevator and is carried direct to the revolving screen; the coarse ore is passed through a crusher, and then over a second screen which separates the fine particles and allows them to be carried likewise to the revolving screens, while the coarser ore passes through the Cornish rollers and is again crushed. It is then carried to the revolving screens, and by a simple arrangement, the coarser particles are separated and returned to the crusher to be reduced to the proper degree of fineness, when a second time they are raised to the screens.

The revolving screens are three in number and separate the concentrates of different degrees of fineness which pass from thence to the jigs, of which there are eight. These jigs are so arranged (on the principle of the different specific gravities of the bodies) that the concentrates, the middlings, which require further concentrating, and the gangue may be removed separately. The concentrates by a series of conduits are conveyed to a vat, where they are raised by an elevator and thence carried by a chute to a bin near the smelter, at the end of the chute a sort of screen being placed which separates the water from the ores and prevents it reaching the bin. The middlings are carried to the crusher and the process of concentration repeated with them. The gangue or waste is carried to the river and dumped. The whole arrangement is automatic as far as possible and every arrangement has been made to insure economy and convenience in the workings. The construction has been under the supervision of Mr. Colquhoun, Mr. Kemper representing the Kansas firm having the contract, and Mr. Schumann, one of the old employees of the Arizona Copper Company, having charge as foreman of the work, and in this, as in all his work, making thoroughness and solidity specialties.



## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

**MOTOR.**—Benton Elmore, Redding, Cal., assignor of one-half to Fred. Grotefend, of same place. No. 347,479. Dated Aug. 17, 1886. This motor is designed for operating various machinery, but especially for working pumps. The motor is made up of an arrangement of a swinging pendulum and a suspended weight for developing the power, gears for transmitting the power from the weight to the pendulum, a peculiar connection between the pendulum and the pump pitman, and a novel mechanism by which the power of the gears is transmitted to the pendulum. The machine is a simple, practicable and effective power mechanism for driving such machinery as pumps, etc.

**CANDLESTICK ATTACHMENT.**—George Grisel, S. F., assignor of one-half to C. C. Volberg, of same place. No. 347,484. Dated Aug. 17, 1886. This attachment is for the purpose of receiving candles of any size and fitting them, by means of its own adjustment, in the candlestick. The candlestick itself may have its socket too large or too small for the particular candle, and in such a case the attachment, which will receive any candle, and will also fit any size of socket of candlestick, acts as a go-between, as it were, between the candle and the candlestick. The attachment consists of disks or plates having wires fitted through them and bent in such a manner that the upper portion is adapted to receive and hold the candle, while the lower portion enters the socket of the candlestick and by pressing against its walls holds the entire attachment in position.

**ELEVATOR.**—Alexander J. McAdam, S. F. No. 347,433. Dated Aug. 17, 1886. This is a ram elevator. There are many points of the invention which, unitedly, tend to make the elevator one of the most complete and safest of this, more than usually safe, class of elevators. One of the objects of the invention is the arrangement of the mechanism in a solid and compact form, located entirely out of the way. By an arrangement of tackle mechanism, the ram itself moves only through a short distance, but this movement is multiplied sufficiently to take the cage through the requisite height. There are provided safety appliances for the cage in case this tackle mechanism should break. One of the most unique of these appliances is the hoisting chain itself, which is so housed that it cannot collapse, but in case of a break becomes a rigid bar and supports the cage.

**KING-BOLT FOR VEHICLES.**—Thomas A. McGovern, Bolinas, Cal. No. 347,435. Dated Aug. 17, 1886. This invention, as its title implies, applies to the running gears of vehicles, and it consists in a king-bolt having a spherical head which is journaled or mounted in a spherical socket properly constructed under the bolster. The king-bolt itself merely passes through the axle. By such a construction as this the bolster is allowed a universal movement around its ball and socket joint, and this is peculiarly advantageous to vehicles and especially those which have two or more reaches, as it relieves them from all strain and twisting, incident upon the four wheels of the vehicle passing over irregularities in the surface of the ground. The wheels may rise and fall so that the front axle will take various angles with relation to the bolster, the bed of the vehicle, and the rear axle, without putting any strain upon these parts, and without bringing the plates intermediate between the bolster and the axle into contact.

**CARTRIDGE-LOADING MACHINE.**—Chas. W. Wacott, Murphy's, Cal. No. 347,455. Dated Aug. 17, 1886. In this machine there is a rotating cylinder, having connected with its inner surface a number of radially arranged adjustable charges, one set being for the powder and another for the shot. This cylinder is fitted within a stationary ring or rim having openings with which the necks of the powder and shot containing hoppers above, communicate. As the inner cylinder rotates its charges are brought into communication with these openings, whereby they receive their supply which they discharge below into a tube, under which are placed the shells to be loaded. A separate tube contains the wads which, by proper mechanism, are delivered to the shell as required, and are rammed home by a plunger. There is also a pin standard and lever for removing and replacing the caps, and the whole machine is so constructed that it will load cartridges of all descriptions without the use of expensive or additional parts or modifications.

**VERTICAL SHAFT-BEARING.**—Isaac P. Lambing, Lone, Cal. No. 347,431. Dated Aug. 17, 1886. The object of this invention is to relieve the step or bearing of vertical shafts from weight. These shafts, in almost every instance, wear in the step, in which they are mounted, and when they are employed to run centrifugal pumps, flour mills, and for other heavy or rapid work, it is almost impossible to prevent them from thus wearing. This invention accomplishes the object by relieving the step of the weight of the shaft, which is effected by means of two horizontal shafts, the

ends of which carry wheels or rollers which come up very close on each side of the vertical shaft. Upon the shaft is secured a collar or flange, having a steel disk on its wearing face, which rests upon the rollers upon the horizontal shafts. In adjusting the bearing, the vertical shaft is raised slightly from its step, and its collar is dropped down until it rests upon the tops of the wheels or rollers, when it is firmly secured and sustains the whole of the weight of the shaft. When the shaft is set in motion, the collar travels upon the tops of the wheels or rollers, which revolve very slowly and take all the weight off the step at the lower end of the shaft. Means are also provided for automatically lubricating the parts, and in this operation but a small quantity of oil will serve to lubricate the device for a long time.

**BATH APPARATUS.**—William F. Lambert, S. F. No. 347,430. Dated Aug. 17, 1886. This device may be used as a vapor bath or shower bath, or as a washing apparatus. A cylinder having a piston moving therein is employed, with a surrounding basin or tub to receive the water, and pipes connecting with the cylinder and carrying spray or other suitable nozzles in convenient proximity to the operator. There is also a platform mounted upon the piston rod, a brake by which the piston may be held, and means for raising the piston, for releasing the brakes so as to allow the piston to descend at will, a vapor generator and pipes connected with or surrounding the platform. The piston is raised by turning the platform, and when the cylinder is filled the operator places himself upon the platform and is covered or surrounded by a vapor-tight cloak fitting closely around the neck. The vapor or steam generated passes through a connecting pipe or hose in a circular perforated pipe around the platform and envelopes the body, making a very perfect and cheap vapor bath. After the vapor bath the cloak may be thrown off and the brake mechanism released, so that the piston descends, thereby forcing the water from the cylinder out through the discharge nozzles or sprays upon the operator. The apparatus takes up very little space, may be constructed at a low price, requires no physical exertion to work it, and can be made ready for use in a very short time.

## New Manganese Mines.

The New York Times says: James B. White & Co., of this city, have completed the purchase of a 5000-acre tract of manganese ore land in Virginia. This purchase will enable these gentlemen to supply the home market with sufficient manganese ore to shut out the greater part of the spiegel and fine manganese imported from England. They will commence the development of the tract at once, and inside of a few months will have a new town built and about a thousand men at work, who will be getting an output of 500 to 800 tons of ore per day. The new purchase lies 20 miles from Waynesburg, and is within three miles of the Shenandoah Valley Railroad. Messrs. White & Co. will at once commence the construction of a branch road, and it will be pushed to completion as rapidly as possible. Men are at work now developing the tract and they find that ore is reached at a depth of about 80 feet. It lies in large bodies, or pockets, and it does not run in veins like coal.

As soon as the exact lay of the ore is determined on, the work of mining will be commenced. The tract lies up in the mountain, where there are no dwellings, and contracts for the building of a town will be let. Two hundred houses will be erected at once, and in the meantime the shafts will be sunk and all made ready for the beginning of work in the mines. The company expects within eight months to be able to ship at least 500 tons of the ore per day. The deposit is so large and the ore so easily mined that they expect to have no trouble in doing this. The present demand for manganese and spiegel, which contains 40 per cent of manganese, is about 20,000 tons a month. With the exception of the Cambria Iron Works and the mills of the Carnegies, all these metals are brought from England, and the manufacturers have always labored under a disadvantage. By their purchases these two firms have been given a great advantage over all other manufacturers, and have consequently secured a great lead. The less favored mills have tried to secure mines of their own, but so far have failed. The Whites will be able to place in the market at least 10,000 tons per month of manganese ore from their new purchase. This will shut out half the English imports, and with a little more time they may be able to double their capacity.

A GENTLEMAN interested in copper, just from the East, while there talked with some of the leaders in the trade, advising the formation of a pool, to control the price at such a figure as would hold copper at a point allowing a fair margin to the largest investors, but forbidding the dozens of small mine-owners from entering the field of production again. He looks to see this done and believes it the only mode of checking the wreck of copper prices.

WHEN a party abandons a mining claim he has the undoubted right to remove from said claim any machinery or buildings which he may have placed thereon, or any ore which he may have extracted from such mine.

## Concentration of Ores.

The present season, says the Denver Tribune-Republican, is prolific in the establishment of new concentration mills. There is scarcely an important camp where is not promised one or more of them. The process man is getting in his work in good shape, and the talkative humbug, who professes to be a "practical mill man," is not at present out of a job. It is in milling as it is in mining; let some poor prospector make a big strike and leap at once from poverty to wealth, and prospecting receives a great impetus, and grub stakes become plenty. So let some one mine obtain a concentration mill and find it a source of great profit, and immediately every man in the country must have a concentrator. If "Mulberry Sellers" can make big money out of a concentrator, why can't the "man in the moon," thinks the owner of the latter impecunious claim. The process professor and practical mill man say there is no earthly reason why a lot of money should not be made, and urge the construction of a mill. The caper for the process man gets in his word when it will do the most good, and the salesman who gets a commission from machinery manufacturers adds his influence. An expert is selected, an examination is made, a favorable report is returned, the money is subscribed, the mill goes up with a flourish of trumpets, the local papers prophesy great success, and things boom, and everybody is happy so long as the expenditure of money is continued. The mine-owners are copped into the employment of some lunkhead or scoundrel as an expert, and the whole thing is little less than a bunko game. The mill fails, debts, sheriff, sale, ruin; these are the words that tell the story, which apparently is to be continued without end.

Among all the problems concerning the treatment of ore, there are none surrounded with more difficulties than concentration. It is considered the simplest, but is the most difficult. There is, comparatively, little ore which is well suited for concentration by mill processes, and judging from past results there are few experts who are competent to tell whether or not any particular ore is suited. The errors that have been made in that branch of ore treatment would be laughable were they not such a lamentable evidence of human credulity and ignorance. We have known mills to be erected for the concentration of ores whose value was in the light gangue, and the concentrates produced were worth less than the ore before treatment. We have seen mills erected to work on ores whose gangue was baryta and whose value was a sulphuret of silver or gray copper, and men who reveled in the title of metallurgist said the scheme was practicable. We have known of one company in Southern Colorado expending over a half of a million dollars trying to concentrate a galena ore, when the pure galena was worth only \$40 per ton, and when they succeeded they wondered why they could not get a high-grade concentrate.

It is altogether practicable and not costly to determine whether an ore can be concentrated profitably by any milling method, and when that fact is ascertained there is an abundance of opportunities for determining what particular method, if any, is best suited to the ore, without going to the expense of erecting a costly mill. An ordinary amount of care and study of the subject will prevent any man from making mistakes in the erection of a concentration mill; that care and study, however, must be rightly directed, and "there is the rub."

## Diving for Gold.

In the U. S. of Colombia, gold is found in many of the streams; but the principal and never-ending source of stream gold, or "oro corrido," is the River Cauca. Here is a deposit of gravel and boulders 20 feet or more in depth, containing gold from fine dust up to the size of a pigeon's egg. The superficial gold, or gold of the "playa," as it is called, varies remarkably in its composition from the gold which is found on the bedrock. We give here a few analyses of Cauca gold: No. 1: From the "playa" (dust) gold, 67.06 per cent; silver, 32.94. No. 2: Ten feet below the surface of river bank (grains), specific gravity 13.18, gold, 75.97; silver, 24.03. No. 3: From bedrock (grains), gold, 78.70; silver, 21.30. No. 4: From bedrock a lump weighing 307 grains, specific gravity 13.35, gold, 90.40; silver, 9.60. During the dry season probably \$5000 per month are taken from the Cauca in this locality by the "natives" alone, as there is no company working this river. The "native" system of working is certainly primitive. A negro having tied a stone to his neck (so as to be readily disengaged), and a rope to his body, which is held by a companion (generally a woman), throws himself into the stream as far as is consistent with safety, and sinks, batea in hand, to the bottom. Having scraped up a batea full of gravel from the bottom (which, by the way, is no easy matter, on account of the immense boulders), he disengages himself from the stone and is brought to land, batea and all, by his companion. When they have accumulated a small heap of gravel it is washed up in the batea. The other method of working is to sink a small shaft on the river bank quite down to the bedrock, and then tunnel in any direction which the big boulders will allow them to, but principally away from the river, always keeping close to the bedrock. An intelligent German, named

Wolff, has constructed a kind of dredging machine for picking up gravel and boulders, to work a few miles farther down the river. The gold from the River Opirama, a tributary of the Cauca, contains per cent: gold, 83.60; silver, 16.40. At present, however, the most important source of gold in the Marmato district is in the mines, which have been worked for more than a century and still show no signs of being exhausted, only the upper part of the mountain having been worked. There is a great deal of variety in the composition of the gold from the different mines.

## Figures for the Thoughtful.

Census statistics show that the people of this country, during the 250 years of their existence as colonies, Territories and States, up to 1860, accumulated and held property to the aggregate value of only \$14,000,000,000, including all landed and personal property. During the 20 years next succeeding the commencement of the war of rebellion our people had paid out, in war, national, State and municipal expenses, a greater amount than all they had accumulated up to the commencement of the war; and yet, with all that immensity of outlay in taxes, customs, etc., they had nevertheless, during the same term of 20 years, accumulated, as shown by the census of 1880, the enormous sum of \$22,000,000,000, or about 70 per cent more than the total accumulation of the previous 250 years!

We now come to another class of figures which present an equal subject for thoughtful consideration. Of the 20,000,000 people who do something—some work or engaged in gainful pursuits—18,000,000, or nine-tenths, of these earn on the average not much more than \$300 a year, which is necessarily consumed in means of subsistence, while substantially all the savings go to the other one-tenth.

Is it any wonder that in view of these later figures we are just now in the midst of a general industrial paralysis? We have a million of workmen idle for want of work to do, and capital in still greater proportion than unemployed labor lies dead or unproductive, and that, too, while our hills and mountains are full of mineral wealth, while millions of acres of productive lands wait for the plow, and homes for homeless millions are to be had for the taking.

It is estimated that the 20,000,000 of our wage-earners make an average annual saving of about \$75 each. Whatever number of persons save double the average yearly saving, or \$150, an equal number save nothing. For as many as acquired \$250, or three times the average annual saving, a like number not only saved nothing, but fell the average yearly saving of \$75 short of the necessities of comfortable existence. Facts plain as these show how dangerously near the great mass of men always are to want and suffering.

**WHY DON'T YOU WORK YOUR MINES?**—The summer is rapidly passing, and while there have been a few assessments worked, there has been but very little ore shipped. The cars are here ready to haul the ore, the smelters in Gunnison are ready to buy your ore, so what more of an inducement do you want to work your mining claim, if you have got one? If your claim has any semblance of ore in sight, take it out, and by that means gradually develop your prospect into a mine. Work is what is wanted to develop the country, and unless you get to work and develop your mine, the country will never be what it ought to be. The truth of the matter is, that there are some claims owned here by prospectors who are too poor to do much work only in a small way. This class of claim-owners need assistance of capital to give them a start. Any one who has capital to invest can come in here and secure interests in good prospects at a very reasonable rate, and there is no better business in the world than a producing mine. There is another class of Jim Crow companies who have exhausted all their means in getting a bunch of claims patented, some of which are worthless, then they have gone to their eastern homes to wait for their claims to grow into mines. Such is the condition of affairs in the Elk mountains to-day. No mining country in the whole United States has had as good an opportunity to prosper as has the Elk mountain country. First, we had our boom, then the railroad was built into the country, facilitating transportation, and now we have a market for our ore in Gunnison. All that is needed is work in the mines to produce the ore, and until such time when the work will be done we cannot expect the country to be redeemed from its present lethargic state.—*Elk Mt. (Col.) Pilot.*

**PLAIN TALK TO ROYALTY.**—Just after the recent terrible riots at Brussels, in Belgium, the King sent for the leader of the Liberals and asked substantially: "What is the matter?" "Why these riots?" and "What is proposed to be accomplished by them?" The Liberal leader replied in about these words: "The government is heedless of the wants and wishes of the people. They starve in thousands. Women destroy their babes for want of bread. And you are more intent on preserving the vested rights of property than the lives of the poor. It must be changed, or the people will change it. The Socialists will aggravate every riot into a revolution, and the people will back them. Vested rights are nothing to the lives and liberties of the people."





A. T. DEWEY.

W. B. EWER.

## DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
 Take the Elevator, No. 12 Front St.

W. B. EWER,.....SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrearages must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.  
 DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

## SAN FRANCISCO:

Saturday Morning, Sept. 4, 1886.

## TABLE OF CONTENTS.

**EDITORIALS.**—Water Jacket Smelting Furnaces; Mining Accident Funds; Gold Washing in Italy; A Maritime Exhibition; Care of Mine Cables; Gold in Germany, 149. Passing Events; A Caller from the Cœur d'Alene; Machine Shop and Foundry Notes, 152. A New Wave Motor, 153.

**ILLUSTRATIONS.**—Raschette Copper Furnace, 149. Valve Motion for Service as Relief or Light Station, 153.

**MISCELLANEOUS.**—The Mechanics' Institute Fair; New Concentrators in Arizona, 150. Notices of Recent Patents; New Manganese Mines; Concentration of Ores; Diving for Gold; Figures for the Thoughtful, 151.

**MECHANICAL PROGRESS.**—Cold Hammering of Iron; Iron That Will Not Rust; Action of Sugar on Iron; Machinery and Its Possibilities; Relative Strength of Wet and Dry Timber; Boiler-making; Animal Power vs. Steam; Paper Doors; Making Pig Iron by Gas, 154.

**SCIENTIFIC PROGRESS.**—Antarctic Explorations; Long-distance Telephoning; Struck by a Meteor; The Origin of Cyclones; An Electric Railway in Denver, 154.

**ENGINEERING NOTES.**—The Panama Canal; Tunnel Between Sweden and Denmark, 155.

**USEFUL INFORMATION.**—Cleaning Woolen Fabrics; Working in Tortoise Shell; Utilizing Seaweed; To Melt Old Rubber; Sympathetic Ink; To Make Mocking Bird Food; How to Destroy Coons; To Make a Good Pomade; Cheap Gas in London, 155.

**GOOD HEALTH.**—Disease Germs in Milk; Galen on the Treatment of Obesity; Medicinal Qualities of Oysters; Why Did They Escape; A Liniment for Ear-ache; The Small Boy who Ate Sorrel; Heart Disease; New Treatment for Consumption, 155.

**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 156-57.

**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 160.

## Business Announcements.

Artificial Limbs—Menzo Spring.  
 Registration Notice—P. F. Walsh.  
 Ore Feeders—Joshua Hendy Machine Works.  
 Assessment Notice—Truckee Ice Company.

See Advertising Columns

## Passing Events.

The current week has come and gone, bringing with it nothing notable or calling for special comment in the mining world. Judging by reports received from all parts of the coast, the great industry moves on steadily and surely, escaping the fluctuations and uncertainties that more or less attend every other branch of business. The advance made of late in the price of lead is well maintained, affording much relief to the producers of that metal. The prices of silver and copper have evidently reached their lowest point, some improvement beginning to manifest itself in the market for both. Commercial and financial circles, not less than the industrial and mining interests, alarmed at the steadily declining value of silver, are concerned now to find means for arresting its further depression. That such means will be discovered and availed of, where such vast interests are at stake, we may well believe. That this metal is not to be ostracized or further demonetized is now evident. Some improvement in the business of its production may therefore be counted upon.

For the first time since the conflict between the farmers and the miners began, hydraulic operations in the central mining counties of this State have entirely ceased. At least this may be inferred, seeing the waters of the Sacramento and its tributaries run clear, as in

primeval days. Now are the valley editors, including Swinley's boarders, "content and happy." The streams in the interior having fallen to their lowest stage, the river-bed miners are in the midst of their harvest, which in most localities will be somewhat restricted, there being rather more water in the rivers than usual at this season of the year. Owing to this condition of things, the Big Bend tunnel, on Feather river, has not been able to take in the whole of that stream, as was expected. This, though a serious disappointment to the company, preventing the working of the river bed this season, has not discouraged them. Already the work of so enlarging this tunnel, that it will answer the purpose intended, has been commenced and will be hurried to completion.

The appalling catastrophes that have befallen Charleston, Savannah and other Eastern cities through earthquake disturbances become the one absorbing topic of conversation and thought toward the end of the week, our people refusing to congratulate themselves that these calamities have been shifted from this land of traditional earthquakes to countries further East. They feel the afflictions that have visited our brethren beyond the Mississippi the same as if they had befallen those inhabiting this slope of the continent. The occurrence of this disaster will have the effect to dispel the sense of security against phenomena of this kind, which has heretofore obtained in this part of the world. Besides the lightning and the cyclone, we have to recognize now this new agent of destruction and element of danger. May this agent never again prove more destructive in these United States than it has thus far done here in California.

## A Caller from the Cœur d'Alene.

Col. R. A. Pomeroy, of Murray, Idaho, Supt. of the Golden King Mining Co., has been making a trip to San Francisco (not for the purpose of selling any property nor booming any mine, but on private business), and we had the pleasure of a call from him early this week. Col. Pomeroy is an old Colorado miner, having been for years charged with the direction of some of the largest mining operations in that State, and represented Clear Creek and Grand counties officially at the New Orleans Exposition.

As early as 1884 he was sent to the Cœur d'Alene, to explore for capitalists, found the country practicable, as a mining region, and reported accordingly. In consequence of his visit, several hundred thousand dollars were invested in the district, and wherever any prospects have been worked the results have been uniformly good, in fact, the most favorable he has ever seen in so new a country. There are gold quartz, argenteiferous galena, gray copper, carbonates, etc. The Colonel has examined the quartz of Tuolumne, Calaveras, Amador and Plumas counties, Cal., and regards it as identical with that of the Cœur d'Alene. The mines thus far discovered are within a radius of about 30 miles from Murray.

Murray is the shire-town of Shoshone county, and has 500 or 600 inhabitants. It is already provided with water-works and two fire companies, as well as a bank, of which Charles Dahler, of Helena, is president, and Warren Hussey, formerly of San Francisco, cashier. There are two papers published there, namely, the Cœur d'Alene Record, tri-weekly, and the Sun, daily and weekly—the latter by Adam Aulbach, an old Californian. Beside a number of arastras, a stamp-mill is now at work and two more are in process of construction. Murray is connected by a good wagon and stage road with Thompson Falls, M. T., 28 miles on the North Pacific R. R.

At Wardner, on the south fork of the Cœur d'Alene, about 20 miles from Murray, as Col. Pomeroy further informed us, a smelter and concentrator are in operation. Here may be seen some of the largest silver-lead mines in the United States. The population is about the same as at the county-seat. The News is printed weekly. This district—the Yreka—is being rapidly developed with excellent results, showing permanent veins. The placer mines on Prichard and Beaver creeks and their tributaries have also done well this season. A great deal of Colorado, Montana and Eastern capital, especially from Kentucky, is here invested; but California, as yet, has secured but little foothold. The interests here are not inflated and

need no "booming," but stand squarely upon their merits. Wardner looks confidently for completed railway connection, inside 60 days, with the steamers which ply from the old Mission to the military post, 11 miles from the N. P. R. R. A fine line of stages runs from the post of Spokane Falls.

Lesser towns of the region are Littlefield, Eagle, Myrtle, Delta, Kingston, Milo, Placer Center and Mullan City.

There are two practical routes to the Cœur d'Alene, the Lake route being the better for reaching Wardner and the Thompson Falls for Murray.

## Machine Shop and Foundry Notes.

## Dow Steam Pump Works.

These works are running on a full force of men. The large compound steam-pump for the new Crocker building, on Bush street, has been completed and put in place in advance of time. A contract has just been completed with the Spring Hill Water Company of Seattle, W. T., for a new stationary fire-pump; steam cylinder 24x24 inches and water end 12x24 inches. This will be the largest special steam fire-pump on the coast. The capacity will be 1500 gallons per minute, equal to eight one and one-eighth streams, having 170 pounds pressure instead of 120 pounds as in San Francisco. This will give Seattle a generous supply for domestic and fire purposes.

The present supply is from Lake Washington, eight miles east of the city. The pumping at present is done by a compound Dow pumping plant; steam end 18 and 36 inches by 36 inches stroke and water end 16 and 36 inches stroke. These have been working since June, 1884, without repairs, raising water over the divide 415 feet and pumping two and a half million gallons in 24 hours. This duty speaks volumes for their efficiency and construction.

It is contemplated to make a large reservoir on top of the hill to hold some 10,000,000 gallons of water, when the city will have its supply by gravity instead of pressure. To accomplish this the company will probably duplicate the present compound pumping plant. It is also in contemplation to have extra cotton hose to stand this heavy pressure. These improvements are being carried out under the direction of H. H. McWilliams, Esq., the consulting engineer of the company.

The Dow Works are also building a combined air and feed pump for the steam tug *Elta White*, owned by Welch & Co., of Burrard's inlet.

The same works are also constructing a large ice-machine plant for the Standard Ice Company, of Los Gatos, Santa Clara county, Cal. This new company, under the superintendence of J. C. Kitton, Esq., formerly in charge of the Arctic Ice Company, of this city, have purchased the old Los Gatos flouring-mill and water power of 200 feet fall, and have contracted with the Dow Works for a preliminary plant equal to 10 tons per day. The water power being already utilized by a wheel, the building—a valuable stone structure—is all ready for business. It is only requisite to couple on the vacuum pumps and other machinery to have the motive power at a nominal cost. This enterprise is backed by several of the substantial citizens of San Jose, and it is the intention to supply that section and San Francisco.

## The Fulton Foundry.

Hinckley, Spiers & Hayes have a full line of important work in hand. The contract with the United States Government for the construction of a large bucket dredger is now nearly complete. This will be one of the most complete of its class.

They also have the contract to construct and completely equip the new 40-stamp Kennedy quartz mill; building, foundations and machinery ready to operate. This mine, in Amador county, under the charge of Mr. Thomas, of Oakland, has a promising future before it.

Simpson Bros., of Coos Bay, have just ordered a new 16 by 24-inch saw-mill engine for their mill at that point.

A novelty in steam engineering is a steam traction engine for hauling loads in the lumber region, or other uses, the invention of W. L. Leland, and will be ready for trial in a few days. The engines—two—are eight inches by twelve inches stroke, are calculated for hand and efficient work; the machine will weigh some 15,000 pounds.

The variety of steam plant constructed at

these works is notable: dredgers, quartz mills, saw-mill engines, traction engines—a novelty on this coast—besides marine engines of the largest and most powerful tugs and ferry steamers. The most important job in hand is the machinery for a fine large new ferry-boat for the South Pacific Coast R. R. Co.—narrow gauge—which, when completed, will enable them to run 15 minute trips, as now contemplated. The boat will be somewhat larger than the *Bay City*. The engine will be similar in design to those of the other boats and will be 52 inches diameter and 12-foot stroke. They are also constructing hoisting works for Grayson, of Fresno, also for Bullard, of Amador.

## Pacific Iron Works.

Work has been resumed at these works, and contracts are now in hand for a 10-stamp quartz mill complete, with Duncan concentrators, for Cœur d'Alene, Idaho. Orders are also in hand for water-jacket smelting furnaces for mines in Mexico and other points. These water-jacket furnaces seem to have met with great favor among mine-owners, where their peculiar features can be made available. These works are also the manufacturers of the new Frisbee-Lucop mill, a centrifugal roller mill of very powerful action.

## The Golden Gate and Miners' Foundry

Are running full force on a variety of work from dredgers to quartz mills, a novelty in the last line being the Beauregard Roller Mill, which has proved an unqualified success in actual practice. As quartz machinery has always been the "strong suit" of these works, it is not strange that they are usually full of it, although a recent departure in the machinery of the stern-wheel river steamer, *A. C. Freese*, constructed by this concern, would seem to indicate that river steamboat machinery was also "in line," as it has been remarkably successful.

## I. H. Small.

Who was burned out in the heavy Brannan and Fifth streets fire, has already made arrangements to have his work carried on at the Globe Works until he can complete other arrangements for manufacturing his improved wood-working machinery. A compound marine engine, constructed for A. M. Simpson's new tug for use on the Columbia river, by Mr. Small, has proven a fine success, although a new departure for him.

## The Risdon Iron Works

Have a varied line of work in hand, a leading feature being the "Hein" boiler, which has met with great success as a flour-mill boiler, and in all situations where a steady and economical power is required. The "Risdon" has won a high reputation on the Pacific Coast and the Islands, as builders of heavy and complicated mining and pumping plant, some of the most important of the Comstock work being from their shops. Sugar mills and heavy marine work have also been a leading feature in recent constructions. The large and heavy machinery of these works enable them to execute the very heaviest contracts.

## The Union Iron Works.

These works are again assuming their wonted air of completeness, as they are now working 487 hands. A very beautiful steel steam harbor-tender has just been completed to the order of the Government of the United States. She is somewhat larger than the *General McPherson*, which she will succeed. She is a very fast and handsome boat. Marine engineering is the leading feature of these works, and they have far superior facilities to any one on the coast, and second to none in the United States, for the construction and engineering of iron, steel or wooden steamships, tugs, etc., as they are located on the water-front and have large and heavy plant for the very largest and most important constructions. An effort has been made to have one of the new "cruisers" recently authorized by the Government of the United States built at these works, and we believe with a fair chance of success. If this new cruiser is constructed here we can be sure that she will be as well and promptly built as at any yard in the country.

## Joseph Wagner.

The specialty of this concern is flour mills, and in their line they have no competition of moment on this coast. They report that they are fairly busy in new mills, remodeling, etc., Samm's mill, at Oakland, being remodeled to run 200 barrels per day.



A New Wave Motor.

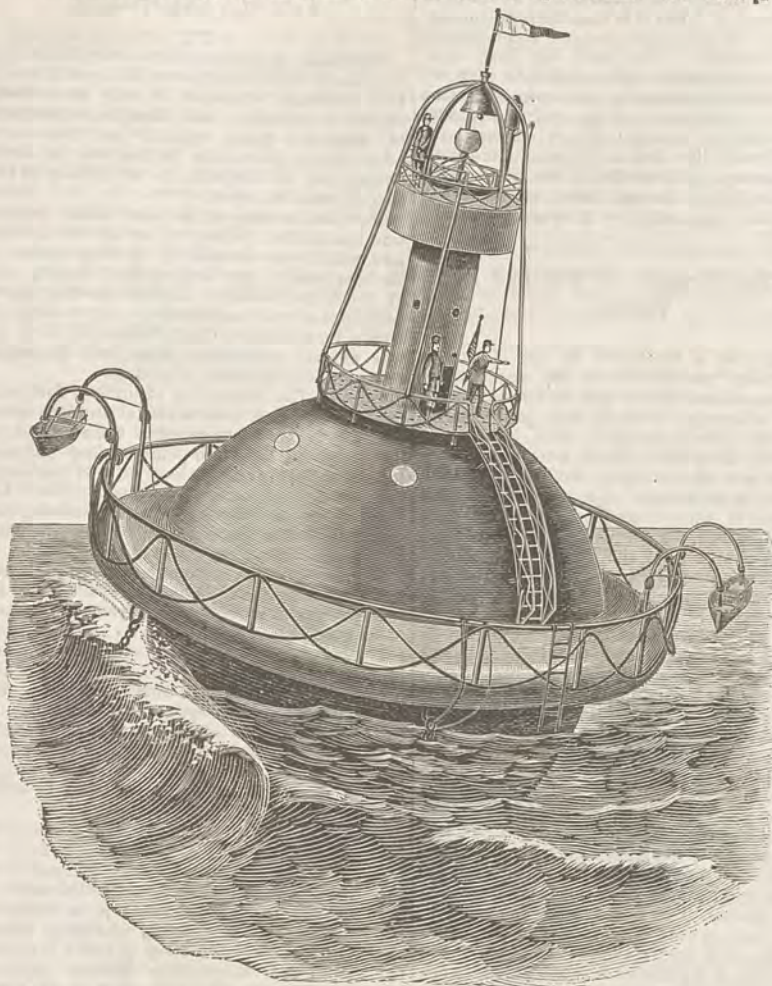
Numerous attempts have been made to utilize the now wasted force of sea waves. The ocean, bays, and harbor represent limitless power if it could only be applied to machinery for various mechanical purposes. An inventor in this city, Terrence Duffy, has devised an appliance by which he hopes to compress air by means of the waves, for transmission ashore to machinery for any industry in a city or town; and, by the addition of the necessary apparatus this compressed air may be employed to generate electricity for illumination or power. The buoy, shown in one of the engravings accompanying this article, is anchored at a convenient distance from shore, and the compressed air is conducted in a flexible pipe to the reservoir or station ashore, whence it may be conveyed in pipes to the machinery.

Fig. 1 shows a vertical section of a metallic buoy, *A*, made preferably in spherical form, and of any required dimensions. The buoy is provided with a conical standard, *C*, which is bolted to the bottom of the buoy as shown in the drawing. This standard is an important feature of the wave motor, as it supports the ballasted basin *B*, on a level, maintaining it always on the plane of the horizon. To accomplish this purpose the standard is provided with a ball-shaped head, *f*, on which the semi-spherical cap, *b*, of the basin fits. As the standard is bolted to the buoy and forms part of it, it will be seen that the buoy, reciprocating the motion of the waves, oscillates and swings on the ball-head in the cap of the basin. In order to fend off the swing of the buoy against the lower ends of the basin, heavy rubber bumpers, *a*, are secured to the lower outer sides of the standard. These bumpers prevent shocks and induce steadiness. The cap, *b*, is bolted to the annular top of the basin, and is provided with an oil-cup, *c*, for lubricating both cap and ball-head.

The basin, *B*, is ballasted, as shown in the drawing, for the purpose of giving the required pressure to the air-pumps, which is at the rate

apparatus and fixtures; on the lower deck, *d*, is the annular air-chamber, *F*, from which air-pipes extend; and on the upper deck, *e*, are ar-

whistle *U*, electric light *V*, and bell *W*. Fig. 2 is a plan of the tower *O*, and water reservoir *R*, in four compartments. We omit [Fig. 2,



WAVE MOTOR FOR SERVICE AS RELIEF OR LIGHT STATION.

the brake fits loosely on the shoe, and guides the basin and prevents it from swinging; and when it is necessary to hold the basin rigid to the buoy, the brake is screwed inward to impinge on the shoe.

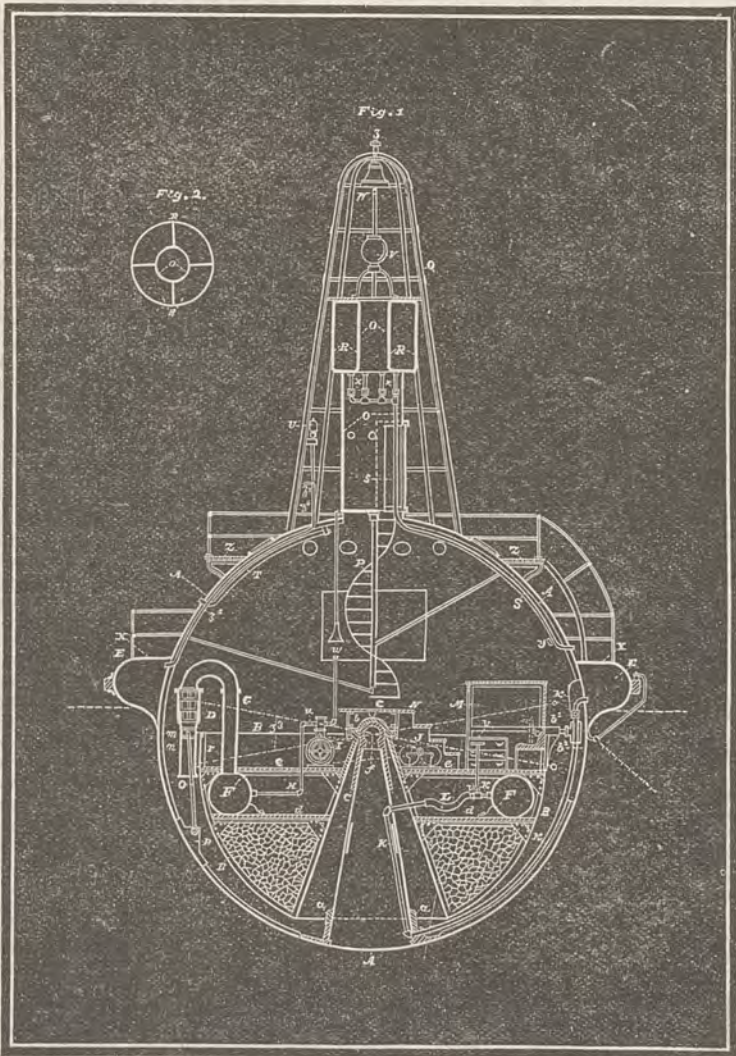
Encircling the buoy above the water-line is a great reservoir, *E*, for storing the compressed air received from the air-chamber, *F*. The reservoir is divided by a number of partitions, each of which is provided with an automatic valve for the purpose of preventing the air from returning and to force it forward to the point of delivery. It is provided also with the necessary escape-valves. In addition to its purpose for storing compressed air, the reservoir serves to impart steadiness to the buoy.

The air chamber, *F*, which has been described as arranged on the lower deck of the basin, receives compressed air from the air-pumps through the pipe *G*, and delivers it to the reservoir through the pipe *K*, which extends upward to the reservoir in the manner shown in Fig. 1. The air-pipe, *K*, is provided with a stop-cock, *v*, to regulate the passage of compressed air, and in order to secure it from injury or breaking, it is provided with a flexible tube, *L*, which reciprocates the motions of the buoy. Compressed air is conveyed from the chamber, *F*, to the engine by a pipe, *H*, and air escapes from the engine by pipes, *w*. The buoy is supplied with fresh air through pipes, *T*, as well as through portholes in the upper segments and through the tower, *O*.

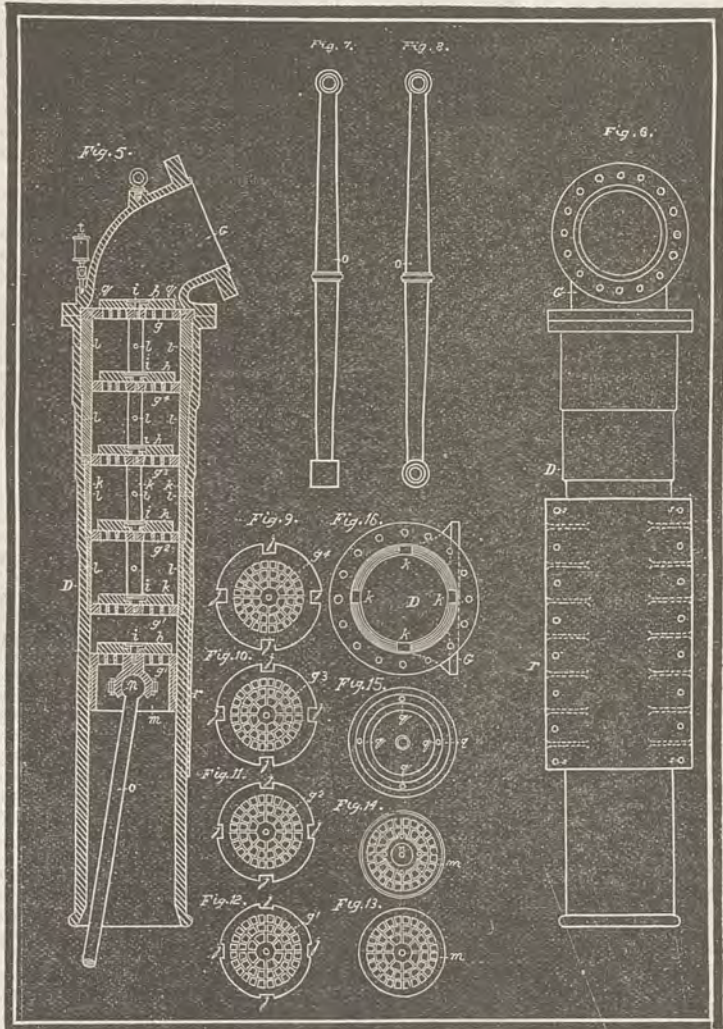
The air-pumps, *D*, are of peculiar construction and arrangement, and are secured in such a manner as to reduce the probability of an accident to them to the minimum. Each pump is bolted to the side of the basin, by a plate, *r*, which is attached to the pump-barrel or forms part of it, as shown in Fig. 6; and it is secured to the shell of the buoy, on the ribs of which there are lugs, *p*, by the piston-rod, *o*, which is held loosely on a bolt which passes through and is secured to the lugs. From the center upward the pump-barrel is graduated in sections and each section is provided with a receding valve. Fig. 5 is a vertical section

ranged the engine, *I*, and dynamo, *J*, and cabins and store-rooms, *M*. A stairway leads to a platform, *N*, placed over the basin cap,

which only shows a general plan. For the purpose of guiding the ballasted poised basin, and preventing it from swinging



VERTICAL SECTION SHOWING INTERNAL ARRANGMENT OF WAVE MOTOR.



ARRANGEMENT OF AIR PUMPS, VALVES, ETC.

of 50 pounds to the square inch for each pump. In the center of the basin there is a conical space for the standard. The air-pumps, *D*, one of which is shown in Fig. 1, are bolted by a plate, *r*, to the sides of the basin, and are attached to the buoy in a manner which will be described hereafter. The basin is provided with decks, on which are arranged necessary

from which the tower is reached by a spiral stairway.

Fig. 1 is a vertical section through the buoy and framework showing the arrangement of the ballasted basin *B*, one of the air-pumps *D*, the air reservoir *E*, the air-chamber *F*, the engine *I*, and dynamo *J*, the guiding and braking device *b*<sup>1</sup>, *b*<sup>2</sup>, and the lower *O*, water reservoir *R*,

round with the buoy, and also to hold it rigid to the buoy and to stop the operation of the air-pumps while making repairs or for other cause, there is provided a guiding and braking device, as shown in Fig. 1. A brake, *b*<sup>1</sup>, having a jawed recess in its end, is secured to the top of the basin on its four sides; the shoes, *b*<sup>2</sup>, are attached to the shell of the buoy. The recess in

of one of the air-pumps, *D*, and part of an air-pipe, *G*, showing the check-valve, *g*, and receding valves, *g*<sup>1</sup>, *g*<sup>2</sup>, *g*<sup>3</sup>, *g*<sup>4</sup>, the guide-bars, *k*, and the universal joint, *n*, connecting-piston, *m*, and piston-rod, *o*. Fig. 6 is an elevation of one of the air-pumps, showing plate, *r*, for attaching it to the  
(Concluded on page 160.)



## MECHANICAL PROGRESS.

## Cold Hammering of Iron.

It either is or ought to be known to all practical men concerned in the working of wrought iron, that if a piece of the very best and toughest iron is hammered in the process of forging until it ceases to be red hot, the effect of such cold hammering, as I may term it, is to cause the iron to become so brittle that it will in many cases break across in the process; or if it does not at that time, this process of cold hammering has so removed and destroyed its tenacity as to render it capable of being broken with the slightest blow. What renders the knowledge of the effects of such a process the more important is that in most cases we shall find that, in order to give the pieces of forged work the requisite finish and fine surface as they come from the hands of our workmen in that department, this very cold hammering and swaging, as it is termed, is required, the more so as it is by such a process that iron forgings are so finished from the hammer as to require the least possible labor after; and as every good workman in that department is anxious to turn his work out of hand with the very best surface on it, which this cold hammering enables him to do, it is not a very easy matter, and not at all desirable, to require them to discontinue the practice, which many have endeavored to do from want of a full knowledge of the subject.

There is nothing inherently wrong in this practice of cold hammering—far otherwise; the evil rests with the applying such a cold hammered piece of forge work to its purpose without having been passed through the curative process, which is simply this, namely, to heat the piece of forged work in question to a dull red heat, and lay it down to cool at its leisure. By subjecting wrought iron to the most violent hammering or compression at a low temperature, and then submitting the iron work so treated to the simple process of heating red hot and slow cooling, we enhance its tenacity or shock-sustaining qualities at least 20 times.—*J. Nasmyth, in the Architect.*

## Iron That Will Not Rust.

The liability of iron to rust is a great drawback to its use for many purposes, and the practical value of a process which will protect it, at a slight expense, is self-evident. This is accomplished by the Bower-Barff process. That the process is successful in accomplishing this object seems no longer a matter of doubt, and at less cost than galvanizing or tinning. The color on cast and wrought iron is a bluish-gray, which to some may be objectionable; but, as the coating takes paint far better than untreated iron, this objection is easily overcome, and with the assurance that the paint will remain and not soon be thrown off as it is generally. For polished work the color is a lustrous blue-black, adding greatly to the beauty of the article treated. This process seems peculiarly well adapted for gas and water pipes. Any one who has had occasion to use water which has passed through a new iron pipe, or one that has not been used for some time, knows how full of rust it is, and that only after months of constant use does it become clear again. With pipe coated with the magnetic oxide by the Bower-Barff process, no trouble of the kind can occur. The water runs pure from the first day, and if for any reason the pipes are emptied, and left so, there is no danger of their becoming coated with rust. Another important fact is that the water coming through one of these rustless pipes is just as pure as when it entered, for the water can dissolve none of the coating of oxide, as it always does with lead or galvanized pipes. It is a well-known fact that water running through lead pipes is very apt to contain lead in solution; and the continued use of such water causes lead-poisoning, for, although the amount (of lead) dissolved may be very small, still it accumulates in the system, and finally causes sickness and disease.—*Popular Science Monthly.*

**ACTION OF SUGAR ON IRON.**—MM. Klein and A. Berg have been studying the action of sugars on the corrosion of boilers, and find that sugar in water has an acid reaction on iron, which dissolves it, with a disengagement of hydrogen. The quantity of iron dissolved increases with the proportion of sugar in the water. The salt of iron formed is the acetate. A neutral decoction of malt also corrodes iron with the disengagement of hydrogen; but glycerine and mannite are without action on the metal. These results are worthy of note in sugar refineries and places where sugar sometimes finds its way into the boilers by means of the water supplied. The experimenters in question also find that zinc is strongly attacked by sugar; copper, tin, lead, and aluminium are not attacked.

**MACHINERY AND ITS POSSIBILITIES.**—Those who entertain the opinion that the possibilities of labor-saving machinery are nearly exhausted, and that the whole field of art industry in which it may be advantageously employed has been already covered by inventive genius, are greatly mistaken. That the achievements of human ingenuity have been wonderful, goes without saying, and there are reasons to believe that future triumphs in this direction will be even greater and more fruitful. We are forced to this conclusion by reason and analogy. Who would

have believed, only a few years ago, that the difficult and complicated processes which are now every day being wrought out by machinery in various branches of manufacture would have been possible? Thus it is that the problems unsolved by one generation become accomplished facts by another. Who shall say that what now seems impossible and improbable may not be successfully attained by those who will come after us? In the hands of the modern scientific inventor matter becomes almost miraculously endowed with life and intelligence, and with great accuracy performs those functions which the most skilled manual labor executes but slowly and imperfectly.—*Manufacturer and Builder.*

## Relative Strength of Wet and Dry Timber.

In reply to a statement by the *American Miller*, that "wet timber is not as strong as dry; in some cases it has not half the strength of dry," a correspondent of that paper writes as follows: "In September, 1876, the Lanesboro Mills, Lanesboro, Minn., were burned, and that fall we rebuilt them, and began making flour the next March. We used sawed pine (taken out of the Mississippi river) for joists, 3 by 12 inches, 12 feet long, and sized them, laying them on top of the girders, to get their full strength, and then used  $\frac{3}{4}$ -inch flooring. The joists were placed 12 inches from center to center, leaving nine inches between them. In the fall of 1877 we piled wheat on the floor 26 feet deep in the bins, and the joists, yet wet and green, only sagged a trifle, and carried the immense weight safely. Two years later the same joists were dry from the heat of our very large stove. We loaded the floor with 24 feet of wheat and six joists broke off nearly square in the middle, and others were cracked. In the first instance the bins held 360 tons of wheat while the joists under them were green; when the joists were dry 300 tons or less broke several of them. This shows that green pine is stronger than dry pine, as the wood becomes brash, or brittle, on drying, and is not as strong as when green. This is caused by the sap drying and leaving only solid matter in the capillary tubes, and they cannot move one on another, while if the timber is green the tubes are full of water, and can bend or move one on another. I know of but two kinds of wood that are stronger dry than green, and they are maple and white oak."

**BOILER-MAKING.**—In regard to boiler-making: "No matter what the quality of the material," says a practical man in the *Iron Trade Review*, "it can be, and often is, injured in the process of manufacture by unskilled workmen. This is especially the case when the inferior qualities are used, as excessive labor in manipulation strains the already weak material in an injurious manner. A stalwart, energetic calker can destroy the utility and safety of a boiler when poor material is used, by the vigor and number of his blows, and keenness of the edge of his tools. Even in first-class material this can be done; hence the necessity of intrusting this branch of the business to men of intelligence and experience. So with the drift-pin in the hands of the riveters; in poor material a fracture can be, and often is, produced with the grain of the material. Occasionally this is done across the grain; an exposure of the defect would also expose their ignorance and recklessness, resulting probably in their discharge; for this reason the use of tools to hide the defect is resorted to, and the matter (hidden from all eyes) may prove the initial cause of an appalling disaster."

**ANIMAL POWER VS. STEAM.**—Mr. A. Sanson, in an article in a recent number of the *Revue Scientifique*, states that from a comparison of animal and steam power, in France at least, the former is the cheaper motor. In the conversion of chemical to mechanical energy, 90 per cent is lost in the machine, against 68 in the animal. He finds that the steam horse power, contrary to what is generally believed, is often materially exceeded by the horse. The cost of traction on the Montparnasse-Bastille line of railway he found to be for each car, daily, 57 francs, while the same work done by the horse cost only 47 francs; and he believes that, for moderate powers, the conversion of chemical into mechanical energy is more economically effected through animals than through steam engines.

**PAPER DOORS.**—These cost about the same as wood, and are said to be much better because there is no shrinking, swelling, cracking or warping. The paper door is composed of two thick paper boards stamped and molded into panels and glazed together with glue and potash, and then rolled through heavy rollers. It is first covered with a water-proof coating and then with a fire-proof coating, and is painted and varnished and hung in the ordinary way.

**MAKING PIG IRON BY GAS.**—The experiment is now being tried in a Pittsburg mill of making pig iron by the use of natural gas. The result is awaited with intense interest by many, as it is claimed that if the experiment is successful it will decrease the cost of making pig iron at least one-half, thus of course affecting the iron trade enormously. It would also, it is claimed, virtually ruin the coke trade in the vicinity of Pittsburg.

## SCIENTIFIC PROGRESS.

## Antarctic Explorations.

Scientists and geographers everywhere will be grateful to learn that, after the lapse of nearly half a century, attention is once more being turned to systematic and scientific exploration in Antarctic polar regions. Associations of scientific men have been formed both in Great Britain and in Australia, to act jointly in furthering such an object.

The first meeting of the Australian Association was held at Melbourne, on the 8th of June last, which was attended by quite a number of the members of the Geographical Society and of the Royal Society. At this meeting much enthusiasm was manifested. On motion of Baron Von Mueller, Capt. Pascoe, F. R. G. S., was elected president. After full discussion resolutions were passed affirming:

First—"The desirability of further Antarctic exploration being undertaken at an early date, not only for the furtherance of the study of the geography of the south polar regions but also for extended investigations into climatology, terrestrial magnetism, geology and natural history, as well as with the view of obtaining further insight into the accessibility and the utilitarian resources of that part of the globe."

Second—"That a communication be addressed to the New Zealand Government soliciting information as to whether the Harbor department of that colony still continues to locate periodically supplies for any shipwrecked people on Macquarie island; and if so, whether on any occasion facilities may be obtained for conveying a meteorologic observer and attendant with the requisite means of shelter and the needful instruments to that island, and what special means will be required to fetch these people back to New Zealand after a lapse of some months."

A copy of these resolutions was directed to be transmitted to the Antarctic Association in Great Britain, expressing active sympathy in the enterprise and proffering aid to the same.

It appears from the further proceedings of the meeting that the honor of vivifying action in this direction, after a sleep of half a century, belongs to the Geographical Society of Melbourne, whose president, Baron Von Mueller, in the course of his opening address at the meeting of April 18, 1884, said:

"It is the extensive complex of the South Sea islands, which promise to yield some of the grandest results for geographic science. The south polar lands under Australian and Polynesian meridians come more readily within our reach than those of any other nation, if, as I trust, we consider ourselves as merely the furthest southern occupants of the great British Empire. \* \* \* Mount Erebus and Mount Terror, historic monuments of one of the most glorious and one of the saddest of grand geographic exploits, are not further from Hobart than that city is from Cape York, and from these wondrous mountains the distance to the geographic south pole does not exceed 725 nautical miles. Whether an Antarctic continent connects Graham's Land with Victoria Land we have no means to surmise, but what enormous strides will yet have to be made to penetrate and map the southern polar regions can be grasped by our mind when we recollect that the distance from Graham's Land to Victoria Land is as great as from the latter to North Queensland. But just as through successive naval explorations, extending over several centuries, and most keenly followed up during the present secular era, portion by portion of the northern Arctic regions were rendered known, so also will it only be by long continuity of efforts, by great skill, bravery and perseverance, and by watching for a combination of lucky chances, that extensive charts of the southern polar lands can be furnished—perhaps some time in the next century."

This address was at once published with the proceedings of the society and forwarded to the learned societies of Europe and America. In the month of August following, the subject was brought before the Royal Society and the British Associations, and an Antarctic Exploration Committee appointed, which included the names of Sir Joseph Hooker, Admiral Sir L. McOlin-tock, and Captain Sir George Nares, veterans in the work of exploration in the polar regions.

The impetus thus given to the movement for renewing Antarctic exploration was referred to in words of rejoicing in the erudite annual address by Baron von Mueller, on the 18th of January last, on which occasion he drew attention to the importance of establishing an outpost on Auckland or Macquarie island as a basis of operation. Looking at the interest with which this question is now viewed by the scientific world, the day is probably not far distant when the many problems associated with the Antarctic pole and its mysterious region will be satisfactorily solved.

**LONG-DISTANCE TELEPHONING** is slowly but surely coming into extensive use. The American Telephone and Telegraph Company of New York has recently been organized for the purpose of establishing direct telephonic communication between the large cities of the country. The first line has been constructed between New York and Philadelphia, the length of the route adopted being about 100 miles. Four years ago a similar attempt was made to connect New York and Boston, but the iron wire

strung between the two cities did not prove successful. The present company has employed hard-drawn copper wires, and now has 74 of them running the whole distance. The line is entirely aerial, except where waters of some width are crossed, in which case submarine cables are employed. Between the two cities there are six series of cables. The line will be open for business within a few weeks, and it is expected that it will prove a great convenience.

## Struck by a Meteor.

Among the thousands of meteors or "shooting stars" as they are now generally called, which daily pass into the earth's atmosphere, many more than is generally supposed no doubt reach the earth; but it is only the very largest that are seen to fall, or that are discovered after their fall. Of course, the numbers which the earth actually encounters in its orbit are as numerous by day as by night, but it is very seldom that one is seen in the light of day, although many, no doubt, fall every day. There are quite a number of well-authenticated instances where they have been known to encounter human beings in their descent.

A correspondent of the *London Times* alludes to what was most probably an instance of the kind which recently occurred in the city of London. The correspondent writes as follows: As a gentleman, a well-known public official, was passing from St. James Park into Pall Mall by the garden wall of Marlborough House, recently, at a quarter to five in the afternoon, he suddenly received on the right shoulder a violent blow, accompanied by a loud crackling noise, which caused him great pain, and to stumble forward as he walked. On recovering his footing, and turning round to see who had so unceremoniously struck him, he found that there was no one on the pavement but himself and the policeman on duty at the park end of it. On reaching home the shoulder was submitted to examination, but nothing was at first discovered to account for the pain in it. But in a little while the servant who had taken away the coat to brush brought it back to point out that over the right shoulder the nap was pressed down flat in a long, straight line, exactly as if a hot wire had been sharply drawn across the cloth. The accident is therefore explained as having been caused by the contact of a minute falling star or meteor. It is an unprecedented and most interesting occurrence, and deserves, I think, to be placed on public record.

## The Origin of Cyclones.

Dr. Werner Siemens, in a recent paper on the "Conservation of Energy in the Atmosphere," gives a very interesting theory as to the origin of cyclones. He states that the comparative vacuum formed at the center of the cyclone can produce suction only in the direction of the axis of the cyclone, so that it either raises water from the surface over which it rotates or draws down air from the higher regions of the atmosphere. The clear sky and quiet air often observable at the center of a cyclone bear evidence that there is a descending current of air. According to Dr. Siemens, a local cyclone is produced by an impulse of the superheated air, due to some local cause, given at the boundaries of an upper and lower tract of disturbance of the neutral equilibrium of an atmosphere at rest, which reaches the boundary of the upper cooled strata of air, which have a tendency to descend. An outer descending current is thus formed around the inner ascending one, the amount of air descending naturally equaling the amount ascending. If the disturbance of equilibrium embraces extended upper and lower strata of air, the descending masses would produce an increase of pressure in the neighborhood of the cyclone, gradually extending to the surface of the earth and upward into the highest regions of the air, imparting its force continually to new superheated masses of air. This air ascends with the inner and upward current, descends with the cool outside current, to again ascend, producing a circular motion. The course of the center of the cyclone is determined by the direction of the mean velocity of all the air masses forming the cyclone, and its duration is that of the disturbance of the neutral equilibrium of the atmosphere which produces and maintains it. The local ascending current, by carrying dust and particles with it, may also produce rain by condensing the aqueous vapor of the higher strata.

**AN ELECTRIC RAILWAY IN DENVER.**—According to the *Denver Journal of Commerce*, the Denver Electric Street Railway has been in successful operation for over a month. Prof. Short, the electrician, has been untiring in his efforts to place his pet project upon a sound basis, and he seems to have accomplished that end. The invention and all that pertains to the construction of the road and its equipment is distinctly of Denver production. Without doubt it is the most perfect system of electric railway operation in the world. The cars are under perfect control, and, it is said, can be moved at any speed up to 15 miles an hour. It is claimed that this is the second electric railway in the United States opened for regular passenger traffic. Contracts have been let for the immediate building of 15 miles of track in the city, and orders for new machinery and cars have been placed.



## ENGINEERING NOTES.

## The Panama Canal.

This great work has been killed again and again by reporters and engineers, but it always comes up again to plague its critics. A leading financial journal of the French capital itself recently put forth a severe criticism on the methods and present management of the enterprise, and set forth in an apparent clear and truthful manner the desperate strait in which the company found itself in its efforts to procure funds to relieve itself of its present burdens and carry on its work in the future. It was argued that from its very inception, through every stage of its progress, down to the present time, its management had been characterized by a degree of recklessness which almost staggers belief. It was held that the work already done is the simplest and easiest on the entire route, and that the deep cutting and damming of the Chagres was the real difficulty to be encountered, and could be accomplished only by an amount of expenditure which would be absolutely ruinous to the enterprise as a commercial success. That the results of the recent investigations have substantially confirmed all the allegations of bad engineering, unreliable estimates and the worst of management. That there is no guarantee, whatever, that the proposed new loan would be anywhere near the amount which would be required to finish the work.

The editor of the *Economiste Francais*—the name of the paper referred to—holds that private enterprise cannot hope to complete the colossal work. But aid will have to be sought from other powers—the United States in particular will have to be appealed to; that such governments should be called upon to join in a guarantee, and that when the work was completed they would be expected to pro rate in making up any deficiency. The editor winds up with the opinion that the annals of history nowhere furnish an example of a work of international importance undertaken with such an utterly inadequate comprehension of the difficulties involved, and that but comparatively little real practical work has been done.

## Per Contra.

We read in other journals that everything is serene, and that the promoters are quite as confident as ever that the work will go on to completion, and that it will prove a financial success; that at the late meeting of shareholders it was shown that the canal has been constructed from its eastern terminus to a distance of 10 miles, and 20 feet in depth; that when M. de Lesseps rose to read the general report on the position of the company he succeeded in dispelling any uneasiness that may have existed in the minds of the shareholders. M. de Lesseps confidently predicted that by the end of 1889 the canal would be finished, or would be at least so near its completion as to admit of vessels passing from one ocean to the other. Since the last general meeting three large contracts have been made, so that at present there does not remain a single section which private enterprise has not undertaken to excavate. It is not surprising that, after the confidence expressed by the chairman, all the resolutions were carried with unanimity. There can be no doubt now that the work will be completed, and that the prestige which the great French engineer enjoys will enable him to raise the capital still required. M. de Lesseps is as sure to connect the two largest oceans by a waterway as he has joined the Red sea and the Mediterranean. Such are the comments of journals friendly to Lesseps.

## American Interest in the Work.

A correspondent of the London *Times* expresses the belief that the work will eventually be practically abandoned, or turned over to some new syndicate; that this country will eventually take up the project. Should the expected collapse occur, our London cotemporary will find himself most woefully mistaken. The people of this country have no other interest in the work than to keep it away from the direct control of any European power, and to watch the opportunity to secure fat contracts on the work. It is our people who have dug out, for good pay, the short section of the canal that goes through soft ground, on the east side of the isthmus—the only part so far completed. Our people built the Panama Railroad, and sold it out to the French at an enormous profit. We have also built three lines of railway across our own domain, and expect soon to construct a great ship railway over the Isthmus of Tehuantepec. But we have no idea of undertaking such an unprofitable scheme as the Panama canal.

**TUNNEL BETWEEN SWEDEN AND DENMARK.**—Mr. Alexander Rothe, an engineer formerly engaged at the Panama canal works, has submitted to the Danish and Swedish Governments plans for a railway tunnel under the sound, between Copenhagen, in Denmark, and Malmo, in Sweden. The tunnel is to have a total length of seven and a half miles, two miles between Amager and the small island of Saltholm, and five and a half miles between Saltholm and Malmo. The ground to be worked is stated to much resemble that in the English channel between Dover and Calais, and to offer no difficulty in the execution of the work. The cost of construction is calculated at about £1,200,000.

## USEFUL INFORMATION.

## Cleaning Woolen Fabrics.

A German technical paper, which is likely to be good authority on such subjects, expresses its views on cleaning woollens as follows:

Opinions on the best methods of cleaning woollens are so infinitely different, and so various and contradictory are the statements of practical papers on this point, that it appears to me, says the editor, a remunerative and interesting task to examine the matter thoroughly. I tried the various degrees of heat, from the hottest to the coolest temperature, and I employed all the favorite cleaning materials one after the other—soap, borax, ammonia, benzine and mixtures of these articles. The results were so decided, and so plainly marked, that the following conclusions must be regarded as definitely established:

1. The liquid used for washing must be as hot as possible.

2. For the removal of greasy dirt, sweat, etc., borax is of so little value that its application would be mere waste. Soap lye alone is better, but the preference must be given to soap lye along with ammonia. This mixture works wonders by quickly dissolving dirt from particular parts of underclothing which are hard to cleanse. It raises and revives even bright colors, and is altogether excellent.

3. On the other hand, for cleaning white woolen goods, there is nothing which even approaches borax. Soap lye and borax, applied boiling hot, gives white woollens a looseness and a dazzling whiteness which they often do not possess when new.

4. If shrinking is to be entirely avoided, the drying must be accelerated by repeatedly pressing the woollens between soft cloths. In no case should woollens be let dry in the sun, as in this case they become dry and hard. They are best dried in a moderate current of air, and in cold weather in a warm place, not too near the stove.

For colored goods there should be prepared a lye of seven quarts of soft water and two ounces of the best soft soap, the quantities being, of course, modified according to judgment and the dirtiness of the articles. The soap is dissolved over the fire, and the lye, properly stirred up, is divided into two vessels, to one of which is added a teaspoonful of ammonia for each quart of lye. The woollens must be entered at a heat which the hand cannot bear, and the fabric must, consequently, be turned and pressed with smooth, wooden stirrers. They are then pressed out as far as possible, and transferred to the second lye, containing no ammonia, and which by this time has become so cool that the articles can be pressed by hand, but no twisting or wringing must take place. They are then pressed between three or four soft dry towels, till the latter no longer become wet.

For white woollens there is added, instead of ammonia, a teaspoonful of powdered borax to each quart of soap lye, and the operation is otherwise conducted exactly as above described. If the second lye is too soapy, it may be diluted with a little hot water.

After two or three lots of woollens have thus been washed, the lye must be heated again—the first lot being put aside to settle, the second being made first—with the addition of ammonia or borax, as the case may be, and fresh lye made for the second.

**WORKING IN TORTOISE SHELL.**—The *Scientific American* furnishes the following information in regard to working in tortoise shell, in its query column: 1. How can the scraps or shavings of the working of tortoise shell be utilized? A. We know of no means by which they can be used. 2. How are names put on tortoise shell with fine gold wire? A. Wire is heated and pressed in. 3. How are names printed placed in between the shell, and plainly legible from outside? A. The name is placed between thin plates of tortoise shell. 4. How can two pieces of shell be soldered together? I have seen new teeth put into a comb, and imperceptible; how is this done? A. Use a pair of pincers or tongs, constructed so as to reach four inches beyond the rivet; then have the tortoise shell filed clean to a lap joint, carefully observing that there is no grease about it; wet the joint with water, apply the pincers hot, following them with water, and the shell will be joined as if it were one piece. The heat must not be so great as to burn the shell, therefore try it first on a piece of white paper. 5. How to polish tortoise shell? A. Having scraped the work perfectly smooth and level, rub it with very fine sandpaper or Dutch rushes; repeat the rubbing with a bit of felt dipped in very finely powdered charcoal with water, and, lastly, with rottenstone or putty powder, and finish with a piece of soft wash leather, dampened with a little sweet oil; or still better, rub it with subnitrate of bismuth by the palm of the hand. 6. How can you soften tortoise shell, besides soaking in hot water? A. Use diluted sulphuric acid; also see Spens' "Workshop Receipts."

**UTILIZING SEAWEED.**—An English chemist has devised an entirely new method of utilizing seaweed. He boils the weed with carbonate of soda and treats the filtered solution with sulphuric acid, obtaining from it in this manner a substance that has more viscosity than starch, or even gum arabic, which may be profitably

employed in stiffening textile fabrics. It is also said to be well adapted for the making of syrups and for certain culinary uses. From the matter left after the extraction of that material—to which he has given the name of "alguna"—a very good quality of writing paper can be cheaply made.

**TO MELT OLD RUBBER.** such as old rubber car springs, scraps, etc., so as to be able to run it into molds for new work: Heat the india rubber with steam; the sulphur then discharges, the india rubber melts, runs into the hot water and collects at the bottom of the pot, while the vapor prevents it burning. The properties of the india rubber are thus sensibly modified; it becomes a blackish mass, liquid at the ordinary temperature, but drying in the air, and becoming then impervious to water. The material loses its elasticity, but is suitable for the preparation of gums or special varnishes for certain articles.

**SYMPATHETIC INK.**—An ordinary solution of gum camphor in whisky is said to be a permanent and excellent sympathetic ink. The writing must be done very rapidly, as the first letters of a word have disappeared by the time the last are written. Dipping the paper in water brings it out distinctly, and it becomes invisible again when the paper is dried. It can be brought out repeatedly without affecting its vividness.

**TO MAKE MOCKINGBIRD FOOD.** take of hemp seed three parts, toasted wheat bread two parts, maw seed one part, ox heart one part. Boil the ox heart well in water, cut it small, and place it in a pan in an oven, where it must be allowed to become perfectly dry and crisp. All the ingredients must then be thoroughly mixed and ground in a mill to coarse powder.

**HOW TO DESTROY COONS.**—An Arkansas farmer writes that last year, when coons made havoc in his corn-field, he went to the drugstore to buy strychnine with which to kill them. By mistake the druggist gave him morphine, and the next morning he found his field full of sleeping coons. He advises the use of morphine instead of strychnine.

**TO MAKE A GOOD POMADE for the hair.** take of castor oil one pound avoirdupois, pure white wax four ounces, melt them together, and then add oil of bergamot two and one half drams, oil of lavender (English) one-half dram, essence royale. Stir the mixture while cooling.

**CHEAP GAS IN LONDON.**—In London gas is furnished at the rate of 65 cents per thousand feet, and the companies pay dividends of 12 per cent. In Brussels the price is 85 cents per thousand feet.

## GOOD HEALTH.

## Disease Germs in Milk.

It is a well-recognized fact that the mother who is nursing her child is obliged to be very careful about her diet, for whatever she eats or drinks has its effect upon her milk, and consequently upon the health of her child. The most acute symptoms, and even death, may be produced by dietary indiscretion. But it is less appreciated that similarly alarming results may be produced in both children and adults by the use of milk taken from improperly fed cattle. There have recently been a number of mysterious poisoning cases, that after a great deal of random speculation have finally been traced to diseased milk. In spite, however, of these warnings, the subject has not yet received the sanitary attention to which it is entitled. Particularly is the danger of such contamination great in the neighborhood of large cities, where the absence of wholesome pasturage is a temptation to the less scrupulous to substitute all grades of organic refuse, the most of which should properly be consigned to the garbage crematory. In addition to this danger, however, it is discovered that even in the presence of abundant and suitable food, cattle are not discriminating in their selection, but exhibit frequently the most depraved tastes. In the neighborhood of large distilleries, it has been observed that the cattle become utterly demoralized by feasting on the refuse from the stills. In time they come to have the dull, stupid appearance characteristic of an opium-eater. It is hardly possible that the milk produced by animals permitted to feed on such abominable stuff can be either wholesome or agreeable.

In other places the case is even worse, for the cattle have been observed to feed with evident relish upon unadulterated animal excreta and other highly pernicious food. Aside from the disgust which the practice excites, it is a source of actual and grave danger. When it is remembered that the fatal plague at Plymouth, Pa., was directly traceable to the careless disposal of the excreta of a single typhoid-fever patient, it can readily be seen that milk may become in this manner a vehicle for the distribution of the most malignant disease germs. So large are the possibilities for evil which may result from the use of milk taken from animals improperly fed, either through design or carelessness, that it is not too much to ask that all public dairy farms should be placed under sanitary supervision, and that the food

and quarters of all cattle whose milk is offered for sale should be regularly inspected by officials appointed for the purpose.—*Scientific American*.

**GALEN ON THE TREATMENT OF OBESITY.**—"The best method of getting thinner consists in gradually withdrawing from the body that whereof there is superfluity, and in strengthening at the same time those parts which had been expanded. Bodily exercise will undoubtedly prove very advantageous, as we see stout horses getting lean by heavy work. Thus, likewise, those will never grow fat who are obliged continually to toil with hard labor. This, however, requires great precaution, it being certain that fat people frequently run danger of death when attempting violent bodily exercise." And Galen says: "Regular alvine motions, energetic bodily exercise, a moderate life, a diet which, although satiating, yields but limited nourishment; which explains why Hippocrates advises stout people wishing to grow thin to dine on vegetables cooked with fat, in order that they may become satiated by a small quantity of food."

**MEDICINAL QUALITIES OF OYSTERS.**—It is not as generally understood as it should be that oysters have medicinal qualities of a high order. They are not only nutritious, but wholesome, especially in cases of indigestion. It is said "there is no other alimentary substance, not even excepting bread, that does not produce indigestion under certain circumstances; but oysters, never." Oyster juice promotes digestion. By taking oysters daily, indigestion, supposed to be almost incurable, has been cured; in fact, they are to be regarded as one of the most healthful articles of food known to man. Invalids, who have found all other kinds of food disagree with them, often discover in oysters the required aliment. Raw oysters are highly recommended for hoarseness. Many of the leading vocalists use them regularly before concerts and operas, but their strongest recommendation is the remarkably wholesome influence exerted upon the digestive organs.

**WHY DID THEY ESCAPE?**—Mr. D. F. Newsom, of Newsom's Springs near Arroyo Grande, San Luis Obispo Co., Cal., states that during the cholera season of 1850-51, while that disease was prevailing in New York City to an alarming extent, he was employed in the brass finishing establishment of Dietz Bros. & Co., in that city; that there were about 100 employes around the factory, none of whom were at all affected by cholera symptoms, while others were dying by hundreds around them. Mr. Newsom thinks this highly suggestive, and that the hint given by the fact recited might afford good foundation for medical experiment with a tincture of the metal indicated.

**A LINIMENT FOR EARACHE.**—According to the *Canada Medical Record*, Pavani recommends a liniment composed of camphorated chloral 2½ parts, pure glycerine 16½ parts, and oil of sweet almonds 10 parts. This is to be well mixed, and preserved in a hermetically closed bottle. A pledget of very soft cotton is to be soaked in the liniment, and then introduced as far as possible into the affected ear, two applications being made daily. Frictions may also be made each day with the preparation behind the ear. It is claimed that the pain is almost immediately relieved, and even in many cases the inflammation is subdued.

**THE SMALL BOY WHO ATE SORREL.**—It was a very curious and almost unprecedented chain of causes, we imagine, which brought about the death of a little boy at Birmingham the other day. The poor child ate during the day a quantity of sorrel which he found near his mother's house. In the night, feeling thirsty, he drank freely of some soapy water which stood near his bed-side. Next day he died, and an inquest being held, the medical evidence was to the effect that the alkali of the soap acting upon the sorrel had formed oxalic acid, a poisonous compound by which the child had been killed.—*London Globe*.

**HEART DISEASE.**—Dr. A. L. Loomis, in a paper read before the American Climatological Association, says that in four cases which he details persons with heart disease were fatally affected by visiting elevations of about 2000 feet. Two went to the Adirondacks, one to the Catskill mountains and one to Colorado. In 26 cases of his immediate experience, he concludes that the removal from a lower to a higher level is in this disease detrimental. The diseases of the Swiss Alps are largely those of the heart, brain or the larger blood-vessels. There is more oxygen at sea-level than at a higher level.

**NEW TREATMENT FOR CONSUMPTION.**—The *Lancet* explains in a recent number a new treatment for consumption, as injecting carbolyzed iodine into the lungs by means of spray of the warmed fluid. The diseased cavities of the lungs are first localized by percussion; then a fine tubular needle, having openings at the point and attachment to a proper syringe, is introduced between the ribs, and the well-known antiseptic qualities of combination are relied upon to effect the healing of the affected parts. It is used once a week. So far, the treatment is quite satisfactory.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**PLYMOUTH CONSOLIDATED.**—*Ledger*, Aug. 28: Messrs. A. Hayward, W. S. Hobart and A. Van Norden, the three principal stockowners of this mine, were in Plymouth several days last week and left Sunday morning. During their visit a thorough inspection of the property was made, with the result that the reports that the mine is looking better than ever were fully confirmed.

**MARLETTE.**—Under the new owners, represented by W. Petre, work on this claim is being prosecuted vigorously. A ditch has been constructed to carry water from the Amador canal to the mine. The ditch will carry 100 inches of water. Three hundred feet of pipe will be required, which is being hauled on the ground and placed in position. Hoisting works are being erected in the tunnel for the purpose of sinking a winze. These works will be run by water-power by means of one of Knight's wheels.

**MISCELLANEOUS.**—Dan McKay has sold his mining property and residence at Scottsville to A. P. Minear for the sum of \$30,000. The purchaser takes possession at once and intends to push the work of development without delay. The McKay mine is in Hunt's Gulch, north of the Doyle claim. It is the intention to sink a shaft at once. A quantity of tools and material is already on the way. Dan McKay is to superintend the operations. It is the prevailing opinion that the chances are favorable for the development of a good mine at this point. The 40-stamp mill of the Kennedy is going up like magic.

**SUTTER CREEK.**—It is now definitely settled that operations at the Eureka shaft are to be abandoned. Orders have been received from headquarters to take out the pump. Previous to this, however, a substantial bulkhead was built in the tunnel at the 1500-foot level. It is built of stone six feet thick, and is evidently intended as a protection to workmen in running a tunnel either from a new shaft or the old works. The bulkhead has been put in about 50 feet from the shaft, and the men, in drifting from the old works, will be able to tap the tunnel with safety. To connect the two shafts it will be only necessary to put a few cartridges of giant powder under the mason work and blow it up. The Lincoln is running at the usual gait. The mill is running to its full capacity, with enough rock in sight to last for a considerable time yet. The ten stamps of the Iowa are running steadily with encouraging prospects. Work on the additional ten stamps of the South Spring Hill mill is in full blast, with occasional stoppages on account of the lumber. It will take from a month to six weeks to complete the job.

## Calaveras.

**INDIAN CREEK.**—*Mountain Echo*, Aug. 25: The Sature mine is closed down for an indefinite period. The Bean mine is at a standstill for the present. Work is progressing slowly at the Kelly mine, recently purchased by a San Francisco company for \$10,000. The east shaft of the Calaveras mine, which has been in operation for some months past and has made rich returns, is temporarily closed down. The old shaft, 400 feet in depth, is being freed from water preparatory to the inspection of the same by an English company that intend purchasing it. This is a very valuable property and we would be pleased to see it fall into the hands of a wealthy company.

**COPPER MINE.**—*Calaveras Prospect*, Aug. 27: A San Francisco company has taken hold of the Satalite copper mine in Campo Seco. The water is being pumped out of the old works, and as soon as that is completed a 50-foot water-wheel will be built to run the machinery. This company have worked other low-grade copper mines in this State, and are satisfied that the mines in Campo Seco can be made to pay by the roasting and leaching process. Five men are employed at present, and in a couple of weeks the company expects to employ 12 or 15 men. W. C. Reveal is superintendent.

**MURPHY'S.**—It is currently reported that Mr. Cox, of San Francisco, has bought a half interest in the Tulloch mine, on the grade, and the Pocket mine of Dodson's, and that the erection of a ten-stamp mill is one of the possibilities of the next two months. The Oro Plata mill has closed down, pulverizers still running, but the closing of the whole works will take place in a few days on account of the turning out of the water.

## Fresno.

**COAL.**—*Expositor*, Aug. 25: Mr. Rawlins, of the firm of Robinson & Rawlins, proprietors of the coal mines 18 miles southwest of Huron, is in town, having tests made of some of the coal taken from their mines. The coal was used by a limited number of persons here last season with satisfactory results, and if the Water Works and other enterprises become satisfied of its value arrangements will be made to ship it extensively to this place.

## Los Angeles.

**THE NEW STRIKE.**—*Times*, Aug. 28: Among all the mines of gold, silver, iron, copper, etc., developed or discovered in the county, the latest strike appears to be one of the most promising. We yesterday noted the fact that a fine ledge had been discovered on Wilson's Peak, and that a lively boom was in its incipency. On the 6th of June last Frank Dunham, a veteran prospector, discovered the ledge. He was up on Wilson's Peak, at a point about seven miles from Lamanda and about 300 yards from a favorite camping ground of those who go up the mountain. The ledge, which is of as promising quartz as ever miner clapped his eye on, is from two to seven feet wide and vertical. By following the numerous outcrops the ledge can be traced for at least three miles. The walls are also clearly defined and it is evidently a true vein. Wood and water are there in great abundance—huge trees and a spring of the finest water. The ledge runs along several ridges in places with deep arroyos on each side. At one end of the plateau which Mr. Dunham prospected—in company with his partner, Ed. Pettibone—there is a precipitous bluff about 300 feet high, with an angle of about 55 degrees. Getting down this bluff by means of a rope, the prospectors found

the vein visible all the way down, and were thus enabled to get an idea of what the vein is at a depth of 300 feet. With a pick they dug out some little chunks of quartz glittering with free flake gold. The very top drift is good stuff, and when pounded up with a hatchet and panned out in a wash-pan, shows numerous colors. The exhilarated party brought in a lot of the ore, and a large specimen is exhibited in Bartlett's show-window in the new Wilson block, First street. It is simple drift but a superb piece of rock. Assayer Spurl has made one assay of the ore, getting a return of \$369.60 to the ton in gold, with traces of silver and copper. Mr. Dunham is associated with Ed. F. Pettibone, a member of Frank Bartlett Post, G. A. R., and an experienced miner, who has delved in Kentucky, Colorado, New Mexico and various localities in this State. He has some promising mines in the rich Cactus district near Yuma. Dunham & Pettibone have taken in with them the following: J. L. Stern and John C. Hester, of Stern & Hester; G. A. Stewart, F. H. Rawlings and Sam. McConnell. These gentlemen have staked out two 1500-foot claims and propose to whoop it up in big style. Said Mr. Stern yesterday: "We will put a big force on Monday to make a new trail, for the old one is too roundabout. The new trail will make the mine not over 10 or 11 miles from Pasadena." Mr. Pettibone starts in a day or two for San Jacinto, where he has some burros. He will bring them up to Lamanda and use them for packing to and from the mine—which is, by the way, but two and a half miles from the north fork of the San Gabriel.

**SAN GABRIEL.**—Mr. H. Martz, one of our heaviest capitalists, is associated with Mr. Samuel Holyland in developing a valuable claim, situated and lying just west of the Winston mine. Scientists tell us that the region of country washed by the San Gabriel and its tributaries is—with the exception of a similar area in the State of Maine—the oldest formation on the American continent, and that we have there all the conditions known for the existence of mineral-bearing ore deposits. This region of country has been the theater of mining adventures by the Spaniards from time immemorial, and many are the legends that have come down of the golden caverns, native silver lodes, and other rich finds of gold and silver made in the days of the Jesuit Fathers of a century or more ago. Here at our door lies a mineral belt, vast in its extent, and rich as it is boundless in the precious metals, still as yet but little known, and comparatively unexplored by the mineralogist of to-day. In the gulches and along the banks of the San Gabriel, for a distance of 40 miles, over five millions in placer gold have been gathered within the last two decades, and the bed of the river for that entire distance is even now paved with gold, but from its peculiar surroundings cannot be worked; and yet with all the prospecting that has been done for 25 years, the source, or matrix, from whence this gold came remains a mystery still, and confounds all theories extant as to gold formations. The fact that the mountain, gulches and ravines of this mineral region abound with forests of timber, and the San Gabriel, with its numberless tributaries, affords a never-failing supply of water, together with the additional fact that it is within two hours, on foot, of orange groves, vineyards and civilization, seems to detract from rather than add to its importance. With less than one-half of the showing in mineral wealth that can be made here, were it out on the desert wastes of Death Valley, invested with all the enchantment that distance lends, it would not fail to attract capital and invite the attention of mining men. One 20-stamp mill running in the San Gabriel Canyon, making its monthly shipments of bullion, would give an impetus to affairs there never before known, and mark an important era in the eventful history of this mining camp; and there is sufficient free milling ore, of fair grade, to be found there and placed within reach by the expenditure of a little capital, to keep a score of 20 stamp mills running for all time to come.

## Placer.

**MINING NOTES.**—*Placer Argus*, Aug. 26: Wm. Hollis, of San Francisco, a former old-time resident of Michigan Bluff, has bought a large tract of mining ground at Last Chance. It comprises part of the Viola, Morning Star and El Dorado claims. He is now running a tunnel to tap the ground which there is every reason to suppose is rich. The old tunnel was found to have been run too high. At the Bald Mountain gravel mine, about six miles above Last Chance, eight men are employed, and have been for over a year past, with every encouragement for hoping that a rich body of gravel will be struck at an early day. The owners of the mine are: Hon. J. H. Neff, Peter Juergenson, Alex. Dolt and William McLennan. Mr. Dolt is the superintendent. About half of the men employed at the Hidden Treasure mine, Sunnysouth, have been laid off temporarily, owing to the pitching of the bedrock in the pay channel. The gangways must be cut down to the level of the pay channel. The entire force will again be put to work, probably in two weeks. The gravel at the pitch-off is richer than it has been for the last year or two. A new mining company are at work between Sunnysouth and the Dam claim on the east side of El Dorado canyon. A tunnel is being run in this mine with very good prospects. The operators are Messrs. Williamson, Buell and Masters. Four men are working there. The Dead Horse mine on El Dorado canyon, which has lain idle for several years, is now running full blast, the Sutcliffe Bros. having taken hold of it some months ago. They are doing well. Interest is reviving in the claims on the river bars and "slides" in this vicinity. Hanson & Co. are fitting up a mine on Yankee Slide (between Gray Eagle and Volcano Bar), and Jensen & Hubbard are fitting up the Red Hot mine near Brushy Bar. The Van Emon Bros. are rigging up their mine, the Big Gun, for a drift mine.

## Shasta.

**DEADWOOD.**—*Shasta Courier*, Aug. 28: Dr. DeGroot has been here collecting data and information in this section for the State Mineralogist. Chief Crowley, of San Francisco, was here yesterday spying the fatness of the land. He and Col. Gannon own three-fourths of the Scorpion mine in French Gulch, W. T. Coleman the balance. Dan Phillips is now foreman of Tom Greene's mine, and right well does he attend to his duties. The Gibson Bros.' group of mines, including the Black Bear, White Bear and Enterprise—Little Gem ledge is on the latter—have been bonded to an Eastern man, who has gone back to perfect arrangements for com-

mencing operations. Lamb & Co. have had a cleanup and are well satisfied. Dick Roberts is working three shifts, day and night, in the McDonald Brothers' big tunnel. The dump pile prospectors are making good wages. Mr. J. Falan has leased a part of the Vermont mine to Messrs. Wren & Leas. McDonald & Olive have been prospecting for the past week for a site to erect chlorination works, and have at last fixed on the south fork of Deadwood gulch, and commenced grading for that purpose. Collins & Barkle have commenced operations on what they call the "Mammoth Ledge," situated near the old Sargent cabin, about half way between here and Lewiston, and within a half mile of Paulsen's arastra; the walls are 24 feet apart and on one there is four feet of good-paying ore. Being so near the arastra will be an advantage. Success to them.

## San Bernardino.

**PROVIDENCE MOUNTAIN.**—*Calico Print*, Aug. 22: The Bonanza King Co. is still prospecting its mines, and has cut several ore bodies, but is doing no work on ore. It keeps 20 to 25 men to work constantly. A few gold-rock miners could get work. The Kerr and Patton property, which changed hands a few weeks ago, is not yet working. Mr. Bahten is expected to commence operations almost at any time. Some developments are being made on water. The mill is going to be erected at the mine and the water pumped to the mill. The Mozart group of mines, about two miles south of the Bonanza King, has just run through a 12-foot vein of ore on the Lucknow mine—one of the group. The ledge was tapped by a tunnel at the depth of 100 feet. This is probably the largest strike ever made in the camp.

**MESCAL.**—The carpenters, machinists, etc., have arrived at this camp, and the Cambria Mining Co. can congratulate itself on the way the mine is opening up. Every day's work shows the mine improving both in richness and quantity. The grading for the five-stamp mill is about completed, and heavy timbers are already on the ground. Mr. E. H. Booth, a practical machinist from the works of M. S. Baker & Co's City Foundry & Machine Works, of Los Angeles, is already on the ground. The machinery is from this foundry, and they mean to show San Francisco that they can erect as good a mill as any other place on the coast. The Ivanpah mills are both shut down, and but little chloriding is being done. Wilt & Sidel are sinking a shaft on their find on the west of Providence mountain. They commenced the shaft on the gold vein which is gradually widening, are now down about 15 feet, and the ore appears to keep up its richness both in gold and silver. Some old prospectors are on the field in hope to make a strike.

## Sierra.

**LA PORTE.**—*Mountain Messenger*, Aug. 28: This mining camp has now a good prospect of a fresh lease of life. The sale of the Gibsonville and La Porte ridge is about completed, and the money will be paid as soon as some of the titles are perfected. The purchasers are Scotch capitalists, who will run in a tunnel from a point near Gibsonville, 7000 feet to develop the ground. J. H. Thomas is entitled to much credit for the successful manner in which he has engineered this mining business. Col. Plum, of Chicago, will soon put in machinery to sink a shaft to open the Bald Mountain Consolidated ground, near La Porte, that promises to fully equal, if not excel, in richness the leads of the Bald Mountain and Extension of Forest City. The results obtained by the boring machines are indisputable proof that the channel extends through the ridge to Gibsonville and beyond. J. H. Thomas, of Oakland, was here Monday, Aug. 16th. His headquarters are at Saw Pit Flat, Plumas county, where he is superintending mines for Scotch capitalists.

## Tehama.

**CHROME.**—*People's Cause*, Aug. 28: Job Comings and Frank Brothers, of this place, have made a discovery of fine chrome deposit in the Coast Range, upon which they have located four claims. An assay shows 58 per cent oxide of chromium and 1 1/2 per cent peroxide of iron. The deposit is extensive and of fine quality, yielding chrome yellow, blue, green, chocolate and a beautiful red. There is also in the vicinity of this deposit of chrome, protoxide of barium, yielding a snowy white which is also of considerable value. This is the second discovery of chrome within the past few weeks in the foothills and mountains of the Coast Range, besides other ores, the character of which has not yet been made known by assays. Samples of these are still under examination by experts, showing that the mineral wealth of Tehama county has not been half told.

## Trinity.

**EAST FORK.**—*Trinity Journal*, Aug. 28: The Crown Point is showing flattering indications of being a good-paying mine. An incline shaft, 100 feet deep, has been sunk on the ledge, which at this depth is 34 inches in width and carries free gold and galena sulphurets. The assays have run all the way from \$39 to \$300 per ton. A trail has just been completed from Backbone mountain to the Golden Chest, the furthest mine up the creek and about 15 miles distant from the town of North Fork. It is owned by Haley, Given & Hubbard. Development of the ledge is now progressing. The ledge is a mammoth one, and the rock well seasoned with the yellow treasure. If we are to believe the rumors in regard to this mine, it is a veritable "golden chest." The North Star mill will start up in about two weeks and will run on some splendid ore; the company having 70 tons of rock on the dump. New stamps, etc., have been procured and the mill generally refitted. Day & Moor have a good chance to make some money on a ledge they are developing, and work on their arastra is still going on, and will be finished shortly. Lawton, Bergin & Bailey, of the Thanksgiving mine, are still getting out good ore, and have made very satisfactory cleanups. Barney McDonald, of the Enterprise, is doing likewise. These two mines employ quite a force of men, and both have arastras. There are other locations in the district, which, if worked upon and thoroughly tested, would no doubt turn out to be good mines. Christ Meckel's pack-train from North Fork makes trips to the various mines almost daily, carrying in supplies, etc. There are upward of 60 men in the district. That East Fork is a better camp than it was a year ago we are all aware, and from present

indications it certainly looks like it would develop into a prosperous, well-to-do mining district ere many more years elapse.

## NEVADA.

## Washoe District.

**CON. CALIFORNIA AND VIRGINIA.**—*Enterprise*, Aug. 28: A less amount of ore is being shipped, but of a better quality—about 175 tons per day, assaying according to mill battery samples over \$20 per ton. The drift being run northwest on the 1400-level toward the Ophir is now in 170 feet. The two crosscuts west from this drift are making good progress in very promising vein matter. Some small streaks of good ore are said to be found on this level, creating a temporary stir in the stock market, but official authority says "there's nothing in it." On the 1500 and 1600 levels they are progressing well in the explorations.

**BEST AND BELCHER.**—West crosscut No. 1 on the 600-level has been extended 39 feet, making a total of 183 feet. East crosscut No. 1 on the same level is 123 feet in length, 40 feet having been added during the week. Material in both drifts continues to be vein porphyry with seams of clay and quartz. On the 2500-level the construction of the stone bulkhead or dam to shut off the water flowing in from the northward is steadily progressing.

**SAVAGE.**—The good ore vein developed on the 600-level shows better as farther opened out. A large proportion of it assays \$300 per ton. During the last few days the old 800-level of this mine has been reopened from the Gould and Curry mine and drifting south is being done, with a view to finding if the rich vein on the 600 extends down to that point. Should it be found to do so, Savage may become a dividend mine again.

**POTOSI.**—Running the diamond drill to the eastward on the 3100-level near the Chollar south line was suspended on Wednesday last, a distance of 404 feet having been accomplished. This hole has passed through one of the heaviest veins of clear white quartz ever found on the Comstock. It is quite strongly mineralized, but no pay ore has been met with as yet.

**CHOLLAR.**—The south lateral drift on the 3200-level is now in 190 feet—face in dry ground. The course of the drift has been changed a little to the west, as there were slight indications of water in the face. Portions of the drift have had to be additionally timbered by reason of the soft character of the ground through which it passed.

**MEXICAN AND UNION.**—On the 700-level the northwest drift in the Union is going ahead properly in favorable ground, and is 200 feet in length. The cutting of a drain in the Mexican mine throughout the floor of the 700-level progresses well. The Mexican and Union should consolidate forthwith.

**GOULD AND CURRY.**—From the lateral drift north on the 450-level or working station 150 feet above the 600-level, a west crosscut is being run, which is now in 44 feet. Material vein matter with some quartz and clay. The drift northeast from the head of the incline upraise was extended 35 feet, making a total length of 47 feet.

**HALE AND NORCROSS.**—By reason of the slight pump disarrangement in the Combination shaft, mentioned elsewhere, work has been suspended on the 3200-level. This difficulty will be obviated to-night, however, and all work go on as before.

**CROWN POINT AND BELCHER.**—As before stated, the repairs and resetting of the incline engine are being energetically pushed forward to conclusion, in readiness for the resumption of work in the two mines on the first of next month.

**OPHIR.**—On the 1465-level the main southwest drift is making good advancement in very favorable vein material. On the 1300-level the south drift from the shaft is also pushing ahead in excellent working ground.

**SIERRA NEVADA.**—On the 520-level the north lateral drift has been extended 18 feet, making a total length of 548 feet. A crosscut, No. 3, has been started near the face of this drift, which is now in 29 feet.

**YELLOW JACKET.**—The daily yield continues to be 100 tons, giving the Brunswick mill all it can do during the present low stage of water in the Carson river.

**MONTE CRISTO.**—The repairs to the hoisting works are completed and work resumed on the 150-level from the new shaft, running west for the ore vein.

**ALTA.**—Crosscutting is about being commenced on the 700-level to develop the ore resources so long sought at that point.

**KENTUCK.**—Daily yield, 40 tons from above the 800-level, of low-grade ore, keeping the Rock Point mill steadily running.

## Belmont District.

**WHAT IS DOING.**—*Belmont Courier*, Aug. 21: The Reveille mines are producing good ore, and the mill is running steadily. John N. Griffin is taking some very nice ore out of the Highbridge mine. He will make another shipment to Eureka some time in September. Shipments of gold bullion will soon be in order from the mill of Leonard, Cruckshanks & Warne, Ophir Canyon. The ore from their mine carries gold of a good grade. The low-grade ores of Nye county can all be profitably concentrated as soon as silver advances to a decent price. The discount is too heavy at present for low-grade ores to leave any margin of profit for those who handle them. The Alexander mill at Grantsville is running steadily on ore from the sixth level of the Alexander mine. The Golden Gate concentrator is a success, and does its work easily and well. Work will shortly be resumed in the Brooklyn mine. There are 13 families and about 50 men residing in Grantsville.

## Esmeralda District.

**MOUNT DIABLO.**—Report for the week ending August 24, 1886: The incline is now 88 feet below the 8th level. The west drift on the 8th level is in 246 feet. The winze from the west drift on the 7th level is down 120 feet and the south crosscut from this drift is in 52 feet. We are in 350 feet in the north crosscut from the west drift on the 6th level, and the south crosscut from this drift is in 148 feet. The north crosscut from the east drift on the 6th level is in 149 feet. We are sinking on some low-grade ore in the intermediate between the 5th and



6th levels. The raise from the intermediate between the 4th and 5th levels is up 28 feet and shows a foot of \$70 ore. A final bullion shipment of \$21,347.02 was made on August 20th.

**PALMETTO.**—*True Fissure*, Aug. 28: R. B. Catherwood, of New York, one of the principal owners of the Palmetto and Silver Peak mines, arrived here last Wednesday on his way to inspect the operations now being carried on at the former place. The report that all work has been stopped is false, and came about this way: When the second level in the Champion was reached, it was found that about 500 tons of waste had been thrown into the shaft from the stopes above. Not caring at present to do the dead-work that the taking out of all this debris would involve, Mr. Catherwood telegraphed from New York to stop all work on Champion shaft and put more men at taking ore from other mines. Work will be continued until spring on the President, Pearl, Diamond, Treasurer and Kentuck, when enough ore will be on the dumps to insure a long mill run. In the spring two 10-stamp mills with capacity for 20 stamps will be built, one at Palmetto and the other at Silver Peak. The property is all owned by four men, and as they are all wealthy and their ore carries about \$40 in gold, the silver scare does not affect them in the least.

#### Hawthorne District.

**HAPPENINGS.**—*Bulletin*, Aug. 25: Assessment work on the Nevada is uncovering some very fine ore. Moss has again struck a body of rich ore and everybody about Kinkead is happy. Moss district is reliable as a gold producer. Arthur George has taken another lease of the Pamlico, and within the last week struck another body of the rich rock with which he formerly surprised the gold hunters of Hawthorne district. A very large body of low-grade gold rock in the Lapanta will be resolved into dividends when the mill is built. In the meantime, the rich rock is being shipped daily and there is enough in sight to continue shipments for a long time. Work is still progressing on the "85," at Aurora. The last ore worked at the Miner's mill, under the direction of H. W. Tangerman, gave a very satisfactory result, and demonstrated the fact that low-grade ores can be profitably worked. The difference between the assay value of the ore and the assay value of the bar showed about \$3 lost in the tailings. In running over copper plates about two-thirds of the assay value is gotten out of the rock. The pulp is then run into tanks and worked in slow-motion pans; by this means excellent results are obtained. Mr. Tangerman has now an offer to have a suitable mill erected at the mine. Should the supply of water prove sufficient to run 20 stamps, a mill of that size will be erected with copper plates, concentrators and slow-movement pans and settlers. Mr. Tangerman calculates to work the rock at an expense not to exceed \$3 a ton.

#### Pioche District.

**NEWS.**—*Pioche Record*, Aug. 21: Charley Roe, owing to the supply of salt having given out, was forced to close down his works at Bristol. It is the intention of the Pioche Con. Co. to construct tanks, of a daily capacity of 50 tons, for leaching purposes. The screenings will first be put through the common process, then afterward treated by the Russell process. It is the intention of the Pioche Con. Co., so Mr. Godbe stated, to at once place the Raymond & Ely in order and extract black ore, which will be shipped to Bullionville, where rolls are to be placed in order for crushing ore, and that the ore will be worked by a new leaching process, the tests of which have given good results. The news from the Ouondago mine is very flattering. While running along the 18-inch ore streak going to the east, Thursday evening, a couple of shots disclosed a breast of extra rich ore four feet in width. The ore at the end of the drift running south is now going down perpendicularly. It is thought that they are just on top of a big body of ore. The mine gives great promise of being a valuable one.

#### Tuscarora District.

**NAVAJO.**—*Times*, Aug. 27: The usual progress has been made with the work at all points the past week. The stopes are yielding the usual grade and quantity of ore. Shipped bullion to the amount of \$8467.98.

**NORTH BELLE ISLE.**—North drift from No. 3 crosscut was extended six feet the past week. The vein shows considerable high-grade ore. From No. 1 crosscut, 400 feet north, the north drift is being advanced on the vein, and is developing a good width and grade of ore that carries from 20 to 40 per cent gold. The new hoisting works are being put in good repair, and as soon as work can be resumed at this shaft, crosscuts will be started at various points on the different levels.

#### COLORADO.

**MINES AND MINING.**—*Georgetown Courier*, Aug. 26: The Osburn & Nunn stamp mill on Fall river, will soon be in running order again. An engine and boiler will be added so as to keep the mill running during the winter. The lessees on the Ouida lode, Chicago creek, had a shipment last week which returned them \$327 and \$109 per ton, according to class. The boys report having a very fair streak of this kind of ore. Chris. Turpin reports the crosscut tunnel which he is driving for the Argentine lode as having reached a distance of 200 feet, with 30 feet further to go to cut the lode. The Argo mine produced about 20 tons of high-grade ore during the month of July. The Brunswick lode, Cascade creek, has recently been purchased by J. F. Depew, who has put a number of men at work. The drift on the South America lode, Ute creek, is now in 250 feet. On a cross-lode, about 150 feet in from the mouth, is being worked. A vein of high-grade ore has been opened up. Mr. G. Barnett has leased the Racket lode, on Chicago creek. The drifts from the 60-foot shaft show fair veins of mineral, which mills \$150 a ton. It is reported that a new body of ore has been opened up in the Mattie mine, from 3 to 16 inches thick, of good grade. Al. Penery & Co., lessees on the Tiger lode, Chicago creek, are working the 100-foot drift, which shows ore carrying ruby silver and gray copper in quantity. A tunnel was located on Red Elephant mountain last week, by J. VanAulken. He states that work will soon be commenced upon it. At 500 feet it will cut the Tabor, when the work will proceed on that vein, to the Red Elephant company's property, opening these up at a

depth of about 1000 feet. Several Georgetown miners have gone over to Montezuma to work on the Silver Wave mine. The Queen of the West mine, in the Horse Shoe, is producing ore which mills \$1,000 to the ton. Sixteen men are at work on the property. The work of sinking the shaft upon the Norman lode, Sherman mountain, is now progressing, the bottom of which shows a very fair vein of ore. Fred Johnson and L. C. Billings are working their Mary Ann. There is a big showing in the breast, and with constant development will yield well. The boys are steadily pounding away. The crosscut tunnel now being run to cut the Rip Van Winkle lode, on Sherman mountain, is in close proximity to the objective point. Several small feeders have already made their appearance, indicating the nearness of the vein. Wm. Shavallia & Co. have taken a contract to drive the crosscut tunnel running to reach the East Muscovite lode, Democrat mountain, a further distance of 60 feet, which it is expected will reach the objective point. The St. Louis lode, on Capital mountain, is improving as the drift is being pushed ahead. The breast now shows a vein of mineralized quartz about ten inches thick. A building, 20x40 feet, is in course of erection. It will be used as a boarding-house. The 7:30 mine is being worked by a force of from 75 to 80 men, and has improved considerably during the past week. Twelve drifts are progressing. Several winzes and raises are also under way. A good-sized vein of high-grade ore has been opened up in the 370-foot level east, which shows considerable gray copper and ruby silver. The outlook of the property never was more promising. Every level shows ore in good-paying quantities, and the ore-house is full of assorted mineral ready for shipment. About 50 tons of unassorted ore is now piled up on the dump. Our "sailor" prospector, C. W. Evans, has opened up another good showing on McClellan mountain. Four inches of nearly solid ore has been encountered, of a very fair grade.

#### ARIZONA.

**ABOUT PRESCOTT.**—*Courier*, Aug. 27: The latest from Alexandra, Peck district, is a bar of silver weighing exactly 73 pounds, which W. C. Dawes sent in by last stage. Jim Shirley, driver of the stage, gave us this silvery "note" and also stated that Mr. Dawes has the water pretty nigh out of the Peck mine and expects, in a week or two, to be crosscutting in the levels of the Occident ground. In Turkey creek district, Messrs. Brann & Mitchell are taking very rich gold rock out of one of their mines. The new ledge in Walker district continues to yield plenty of rich silver ore. Castle creek mining district in this county is having a healthy boom just now. Monday evening that veteran prospector and miner, Willard Rice, returned from the May Flower mine a one-half interest in which, with several adjacent locations, have been recently sold by Chas. Thompson to A. E. Foote. Mr. Rice was laden with samples prudently and carefully selected by him from different parts of the mine. He reports a great abundance of free-milling gold ore. One sample taken from the 700-foot level was found by Assayer Stahl to yield \$161.22 in gold and \$358 in silver. This sample is asserted by Mr. Rice to be below the average of quality of ore found in great abundance on the level from which it was taken by him. Another sample taken from crosscut to foot-wall about 65 feet down, assaying \$20.09. Mr. Rice, who is a level-headed pioneer, well posted in all that pertains to mines, is enthusiastic over the prospects and developments of Mr. Foote's purchase.

#### DAKOTA.

**ITEMS.**—*Lead City Tribune*, Aug. 20: Clara Nevada is shipping ore to Omaha. Steel galena is reported to have been discovered in the Big Chief mine. A night and day shift is employed on the Minna mine, in the Bear Butte district. Work is about to be resumed on the Lady Washington, just north of Lead City. Four bars, the aggregate weight of which was about \$3850, were brought in yesterday from Iron Hill. Charles Hardin, of Two Bit, claims to have obtained \$17 with the use of a mortar and pestle from Good Enough ore a few days ago. There is a large body of ore—carbonate and galena—in the quartzite in the bottom of the Cold Creek canyon, near Richmond Hill. It is reported to assay well in silver. It also carries gold. Deadwood parties have received a charter for sampling works in that city. Thirty thousand dollars have been subscribed to forward the enterprise. If properly conducted it cannot fail to be a great benefit. The Annie mine, on Spruce gulch, is to be opened by a tunnel. It is located some distance below the present workings. A body of good gold ore has recently been discovered in the lower workings of the mine. Some rock lately brought over from the Mugwump, at Carbonate, looks remarkably well. It carries silver. The hoisting plant which has been ordered for this mine is said to be finer than any other at the camp. The directors of the Mugwump Mining Co. held a meeting at the rooms of the Lead City Board of Trade to-day and issued an order to commence the erection of the building for the hoisting works.

#### IDAHO.

**NEWS.**—*Ketchum Keystone*, Aug. 21: Two cars of ore from Bayhorse were dispatched to Omaha on Wednesday. T. E. Clochey & Co. have, during the week, purchased about 50 tons of ore from the various mines. Two carloads of ore from the Carrie Leonard were received during the week, and sent to the sampling works at Hailey. Seven and one-half tons of ore were received at the Sampler from the Buzzo group of mines during the week. During the week ore has been received at the sampling works from the King of the West, Kate May and Buzzo mines. One car of bullion from the Clayton smelter was sent to the separating works at Omaha, during the week, by the Idaho Forwarding Company. The prospects of the Ophir mine brighten every day. The vein of ore mentioned in last week's review continues to gain in width and now shows over 40 inches. The owners propose putting on more men and work regular shifts. Work on winter quarters will soon begin. Thomas Popham has bonded the Albion mine, Cassia county, for the term of six months, the consideration being \$3000. He will leave next week for the mine and intends to do considerable work before snow flies. The property shows a good prospect, and Tom is sanguine that the Albion will, in a

short time, make a good showing. About three tons of good ore was brought to the sampler during the week from the Kate May, at Galena. The mine is being worked by Messrs. Knadler & Spaulding. The ore will go about 120 ounces silver and 60 per cent lead. The work being done on the mine is only on account of assessment. The Bayhorse Smelting Works will start up September 1st. Andrew Cassidy, an old coaster, is on his way to put up a smelting furnace. The above item we find in the *Idaho World*. As yet Mr. Cassidy has not arrived. Forty tons of Skylark ore is on the way from Clayton, to be forwarded to the Omaha Smelting Works. The ore is all first-class.

#### MONTANA.

**PHILLIPSBURG.**—*Butte Miner*, Aug. 25: Just now a large number of St. Louis people are in the city attending the election of the Bi-metallic Company, (the owners of the James G. Blaine lode), the annual meeting of the Granite Mountain Company and generally looking after their vast interests here. The St. Louis people have taken a strong hold upon the mineral properties of the camp and they have been very successful. They own or control the Granite, probably the richest mine in the world; they also control the Hope property with its mill, and have recently organized the Bi-metallic Company, through the instrumentality of which they are developing the well-known Blaine lode. The annual meeting of the Bi-metallic Company was held yesterday and among the directors elected is Josiah M. Merrill, of Butte, who was subsequently elected general manager also. The Bi-metallic property adjoins a 60-foot fraction of the West Granite which lies between the Granite and the Bi-metallic. The property is now being developed. A shaft is being sunk and is now down 190 feet. At 200 feet a station will be cut, when they will crosscut to the north, with the hope of cutting the vein of the Granite mine. Much water has been encountered, but so far no indication of ore. It is estimated that the vein which they are seeking will be encountered 80 feet north of the 200-foot station. About 150 feet west of the present workings the company has a shaft 50 feet deep, being the original discovery shaft of the Blaine lode. In this shaft some very rich ore has been found, but the vein is narrow. The Granite is unquestionably the richest mine in Montana, if not in the world. With its 30-stamp mill it manages to declare \$100,000 a month in dividends—a grand total of \$1,200,000 a year of net earnings. The company is now erecting 40 additional stamps, which will double the present output and one-third more. So we may reasonably expect that the net earnings will soon exceed \$200,000 a month. The mine is now developed by five tunnels, and a level under tunnel No. 5, known as No. 6. These workings have thoroughly exposed the richness of the mine and the area of the deposit. It is estimated by competent persons who have inspected the mine that at least \$16,000,000 is now in sight. The mine is carefully managed and scientifically developed under the direction of Captain Plummer, the general manager. The Granite is a veritable bonanza. It is in No. 6 where the richest ore is now being found, and where they also have the largest body; and it improves in size and richness as development is pushed. The richest ore taken out of the mine—said to average nearly \$1000 a ton—is sacked and shipped for reduction, being smelting ore. The Hope Company has thoroughly prospected old Hope hill and established the area and continuity of the mineral deposits upon which the company's mill is dependent. It is estimated that there is now ore enough in sight to keep the mill busy for at least three years—or more than has been in sight at any time since the company was organized. The ore is low grade, carrying about 16 ounces and free milling. The mine is exceedingly "faultry," no less than eight faults having been encountered last year and four this year to date. The ore is found in pockets. The exceedingly low grade of the ore and the expensive character of the mine has been overcome by the present manager, G. H. Babcock, in immense reductions in the cost of reducing the ores. The mill consists of ten stamps. It crushes 34 tons of ore a day and reduces ore at \$3.75 per ton—the best work, probably, done by any mill in the country. Mr. Babcock hopes to reduce this cost to \$3 next month. The present cost of extraction and reduction is \$9.83. The hope of Phillipsburg is the West Granite mine. This is the property some time since acquired by J. K. Pardee for himself and a syndicate of Helena capitalists. This property adjoins the great Granite mine on the west and is believed to contain the extension of that vein. Tunnels numbers 5 and 6 of the Granite are only between 200 and 300 feet from the side line, and the trend of the bonanza vein certainly seems to be into the West Granite claim. There are many reasons for believing that the Plummer vein of the Granite will be found in the West Granite. But faith in the West Granite is not based upon this theory solely. A tunnel has been run 540 feet. At 400 feet from the tunnel mouth, the header was deflected from a northeast to a course very nearly due east. At 100 feet from point of deflection the vein was struck. Owing to the large amount of water contained in the vein the entire level was filled with vein-filling and broken quartz. Examination showed that they had been paralleling the vein for 100 feet. The vein was crosscut 30 feet back of the header, a square set put in and the level again started on the vein. The inclosing rock was found not to be disturbed. Sixteen inches of ore laid to the hanging wall against a 12-inch clay casing. Against this one lay three feet of pink manganese. This constituted the vein. At the crosscut west of the header—at the point of deflection—20 inches of very high-grade rock was found, the vein being about the same width as at the head of the header. This level is pushed west on the ore body, which increases in size, of a uniform richness. This is the farthest west that ore has been found in the camp and indicates that, as in the Granite, the vein increases in richness as it goes west. The ore now taken out averages 400 ounces, though ore is taken out that runs 600 and 800 ounces. Mr. Thomas Cruise, the president of the company, is now in the camp, and examined the property yesterday. He was greatly pleased with the mine and says that the work of development will be rapidly pushed. Mr. Cruise and his Helena associates being ready to put up all the money that may be required. Engineer Kellogg has surveyed a shaft for the company, and work on sinking it has begun. It is the intention to sink

500 feet at once and then prospect the property systematically. The miners of the camp and the people generally have every confidence in the West Granite, and an unusual amount of stock is held and is daily being bought out of the savings of the people. They confidently believe that they have another bonanza in sight. The company property is very extensive, comprising eight claims, all lying south and west of the Granite and further down the mountain side.

**SOUTH SIDE MINES.**—Having mentioned something about the mines on the north side of Alta City, I will now undertake to mention a few on the south side. Our enterprising miner, Ed. Haines, has secured a lease on the ground taken from the old Emma years since, east of Alta near the creek. He expects to erect a jiggling apparatus to work the same. The Jack mine, the property of Charles M. Sickler and James R. Tainsh, has been successfully worked this summer under the direction of Mr. Tainsh. Mr. James Wall, our old recorder, a few days since developed a good rich vein of high-grade ore in the Peruvian mine. Mr. Wall was in town a few days since and is much pleased with his good prospect. Mr. Joseph Burwood has taken a lease on the Oxford and Geneva. He has already made a good shipment from the same, and has more ore on the dump ready for shipment. The Moltke mine is now working on lease by the old Alta pioneer, Baldy Fritz. He has taken out a good quantity of high grade ore. Our worthy citizen, Henry Wagner, Esq., the owner, was here and seemed to be much pleased with the mine. Judge James A. Varnes is still working the Albion on lease. He has taken a large quantity of high-grade ore, and has already made a big shipment, and will be ready in a few days to make another.

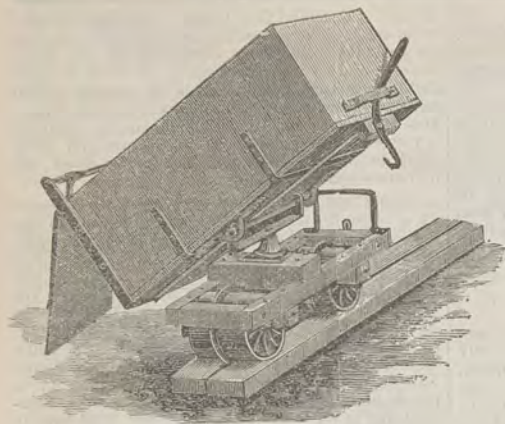
#### NEW MEXICO.

**THE MINES.**—*Socorro Bulletin*, Aug. 24: The Kelly mine is being operated with the usual good system, and is turning out several carloads of ore daily, which is shipped to this city and treated at the Billing works. For four years this property has been a constant producer, and in the deepest workings of the mine, which cannot now be less than 700 feet below the apex, its ore body displays increased quantities of that character of mineral which has placed this property in the same category with the first producing properties of this continent. The condition of this property establishes the value of the mines of the Magdalena district. The Graphic and the Greyhound mines, in the same district, are also being developed and exploited in a manner that does credit to their management, and affords daily mineral for treatment at the Graphic smelter of this city. The Greyhound is developing in a manner to astonish its owners, and both properties are making an output of mineral of better than ordinary quality from ore bodies which are steadily increasing in dimension. The Imperial mine, lying south of the Kelly, which was recently sold to Chicago parties for \$43,000, is awaiting the necessary machinery now on the way from the East, when the active exploitation and development of the property will commence in earnest. It is even rumored that a smelter, to be erected in this city, will be the next move made by the present owners. The Ruby gold excitement in Jordan Canyon gave a fresh impetus to mining in this county, and now not less than 20 claims in the vicinity of the gold strike are affording excellent ore. The Ruby mine has gone under new management, which is now working the property with a method that will insure its economical and successful development. The Jane Bowman gold mine in Water canyon shows up better than ever before, and the Ninevah Copper, in the same district, is awaiting hoisting machinery preparatory to continuous development. The concentrator near the Jane Bowman will commence operations in a short time. The Cooney or Silver Bar mine near Alma will be worked in a few days with an increased force, and the company owning it will erect a stamp mill and concentrator at once for the treatment of its ore. The Peacock or Miller mill, in the same district, has been working steadily, only stopping as necessity demanded for repairs, etc. The Sheridan Company mill is fast arriving at that stage where it will very largely augment the bullion production of this county. The Brittenstein mines and mill in the Pueblo district will, at no remote period, continue their bullion product to swell the production of the county. Several new plants are talked of, among them one for the Anchor mine. Not less than 200 mineral locations were made in this county within the past six weeks, and more than 400 miners are added to the population which inhabits our mountain ranges. Important strikes are reported weekly from Water canyon and the east slope of the Magdalenas, and ruby silver was discovered on the summit of the Magdalenas two weeks ago.

#### OREGON.

**GRANT CO. NOTES.**—*Bedrock Democrat*, Aug. 23: The new quartz find on Dixie creek is still showing up very well. They are not doing much at the Keystone now, except preparing for a big run after a while, but the rock that is being taken out is up to the usual standard. The Brackett & Lockwood ledge is being prospected, and so far is satisfactory. Yesterday some of the coal discoverers mentioned last week returned, after having partially prospected the ledge, which is about 16 feet wide on the surface. The discovery was made by John Garrison while out hunting. The coal burns quite well, and may, in time, be a valuable piece of property. Mr. Garrison wants to sell an interest to some man with capital so that he can develop it. Latest reports from the Big creek placer mines are very encouraging. Charley Dustin was over from Long creek during the week, and brought the news of recent discoveries. One man sunk a prospect hole, and before reaching bedrock he struck dirt which went three dollars to the pan. That country is composed of immense gravel deposits, and is liable to show something very rich. Laurance Starr & Co. are at work on a quartz lode in the Quartzburg district, which is from 80 to 100 feet wide. Assays from this mine are highly encouraging; they have been at work developing this ledge for some time. Shearer & Co. also have men at work on the same line north; Barrett & Co. on the same south. There are thousands of tons in sight. This is the mine for a large steam mill, plenty of timber on the claims. We are just beginning to find that Grant county is rich in gold and silver quartz,





JAMES' PATENT ORE CAR.

# TATUM & BOWEN,

34 &amp; 36 FREMONT ST., Donahue Block, SAN FRANCISCO.

91 &amp; 93 FRONT ST., PORTLAND, OREGON

Ore Car, . . . \$ 40.00  
 Rock Breaker, . . . 100.00  
 Quartz Mill, . . . 350.00

## THE JAMES QUARTZ MILL

Saves a Higher Percentage than any other machine.

Its action is a reciprocating motion of four separate and distinct Dies attached to a heavy casting in such a way that the **WHOLE WEIGHT and FORCE OF BLOW ACTS ALTERNATELY ON EACH DIE.** In this respect it resembles the Stamp Mill, and in point of amalgamation is superior to any machine in use. There is no wear, except on Shoes and Dies, and there is no expense for setting. Weight, 3000 pounds. Capacity, 6 Tons in 24 hours through No. 40 Screen. Requires 4 H. P.



SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

**BEST SOFT LAKE SUPERIOR COPPER USED.**

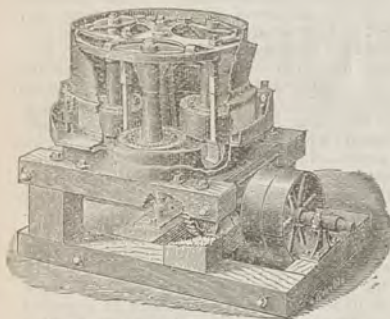
3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.**

**E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



Centrifugal Roller Quartz Mill.

## F. A. HUNTINGTON,

MANUFACTURER OF

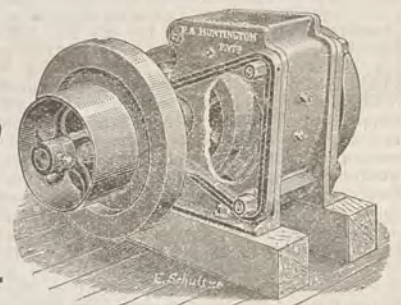
Centrifugal Roller Quartz Mills,  
 CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,

Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.



THE CONSUMERS' COMPANY.

## VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.  
 SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank  
 Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**

218 California Street, San Francisco, Cal.

## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

**GIANT POWDER or DYNAMITE,**  
 Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and  
 GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

**JUDSON POWDER IMPROVED.**

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast  
 ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and  
 saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

**BANDMANN, NIELSEN & CO.,**

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

DEWEY & CO., { No. 252 MARKET ST } PATENT AGENTS.  
 Elevator 12 Front St.

## CINCINNATI CORRUGATING COMPANY.

JOHN F. HAZEN, Prest.

JAMES HICKS, Treas.

J. G. BATTELLE, Sec'y.

## Over 1500 Tons Iron in Stock!

FOUR WIDTHS OF CORRUGATIONS MADE!

**STANDING SEAM PLAIN ROOFING!**

**All Paint Re-ground in Pure Linseed Oil!**

## JENKINS PATENT VALVES.

Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over all  
 other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossi-  
 ble to make them tight except by regrinding, which is expensive if done by hand, and if done  
 by machine soon wears out the valve, and in most cases they have to be disconnected from  
 the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is  
 manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited.  
 To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.



## CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

**STEIGER & KERR, Occidental Foundry,**

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

UTAH OFFICE—SALT LAKE CITY, UTAH.

DENVER OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,

JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

## Metallurgy and Ores.

**SELBY  
SMELTING and LEAD CO.,**  
416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY  
And Assay Office.**

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

**Standard Shot-Gun Cartridges,**  
Under Chamberlin Patent.

J. KUSTEL.

H. KUSTEL.

**METALLURGICAL WORKS,**  
318 Pine St. (Basement),  
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.  
Assaying and Analysis of Ores, Minerals and Waters.  
Mines Examined and Reported on.  
Practical Instruction given Treating Ores by improved processes.

**G. KUSTEL & CO.,**  
Mining Engineers and Metallurgists.

**C. H. AARON,**

**ASSAYER AND METALLURGIST,**  
NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

**WM. D. JOHNSTON,**

**ASSAYER AND ANALYTICAL CHEMIST,**  
514 Kearny Street,  
SAN FRANCISCO, - CALIFORNIA  
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

**JOHN TAYLOR & CO.,**

IMPORTERS AND DEALERS IN  
**ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,**

CHEMICAL APPARATUS AND CHEMICALS, DRUGGISTS' GLASSWARE AND SUNDRIES, ETC.  
114-118 Pine Street, - San Francisco.

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.  
Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well justify the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

**JOHN TAYLOR & CO.**

**Nevada Metallurgical Works.**

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

**C. A. LUCKHARDT & CO.,**

(Formerly Huhn & Luckhardt, )

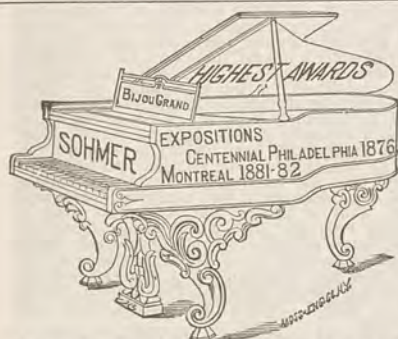
Mining Engineers and Metallurgists.



**The California  
Perforating Screen  
Company.**

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

**FLOUR AND OTHER MILLS.**  
Quartz Mill Screens a Specialty.  
147 Beale Street, San Francisco,



**SOHMER & CO. PIANOS.**  
**PEEK & SON PIANOS.**  
**BYRON MAUZY,**

SOLE AGENT,

922 Market Street, San Francisco, Cal.  
SEND FOR CATALOGUE.

**American Exchange Hotel,**  
SANSOME STREET.

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50  
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

**NATIONAL ASSURANCE CO.,**  
OF IRELAND.

**ATLAS ASSURANCE COMP'Y,**  
OF LONDON.

**BOYLSTON INSURANCE COMPANY,**  
OF BOSTON, MASS.

**H. M. NEWHALL & CO.,**

GENERAL AGENTS,

309 & 311 Sansome St., San Francisco, Cal.

**QUARTZ BREAKERS!**

—AND—

**Pulverizers Combined.**

To Run by Hand or Power.

Mining Machinery of Every Description: Drawings, Plans and Specifications.

E. I. NICHOLS, 316 Mission Street, S. F.

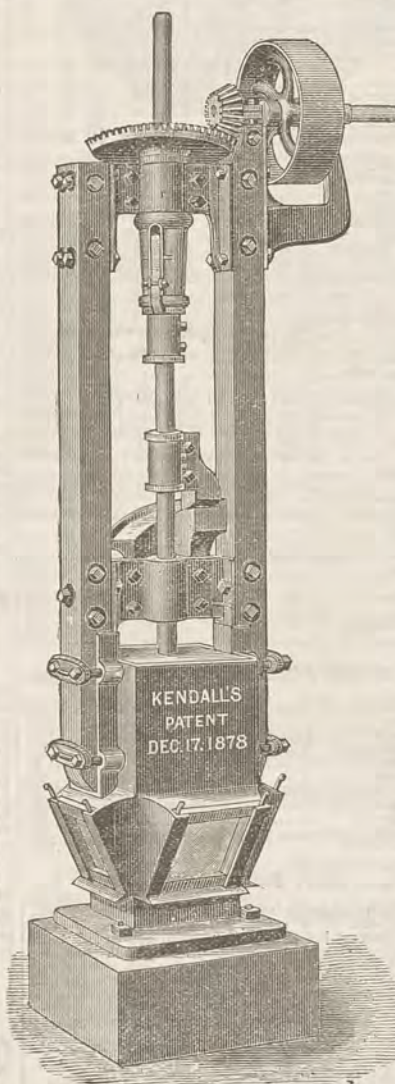
**A Good Opportunity for a Mechanist.**

A variety of good Tools, Patterns, etc., with business for sale cheap by a party retiring from business. A splendid opportunity for an enterprising mechanic. Address A. B. C., care of this paper.



**RUPTURE!**

A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort night and day. Gives universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDDER, (Druggist) 701 Market Street, cor. Third, San Francisco.



L. C. MARSHUTZ.

G. T. CANTRELL.

**NATIONAL  
IRON WORKS,**

N. W. Cor. Main and Howard Sts.,  
San Francisco,

...MANUFACTURERS OF...

**Stationary and Compound  
Engines,**

**FLOUR, SUGAR, SAW and QUARTZ  
MILL MACHINERY.**

**AMALGAMATING MACHINES.**

**CASTINGS and FORGINGS**

Of Every Description.

All Work Tested and Guaranteed!

**Improved Portable Hoisting Engines**

...SOLE MANUFACTURERS OF...

**KENDALL'S PATENT  
QUARTZ MILLS.**

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past seven years, we know their merits and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that is claimed for it and give entire satisfaction.

MARSHUTZ & CANTRELL.

Send for Circulars and Price List.

**THOMAS PRICE'S ASSAY OFFICE,**  
CHEMICAL LABORATORY,  
**BULLION ROOMS and ORE FLOORS,**  
524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

**SQUARE FLAX PACKING.**

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.



### A New Wave Motor.

(Continued from page 153.)

basin. Figs. 7 and 8 are views of the piston-rod. Figs. 9, 10, 11, 12 are views of the receding-valves, showing the grooves in their rim. Fig. 13 is a plan of the piston. Fig. 14 is the same, looking from underneath. Fig. 15 is a plan of the check-valve, *g*, showing oil-holes and channel. Fig. 16 is a plan of the air-pump, showing the guide-bars, *k*, and the valve-seats.

Each of the four receding valves shown, *g*<sup>1</sup>, *g*<sup>2</sup>, *g*<sup>3</sup>, *g*<sup>4</sup>, has recesses or grooves, *j*, in the rim, into which guide-bars, *k*, enter, and on which the valves move up and down. The guide-bars are secured to the pump-barrel by screws. Each of the receding valves increases in diameter corresponding to the sections of the pump-barrel, as shown in Figs. 9, 10, 11, 12, and is provided with a rubber cap, *h*, which is attached to the valve by a screw, *i*. The cap is countersunk for the head of the screw, the shank of which is loose in the cap, by which means the cap rises to the pressure of the air and permits it to pass into the upper section of the pump. The check-valve, *g*, and the piston, *m*, are each provided with a like rubber cap, having similar action. The piston-rod is connected with the piston by a universal joint, *n*, which acts reciprocally to the motions of the buoy. For the purpose of lubricating the guide-bars, *k*, an oil-cup, *l*, placed on the top of the pump-barrel, supplies oil to holes, *q*, in the check-valve, through which it flows to the bars. In Fig. 1, the dotted lines, *z*<sup>1</sup>, show the movement of the buoy in imparting a full stroke to the pump. A full up-stroke will discharge the compressed air out of the pump, leaving the valves massed in the upper section; and on the down-stroke each valve will fall and seat in its proper section. The object of the sections in the pump-barrel is to store the air received from imperfect strokes of the piston caused by the irregular action of the waves; and, whether the stroke is short or long, the air received is stored in the sections until it is discharged into the air-chamber. The basin, *B*, to which the pumps are attached, imparts to the pumps the wave-power received from the buoy—the weight of the ballast in the basin being the equivalent of the pressure exerted on the pumps.

In adapting the wave motor for service as a signal, relief, or light station, a heavy iron framework, *Q*, is attached to the upper segment of the buoy, as shown in Figs. 1 and 4. In this framework there are arranged and secured a signal whistle, *U*, which is operated by compressed air conveyed by a pipe, *Z*<sup>1</sup>, from the reservoir, *E*; an electric light, *V*, and a bell, *W*; and at the top there is a step for a flagstaff. Extending from the top of the buoy to about the middle of the framework there is a cylindrical iron tower, *O*, having porthole lights and a door opening from the hurricane deck, *Z*. The tower is also entered from the inside of the buoy by a spiral stairway, *P*, for the purpose of arranging or repairing the electric lights, and for a lookout. Surrounding the buoy above the reservoir, *E*, there is a main deck, *X*, from which a companion-ladder extends to the hurricane deck.

The inventor is of the opinion that the wave motor may also be applied to a sailing vessel as an auxiliary means of propulsion. When employed as a signal, relief or light station the buoy would be 30, 60 or 90 feet in diameter. In every case where the station was unusually exposed to the action of high winds and the consequent rough water, the buoy would be provided with means for discharging oil overboard to smooth the surrounding water.

### Mining Share Market.

There has been little change on the Comstock this week. A fracture of the pump-rod of the Cornish pump in the Combination shaft was discovered on Thursday morning, near the upper end of the rod. Its working was stopped immediately, as in a pump-rod about 3000 feet long, made of 16-inch timbers, it will not do to wait for a break. The fractured section has accordingly been removed and a new one substituted, says the *Enterprise*. Meanwhile, owing to the bailing tanks being called into service at the shaft, hoisting of debris could not be done, consequently operations on the 3200-level were temporarily suspended. The hydraulic pump and the tanks kept their water reduced and confined to the sump, all of which shows the perfect efficiency of the pumping arrangements in this shaft in case of any possible emergency.

With regard to the proposed pumping out of the submerged lower levels of the Gold Hill mines, strong objection has existed. The Yellow Jacket Mining Company holds the key to the situation, and Colonel Bob Morrow holds the controlling interest of that mine. The shaft is 3000 feet in exact perpendicular depth, and has a splendid Cornish pump, which was taken from the shaft at the time of the flood. Colonel Bob Morrow is now stated to have given his consent to the arrangement. If so, there will be plenty of capital provided to carry the scheme through. Some of the principal mining men of the Comstock are now in San Francisco, engaged in trying to effect this important object, which it most certainly is to be hoped will prove a success. In case of pumping out the Yellow Jacket shaft, others would follow suit, and it is said that the Bullion Company would also assist by sinking their shaft deeper. This, however, is problematical, or a question for the future, as the sinking of that shaft to a corresponding depth with the 3100 level of the Chollar and Potosi, or the 3000 level of the Jacket, would involve sinking 700 or 800 feet deeper. Start the Yellow Jacket pump, however, and all other desired adjuncts and measures of assistance would be easily arranged.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.	
Bullion M Co.	Nevada.	31.	30. Aug 31.	Oct 25.	R. R. Grayson.	327 Pine St	
Con Imperial M Co.	Nevada.	23.	10. Aug 5.	Sept 8.	C. L. McCoy.	329 Pine St	
Chollar M Co.	Nevada.	21.	40. Aug 24.	Sept 23.	Oct 20.	C. E. Elliot.	309 Montgomery St
Eureka Con M Co.	Nevada.	10.	1.0. July 23.	Sept 6.	Sept 25.	E. H. Willson.	328 Montgomery St
Horseshoe M Co.	California.	10.	02. July 27.	Aug 30.	Sept 15.	T. R. Covey.	Grass Valley
Hale & Norcross M Co.	Nevada.	91.	50. July 16.	Aug 18.	Sept 8.	J. F. Lightner.	309 Montgomery St
Indian Spring Drift M Co.	California.	6.	03. July 26.	Aug 30.	Sept 13.	L. H. Sharp.	213 Sansome St
Loreto M & M Co.	Mexico.	9.	40. Aug 5.	Sept 6.	Sept 29.	U. T. Bridge.	224 California St
Mount Como M Co.	Nevada.	1.	10. July 7.	Aug 14.	Sept 3.	M. Horowitz.	331 Montgomery St
Mount Cory M Co.	Nevada.	1.	1.00. Aug 25.	Oct 2.	Oct 23.	G. Frier.	309 Montgomery St
Nevada M & M Co.	Nevada.	1.	1.00. Aug 25.	Oct 2.	Oct 23.	G. L. Brander.	309 Montgomery St
New Cose M Co.	California.	13.	20. July 13.	Aug 27.	Sept 13.	J. L. Hunt.	5 Pioneer Place
North Banner Con M Co.	California.	14.	11. Aug 7.	Sept 9.	Sept 27.	T. J. Mitchell.	Grass Valley
Occidental M Co.	Nevada.	7.	30. Aug 9.	Sept 13.	Oct 4.	A. K. Durbin.	328 Montgomery St
Panama M Co.	Idaho.	6.	01. Aug 7.	Sept 17.	Oct 16.	A. Halsey.	309 Montgomery St
Panalella M Co.	Mexico.	2.	30. July 14.	Aug 20.	Sept 10.	M. Herzog.	330 Sutter St
Potosi M Co.	Nevada.	10.	30. Aug 31.	Oct 5.	Oct 25.	C. E. Elliot.	309 Montgomery St
Utah M Co.	Nevada.	53.	50. Aug 24.	Sept 23.	Oct 18.	A. H. Fish.	309 Montgomery St

MEETINGS TO BE HELD.

### MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Ala'ka M Co.	California.	A. Judson.	320 Sansome St.	Annual.	Sept 7
Brush Creek M Co.	California.	A. Judson.	320 Sansome St.	Annual.	Sept 7
Con Amador M Co.	California.	F. B. Latham.	327 Pine St.	Annual.	Sept 7
Jupiter M Co.	California.	Edward Land.	309 Montgomery St.	Annual.	Sept 25

### LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	25.	Aug 25
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Aug 16
Young America M Co.	California.			40.	May 20

### San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Sept. 2, 1886.

ANTIMONY—French Star.	9 1/2 @	—
BORAX—San Bernardino.	— @	8
Artinasosa.	— @	62
Ing—Glenbrook ton.	— @	22 50
Eglington, ton.	— @	21 50
American Soft, No. 1, ton.	— @	24 00
Oregon Pig, ton.	21 00	@ 23 00
Clippers Gap, Nos. 1 & 4.	22 00	@ 23 50
Clay Lane White.	21 50	@ —
Shotts, No. 1.	23 50	@ —
Steel—English, B.	10 @	15
Black Diamond, ordinary size.	10 @	—
Plow.	4 @	5
Machinery.	5 @	6
Sanderson Bros.	10 @	—
COPPER—		
Braziers' sizes.	20 @	22
Pine-box heels.	20 @	—
Bolt.	19 @	—
Sheeting.	18 @	—
Ingot.	12 @	13
Lead—Pig.	5 00 @	5 20
Bar.	64 @	—
Pipe.	8 @	—
Sheet.	8 @	—
Shot, discolor, 100 lb.	Drop, 8 bag.	1 35 @
Buck, 7 bag.	1 85 @	—
Chilled, do.	2 20 @	—
ZINC—German.	9 @	10
Sheet, 73 ft. 7 to 10 lb, less the case.	7 1/2 @	—
QUICKSILVER—By the flask.	36 75 @	37 00
Flasks, new.	1 05 @	—
Flasks, old.	85 @	—
TINPLATE—Coke.	5 25 @	6 50
Charcoal.	6 75 @	7 25

### New York Metal Market.

Telegraphic advices dated Sept. 2d give the following New York prices:

BORAX—6 3/4 @ 7 1/4 c.  
BAR SILVER—92 3/4 per oz.  
COPPER—LAKE—\$10.25.  
IRON—No. 1, \$17 to \$18.00.  
LEAD—\$4.85 to \$4.95.  
QUICKSILVER—43 @ 43 1/4 c.

The following is the latest by mail from the "New York Metal Exchange Market Report":  
COPPER—Firm and fairly active, spot closing 10.20c @ 10.30c. Transferable Notices (Lake) issued at 10.30; Transferable Notices (Chili Bars) issued at 1.39 1/2.

LEAD—Steady at \$4.75 @ 4.82 1/2 c spot; \$4.80 @ 4.85 futures. Transferable Notices issued at 4.77 1/2.  
TIN—Fully steady and decidedly brisker at \$21.75 @ 21.90. Transferable Notices issued at \$21.80.  
Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$21.90 @ 22.25; Billiton Tin, \$22.00 @ 22.35; Banca Tin, \$21.15 @ 22.50; Baltimore Copper, \$9.25 @ 40; Orford Copper, \$9.35 @ 40.65; P. S. C. Copper, \$9.35 @ 40.65; Foreign Lead, \$4.85 @ 4.90; Foreign Spelter, \$4.70 @ 4.75.

### Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Germany, Aug. 24, \$6154.96; Hanauer, 24, \$900; Crescent, 24, \$1400; Queen of the Hills, 24, \$1400; Nevada, 24, \$9150; Queen of the Hills, 25, \$2950; Nevada, 25, \$2970; Germany, 25, \$2983.38; Hanauer, 26, \$5970; Germany, 26, \$2952.94; Hanauer, 28, \$9030; Germany, 28, \$5680.64; Queen of the Hills, 28, \$5680. The last week's output in the mining market, Salt Lake City, was 31 cars bullion, 733.298 lbs.; 38 cars ore, 1,091,360 lbs; seven cars copper ore, 216,650 lbs.; total, 76 cars, 2,041,308 lbs.

### Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

### Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
G. W. INGALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
R. G. HUSTON—Montana.  
GEO. McDOWELL—San Luis Obispo and Santa Clara Co's.  
FRANK W. SMITH—Utah and Colorado.  
M. S. PRIME—Alameda Co.  
A. S. LUCH—Nevada and Placer Co.'s.

## IRRIGATION.

### The Law of Water for Irrigation in Colorado.

By S. W. CARPENTER.

This book is intended to present in a clear and concise way the Colorado law of this very important subject at the present time, with all the latest decisions. It also contains many suggestions of the greatest value to those interested in securing and preserving water rights in Colorado.

The information will be found of great value to those who are interested in irrigation laws for California.

We append, by permission, a notice of the book from Hon. H. P. H. Bromwell, of Denver, a member of the State Constitutional Convention, and of the General Assembly at the time much of the legislation on the subject of irrigation was framed, and later referee in the establishment of priorities in Water District No. 3, Cache la Poudre river, and a well recognized authority in such matters.

DENVER, COLO., June 2, 1886.

S. W. CARPENTER, Esq.—Dear Sir: I have examined the digest and compilation entitled "The Law of Water for Irrigation in Colorado," which you have prepared, and beg leave to say that in my opinion it will prove to be of much use and value to the community. The work so much needed has been done by you remarkably well, considering the brevity necessary in preparing a book for the use of all parties interested in irrigation, as well as of members of the bar. Respectfully and truly,

H. P. H. BROMWELL.

Price, \$1.25. Post-paid.

FOR SALE BY

DEWEY & CO., 252 Market St., S. F.

### Testing and Working Silver Ores

An illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the heading of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the heading of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Knecht's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

Price, post free, \$2.00. Sold by Dewey & Co., Publishers, 252 Market St.

### Practical Treatise on Hydraulic Mining.

By AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdies, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by Dewey & Co., Publishers, 252 Market St., San Francisco.

MERIT will tell; misfit spectacles will ruin your eyesight; judge by comparison. Muller's optical depot, 135 Montgomery St. x

## REGISTRATION

—FOR THE—

### General Election.

All electors desiring to vote at the General Election, to be held November 2, 1886, must be registered regardless of any previous registration.

Registration for the General Election to be held November 2, 1886, will commence at the office of the Registrar of Voters, in the basement of New City Hall, on WEDNESDAY, August 4th, and will continue until MONDAY, October 11th, inclusive. Office hours, 9 o'clock A. M. to 5 P. M.

By order of the Board of Election Commissioners.

P. F. WALSH, Registrar.

August 1, 1886.

H. M. RAYNOR,

No. 25 Bond St.,

NEW YORK.

ESTABLISHED  
1858.

FOR ALL

Laboratory

—AND—

Manufacturing Purposes.

Wholesale and Retail.

Native Platinum and Scrap purchased.

### ASSESSMENT NOTICE.

Truckee Ice Company.—Location of principal place of business, San Francisco, California. Location of works, Martins Creek, near Truckee, Nevada county, California.

NOTICE is hereby given, that at a meeting of the Directors, held on the 1st day of September, 1886, an assessment (No. 1) of Ten Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 202 Sansome Street, room 4, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 4th day of October, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 25th day of October, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

GEO. W. SCOTT, Secretary.

OFFICE—No. 202 Sansome St., room 4, San Francisco, California.

### DIVIDEND NOTICE

OFFICE OF THE

Paradise Valley Mining Company  
San Francisco, California.

At a meeting of the Board of Directors of the above-named Company, held August 24, 1886, Dividend No. 8, of Twenty-five (25) Cents per share, was declared payable on Wednesday, the 25th of August, 1886, at the office of the Company.

W. LETTS OLIVER, Secretary.

OFFICE—No. 328 Montgomery St., San Francisco, Cal.



## LUBRICATION.

Our readers can procure of CHARLES J. WOODBURY Manufacturer of Oils, 123 California St., San Francisco, a fine Lard Engine Oil, unsurpassed by any other Oil for general use, and which will flow through any feeder at all temperatures. Also, Cylinder Oils, Refined Cylinder Tallow, Lubric Compound, Farm, Machine, and strictly pure Lard Oil. The Woodbury Oils are in use on the Central, Southern, and Northern Pacific Railways, and nearly every Railroad and Steamship line on the coast.

## A Great Repository of Practical and Scientific Information.

One of the Fullest, Freshest, and Most Valuable Handbooks of the Age. Indispensable to every practical man. Just Ready. Price, \$2.00, Free of Postage to any address in the world.

## THE Techno-Chemical Receipt Book:

Containing several thousand Receipts covering the Latest, Most Important, and Most Useful Discoveries in Chemical Technology, and their Practical Application in the Arts and the Industries. Edited chiefly from the German of Drs. Winckler, Elsner, Heintze, Mierzinski, Jacobsen, Koller, and Heinzerling, with additions by William T. Brann, Graduate of the Royal Agricultural College of Eldena, Prussia, and William H. Wahl, Ph. D. (Held.), Secretary of the Franklin Institute, Philadelphia; author of "Galvanoplastic Manipulations," illustrated by 78 engravings. One volume, over 500 pages, 12mo., elegantly bound in scarlet cloth, gilt, closely printed, containing an immense amount and a great variety of matter.

Price, \$2.00, free of postage to any address in the world.

**ABSTRACT OF CONTENTS:** Adulterations, Imitations, etc. How to Detect Them; Alloys; Artificial Gems, Pearls, and Turkish Beads; Bitters, Cordials, Elixirs, Liqueurs, Ratafias, and Essences, Extracts, Tinctures, and Waters Used in their Manufacture, and the Manner of Coloring them; Blasting Compounds, Plastering Powder, Dynamite, Gun Cotton, Gunpowder, Nitro-Glycerine, Fulminates, etc.; Bleaching; Boiler Incrustations; Bone, Horn, and Ivory, to Bleach and Dye them, and make Imitations and Compositions; Bronzing and Coloring of Metals; Building Materials, Artificial Building Stone, Mortars, etc.; Cocoa and Chocolate; Celluloid, Caoutchouc, Gutta Percha, and Similar Compositions; Cements, Pastes and Putties; Chemical and Techno-Chemical Expedients, Preparations; Cleansing, Polishing, and Renovating Agents; Colored Chalks, Crayons, Pencils, and Inks for Marking Linen etc.; Confectionery; Copying and Printing; Damaskeening Steel; Decoration, Ornamentation, etc.; Dentifrices and Mouth Washes; Dyeing Woolen and Cotton Goods, and Yarns, Silk, Straw Hats, Felt Hats, Kid Gloves, Horsehair, etc.; Mordants; Electro-Plating, Galvanoplasty, Gilding, Nickeling, Silvering, Tinning, etc.; Enamels and Enameling; Feathers, Ostrich, Marabouts, etc., how to Wash, Restore and Dye; Fire-extinguishing Agents and Means of Making Tissues; Wood, etc. Incombustible; Fireworks; Food and Food Preparations; Freezing Mixtures; Fruit and other Syrups; Fuel and Heating, Heat Insulation (Non-conducting coverings); Fusible Colors used in Porcelain Painting; Glass, Composition of the various kinds of, Colors for, and Processes for Enameling, Engraving, Gilding, Silvering, Pulverizing, Filing, Bending, etc.; Glazes for Earthenware; Glass and other Signs; Glue, Manufacture of; Household and Rural Economy; Illuminating Materials; Imitations, Substitutes, etc.; Indigo, Indigotine, and Alizarine; Inks, Lithographic, Printing, and Writing; Jeweler's Polishes; Lacquers and Varnishes; Leather, Tanning and Dyeing, including Furs, etc.; Liquors and Beverages: Beer, Brandy, Gin, Whisky, Wines, etc.; Lubricants for Machines, Wagons, etc.; Marine Glue; Matches; Metal Industry; Mustards; Oils and Fats, Animal, Vegetable, and Mineral; Oil Paintings; How to Cleanse, Pack, and Varnish them, and to Restore Gilt Work; Paints and Pigments; Grinding and Mixing Colors, Graining, Imitation of Marbles. Paints and Washes for Various Purposes, etc.; Paper and Paper Materials, Manufacture, Staining, etc.; Glass, Sand and Emery Paper; Perfumery, Aromatic Vinegars, Cosmetics, Extracts, Hair Oils, Pomades, Powders, Washes, Fumigating Articles, etc.; Pharmaceutical preparations; Photography; Plaster of Paris Casts which can be Washed; Preserving Meat, Milk, Vegetables, Vegetable Substances, Wood, etc., and Preservatives; Sealing Wax and Wafers; Shoe-Blacking, Dressings, etc.; Sizing and Dressing for Cotton, Wool, Straw, etc.; Soap, Hard and Soft Soaps, Medicated and Toilet Soaps, etc.; Soldering and Solders; Sugars, Glucose, etc.; Textile Fabrics and Tissues; Tobacco, Smoking Tobacco, Snuff, Sternuative Powders, etc.; Vinegar, Manufacture of Ordinary and Fine Table Vinegars; Washing and Scouring, Manufacture of Washing Blue, etc.; Waste and Offal, Utilization of; Water-Glass (Soluble Glass) and its Uses; Water-proofing Compounds; Wax and Wax Preparations; Wood Gilding, Polishing, Staining, etc.; Yeasts, Manufacture of Pressed Yeasts, Bakers' and Brewers' Yeast, etc.; **Addenda.** Alloys; Antiseptic and Preservative Agents; Artificial Eyes, Manufacture of; Asbestos and its Uses; Bleaching; Bookbinding, Gilding, and Ornamenting; Bronzing; Gilding, Silvering, etc.; Building Materials, Celluloid, Imitations, Substitutes, etc.; Cement Work; Cleansing, Polishing, and Renovating Agents; Colors, Enamels, Cements, Glue, Varnishes, Water-proofing Substances, etc.; Copying; Explosive Agents; Glass; Horn Combs, Manufacture of; Lubricants, Blacking, etc.; Metal Industry; Miscellaneous; Oils and Fats; Paper; Straw, Bleaching and Dyeing of; Strength of Materials; Willow-Ware; Index.

A circular of 32 pages, showing the full Table of Contents of this important book, sent by mail free of postage to any one in any part of the world who will furnish his address.

HENRY CAREY BAIRD & CO., Industrial Publishers, Booksellers & Importers, 810 Walnut Street, Philadelphia, Pennsylvania, U. S. A.

## ORE FEEDERS.

We direct attention to an advertisement, which appears in our journal, of the "Original Roller" Ore Feeder, manufactured by the "Joshua Hendy Machine Works," of Nos. 39 to 51 Fremont St., this city.

As the manufacturers of a similar form of Feeder, known as the "Templeton Roller," claim that it is superior to any other style, and cite those in operation at the "Bunker Hill" mill in Amador county, we expressly contradict the statement, and in substantiation submit a copy of a letter shown to us by a representative of the "Joshua Hendy Machine Works," which speaks for itself:

BUNKER HILL GOLD MINING CO.,  
AMADOR CITY, CAL., July 12, 1886.

To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: We have used the "Challenge" and "Roller" or "Templeton" Ore Feeders in our mill for the past three years, and I am free to say that I consider the "Challenge" far superior to the "Roller" Feeder, in that most important of all things in a quartz mill, namely, the regular feeding of ores to the batteries. If the "Roller" Feeder is regulated to feed finely pulverized ore, the coarser ore will choke the outlet of the Feeder, and no ore can reach the batteries. If, on the other hand, it is regulated to feed coarse ore, then the fine ore when it comes will sluice right through and fill the batteries. The "Roller" Feeder requires constant attention. Yours truly,  
(signed) N. W. CROCKER, Supt.

Dewey & Co.'s Scientific Press  
Patent Agency.

OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

DEWEY & CO., Patent Agents.  
No. 252 Market St. Elevator 12 Front St.  
S. F. Telephone No. 658.

A. T. DEWEY. W. B. EWER. GEO. H. STRONG.

RICHARD C. REMMEY, Agent,  
Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 539 Commercial St., S. F.

Engraving Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.

**JOHN A. ROEBLING'S SONS CO.**  
**WIRE ROPE**  
GALVANIZED SHIP RIGGING, MINING, TILLER,  
ELEVATOR, TINNED, & COPPER ROPE, SASH CORDS.  
LARGEST WIRE ROPE WORKS IN THE WORLD.  
**IRON & STEEL WIRE OF EVERY KIND.**  
TELEGRAPH WIRE, HARD & SOFT COPPER WIRE  
INSULATED FOR ELECTRIC USE.  
SWEDISH IRON WIRE, CRUCIBLE STEEL WIRE.  
TRENTON, N. J. & 14 DRUMM ST. SAN FRANCISCO, CAL.



HERCULES SLAYING THE GIANTS.

## HERCULES POWDER

Derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

- No. 1 (XX) is the Strongest Explosive Known.**  
**No. 2 is superior to any powder of that grade.**

PATENTED IN THE UNITED STATES PATENT OFFICE

## THE CALIFORNIA POWDER WORKS,

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES Powder.  
ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street, - - - San Francisco Cal.

CALIFORNIA  
ARTIFICIAL STONE PAVING CO.  
(SCHILLINGER'S PATENT.)

SIDEWALKS, GARDEN WALKS, CORRIDORS, OFFICES, CARRIAGE  
DRIVES, STABLES and CELLAR FLOORS, KITCHENS, Etc.

The Courts here and in the East have decided that Artificial Stone Pavements with plastic concrete and in detached blocks, are infringements on the Schillinger Patent; and also, that when the plastic material is blocked off with a trowel and cut through far enough to control the cracking caused by shrinkage, that such pavement is in law the same as if laid in detached blocks, and is an infringement of the patent. All property-owners having such pavements laid without the license of the above Company, will be prosecuted.

OFFICE, 404 MONTGOMERY STREET, SAN FRANCISCO.

EGBERT JUDSON, President. ALBERT H. REICHLING, Secretary. G. GOODMAN, Manager

## THE RUSSELL PROCESS COMP'Y.

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

INVENTORS, TAKE NOTICE

L. PETERSON, MODEL MAKER,  
265 Market St., N. E. cor. Front (up stairs), San Francisco  
Experimental machinery and all kinds of metal, tin and Brasswork.



FOR THE BEST IMPROVED  
ARTIFICIAL LIMBS  
ADDRESS  
MENZO SPRING,  
9 Geary St.  
SAN FRANCISCO, CAL.  
OFFICE 5, Up-Stairs.

**HEALD'S BUSINESS COLLEGE,**  
24 Post St. S. F.  
Send for Circular.

## THE SCIENTIFIC PORTABLE FORGE



**BLACKSMITH HAND BLOWERS.**  
GUARANTEED

The Lightest Running! The Strongest Blast!  
The Most Durable!

ADAPTED TO ALL KINDS OF WORK,  
Send for Catalogue! AND MADE IN STYLES AND SIZES TO SUIT.

THE FOOS MANUFACTURING CO., - - Springfield, Ohio



NOTICE TO  
**MINING MEN,**  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.

Engineers' Tables of Progress

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, etc., address:

**INGERSOLL ROCK DRILL CO.,**

REPRESENTED BY

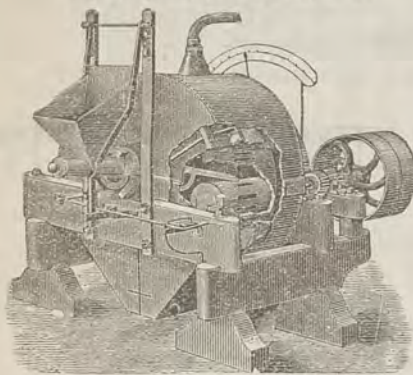
**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

**Tustin's Pulverizer**  
WORKS ORE WET OR DRY

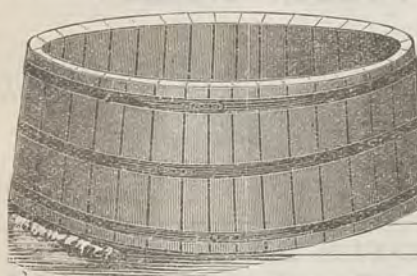
FULTON IRON WORKS, S. F.



MANUFACTURED BY

**HINCKLEY, SPIERS & HAYES,**

Mining Vats and Tanks.



LEACHING VATS with FALSE BOTTOMS.

PRECIPITATING VATS,

SOLUTION and WATER TANKS

For Mining Purposes.

**WELLS, RUSSELL & CO.,**

Mechanics' Mills, San Francisco.

**N. W. SPAULDING  
SAW COMPANY**

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

**Saws.**

SAW MILLS AND MACHINERY  
Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake. The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**  
316 California St., San Francisco.

## FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

(ESTABLISHED IN 1855.)

Office, 220 Fremont St.,

MANUFACTURERS OF

San Francisco.



BABCOCK & WILCOX BOILERS.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure or Compound, Stern or Side-wheel Engines.

MINING MACHINERY—Hoisting Engines and Works, Cages, Ore Buckets, Ore Cars, Pumping Engines and Pumps, Water Buckets, Pump Columns, Air Compressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for Dry or Wet Crushing, Amalgamating Pans, Settlers, Furnaces, Retorts, Concentrators, Ore Feeders, Rock Breakers, Furnaces for Reducing Ores, Water Jacks, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MACHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines and Boilers, Dredging Machinery, Powder Mill Machinery, Water Wheels.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

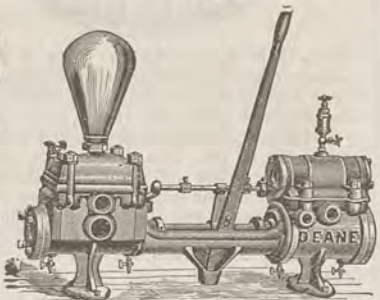
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

—ALSO—

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**

## FRASER & CHALMERS.



CHICAGO, ILL.  
U. S. A.

General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

PERFORATED METALS FOR  
REVOLVING and SHAKING-SCREENS,  
JIGS & STAMP BATTERIES.

Denver Office:  
No. 248  
18th Street,  
Denver,  
Colo.

NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.

Mexico Office:  
No. 11  
Calle de Juarez  
Chihuahua,  
Mex.

UTAH OFFICE—SALT LAKE CITY, UTAH.

## Iron and Machine Works.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

—BUILDER OF—

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines  
Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. **ORDERS SOLICITED.**

### UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,  
SACRAMENTO, CAL.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON

THORNTON THOMPSON

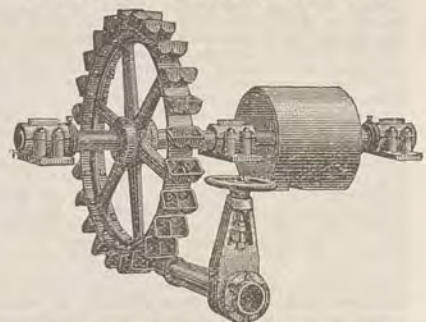
THOMPSON BROTHERS,

**EUREKA FOUNDRY,**

139 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

### PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent, distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.



**H.H.H. HORSE LINIMENT.**  
THE H. H. H. Horse Liniment puts new life into the Antiquated Horse! For the last 14 years the H. H. H. Horse Liniment has been the leading remedy among Farmers and Stockmen for the cure of Sprains, Bruises, Stiff Joints, Spavins, Windgalls, Sore Shoulders, etc., and for Family Use is without an equal for Rheumatism, Neuralgia, Aches, Pains, Bruises, Cuts and Sprains of all characters. The H. H. H. Liniment has many imitations, and we caution the Public to see that the Trade Mark "H. H. H." is on every Bottle before purchasing. For sale everywhere for 50 cents and \$1.00 per Bottle.

For Sale Everywhere.

### San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice

TUBBS & CO.

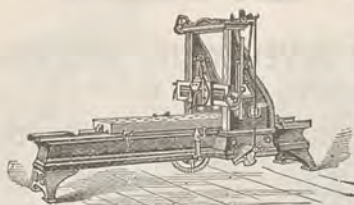
611 and 613 Front St., San Francisco.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



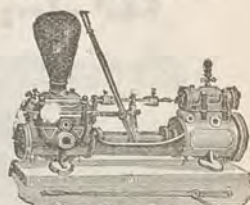
Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Knowles Steam Pump  
The Standard.

### Mining Machinery, Steam Pumps, Wood and Iron Working Machinery ENGINES and BOILERS.

SEND FOR CIRCULARS.



1850.

1885.

#### RANKIN, BRAYTON & CO., MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., of any DESIRED CAPACITY.

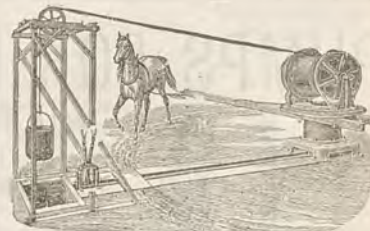
#### WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



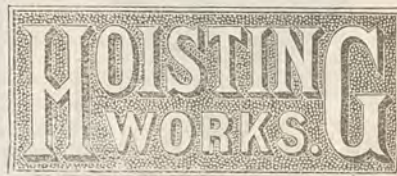
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



#### BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700 pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE OF CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

## THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

### BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
AIR COMPRESSORS—Rope Power Transmission.  
HYDRAULIC PUMPING and Hoisting Machinery.  
WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch pipe of 1-inch iron for Spring Valley Water Works Company, San Francisco.  
SAW-MILL MACHINERY of all kinds.  
STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.  
MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.  
WILSON'S PATENT GAS-PRODUCER.  
STEAM BOILERS of all descriptions.  
SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.  
STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.  
Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.  
Send for Circular and Price Lists.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.  
J. C. B. GUNN, Secretary.

### UNION IRON WORKS,

Office, Cor. Market &amp; Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

#### STEAM, AIR, AND HYDRAULIC MACHINERY.

#### Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

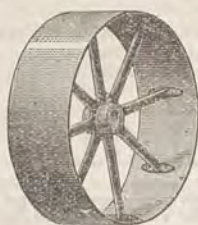
TRY OUR MAKE, CHEAPEST AND BEST IN USE.

#### UNION IRON WORKS,

Successors to PRESCOTT, SCOTT &amp; CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



### PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT &amp; MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 &amp; 131 Fremont Street,

San Francisco, Cal.

## ADAMANTINE Shoes, Dies and Crusher Plates



ADAMANTINE.

We manufacture the above Adamantine Shoes, Dies and Crusher Plates. They are in use on the hardest quartz in the United States and South and Central America, and have been for the last ten years; we warrant them to outwear three (3) sets made of any other metal, and many report that they last from 4 to 8 times longer than any other make. They never break AT THE SHANK, and the wear is so light that little or no foreign matter gets mixed with the crushed ore.

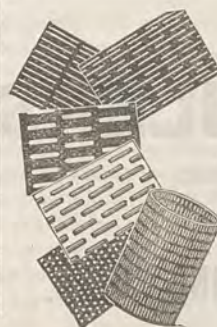
Also CHROME CAST STEEL for Mining and General Use, of the finest quality.

For further particulars, address

#### CHROME STEEL WORKS,

H. D. MORRIS, Agent, 22 Fremont St., San Francisco.

When ordering, a rough sketch, with full dimensions, is all that is necessary.



Chicago Prices Beaten!

ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

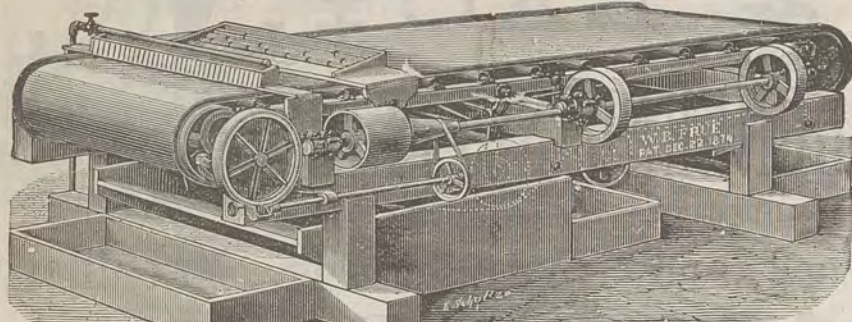
221 &amp; 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).  
Orders Promptly Executed



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS.**  
(\$575 00), F. O. B.

**OVER 1,000 ARE NOW IN USE.** Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement. The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them. Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for. N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

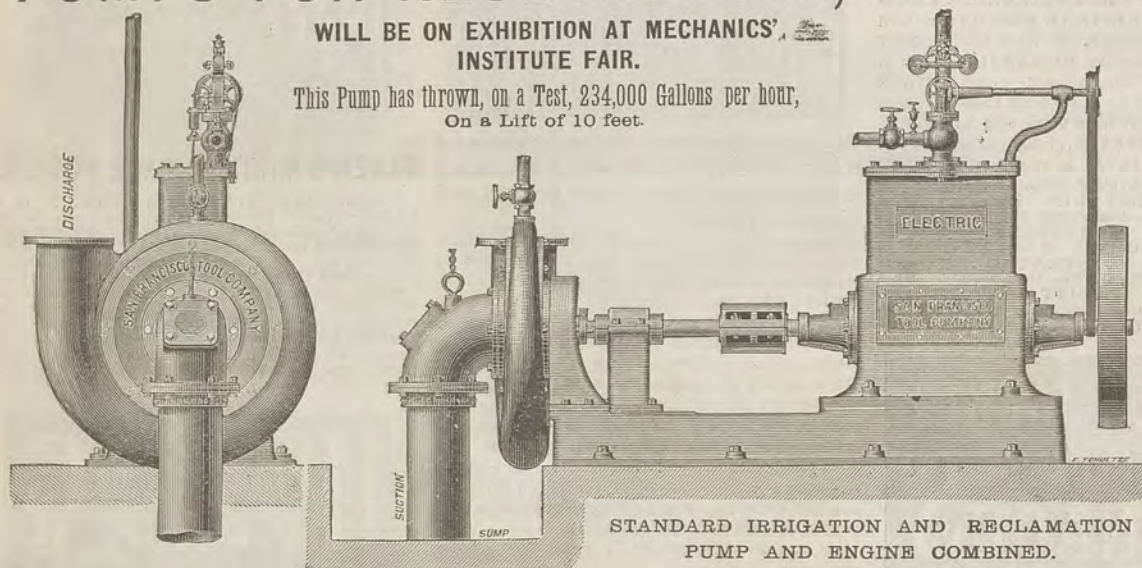
Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

## PUMPS FOR RECLAMATION, IRRIGATION, AND DREDGING.

WILL BE ON EXHIBITION AT MECHANICS' INSTITUTE FAIR.

This Pump has thrown, on a Test, 234,000 Gallons per hour,  
On a Lift of 10 feet.



STANDARD IRRIGATION AND RECLAMATION  
PUMP AND ENGINE COMBINED.

**PIT, VERTICAL,  
BULKHEAD, TURBINE,  
CENTRIFUGAL AND  
LOW-LIFT PUMPS.**

WE MANUFACTURE ALL KINDS OF

Machine Tools, Including Engine Lathes, Drilling Machines, etc.

Horizontal, Single Acting, Compound Condensing, and Automatic Steam Engines.

Cast Iron Sectional Boilers, Horizontal and Vertical Tubular Boilers, Water Valves, Water and Steam Fittings, Hydraulic Jacks, etc.

Mill Rolls Ground and Corrugated. SEND FOR CIRCULAR.

**SAN FRANCISCO TOOL CO.**

Works, First and Stevenson Sts., San Francisco, Cal.

## H. P. GREGORY & CO.

Nos. 2 and 4 California St., San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

# MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING MACHINERY.

FRANK & CO.'S WOODWORKING MACHINERY.

NEW HAVEN MANUF'G CO.'S MACHINISTS' TOOLS.

BEMENT & SON'S MACHINISTS' TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND EXHAUSTS.

SHIMER MATCHER HEADS.

BRAINARD MILLING MACHINES.

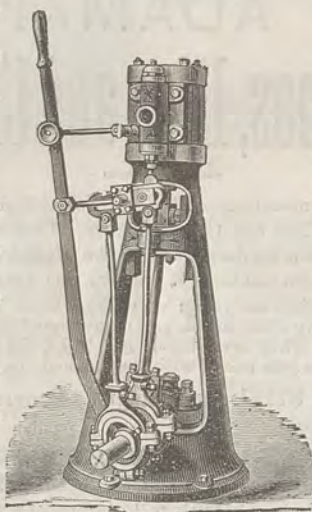
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISHERS.



YACHT ENGINES.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

WILLIAMSON BROS' HOISTING ENGINES.

ATLAS ENGINE WORKS ENGINES AND BOILERS.

PAYNE'S VERTICAL AND HORIZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS AND MACHINERY.

NATHAN AND DREYFUS OILERS. KORTING INJECTORS AND EJECTORS.

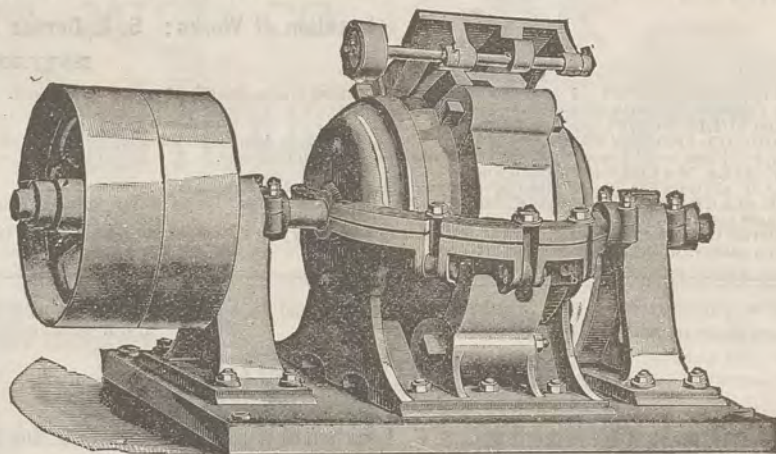
DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied. At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet. All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco. Certificates as to performance of the Mills, and any information required, furnished on application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 & 106 Washington St., NEW YORK.

OR PACIFIC IRON WORKS, SAN FRANCISCO.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, SEPTEMBER 11, 1886.

VOLUME LIII.  
Number 11.

## Improved Pumping Engine.

During a recent visit to the Mechanics' Institute Industrial Exhibition, now being held here, our attention was directed to the Rider compression (hot air) pumping engine being there exhibited by the Joshua Hendy Machine Works, Nos. 39 to 51 Fremont street, this city, who are the agents for their sale in the Pacific States.

With reference to these engines we quote from a circular, which is freely distributed by that firm at the exhibition, and refer to the cut which appears on this page.

The importance of an abundant supply of pure water in every household cannot be over-estimated, statistics proving that a scarcity of water is a sure forerunner of zymotic diseases. The houses of farmers and country gentlemen being dependent upon wells for a water supply, the want of a simple and safe pumping engine which can be attended by an ordinary laborer has been greatly felt—hand pumping in large establishments being out of the question—the general resort was (until the introduction of the Rider) to the use of steam engines. This is objectionable on account of the expense and the necessity of employing skilled labor to insure safety.

The Rider engines meet this difficulty. New patterns, embodying all the improvements suggested by a long and varied experience, have been made, which now make the Rider the most valuable non explosive pumping machine extant.

All parts are interchangeable and made to a perfect system of steel gauges. They are adapted to every situation where it may be required to raise a supply of water ranging from 1000 to 50,000 gallons a day. The large number now in use throughout the United States, Europe and other parts of the world, and the high appreciation in which they are held, as well as the constantly increasing demand, attest their economy and superiority.

For the use of railroads, for filling water tanks, these engines, particularly the 10-inch size, have all the efficiency of a steam pump without the attendant care and expense necessary to the maintenance of steam.

For supplying French flats or apartment-houses, city and suburban residences, with water, they have proved to be the only machine which can be advantageously and successfully used, as they can be run by any household servant without risk of explosion, danger of fire, or extra cost of insurance. Reference is made to a large list of well-known gentlemen who have them successfully running in their residences, to convince any one of their perfect adaptation to this purpose.

For public buildings, hotels, colleges, universities and asylums; for breweries, tanneries, factories, sewing machine use, chemical works, operating printing establishments; stone quarries, brick-yards and nurseries; for supplying fountains and hydraulic elevators, furnishing water for sprinkling streets, etc., they are unequaled; while for purposes of irrigation, for dry lands, orange groves, vineyards, gardens, parks, lawns, etc., and for draining marshy places, pumping bilge water from vessels or basements of buildings, pumping water for cattle on stock farms, they are far superior to all other pumps in the essentials of safety, economy, simplicity and efficiency.

From a depth of 20 feet these engines will deliver as follows: 6-inch engines, 2500 gallons

per hour; 10-inch engines, 6000 gallons per hour. A 6-inch engine will consume five pounds of anthracite coal, and a 10-inch 10 pounds per hour. Bituminous coal, coke or wood, can be used equally as well.

Every engine is fitted with either Rider's patent rolling valve pump, or Rider's deep-well pump; both being of the best possible construction, brass-lined, double-acting, and capable of

## Quality of California Gold.

There is, of course, only one sure way to determine the fineness, and, consequently, the exact value, of gold, and that is by the process of assaying, after the melting of the dust into a bar or ingot. Even the knowledge of the region or gold-field from which a certain description of gold originated is not always a sure evidence of

mines in different counties in California, the State Mineralogist having investigated the subject. Still, as we have stated, it will not always do to rely on the supposition that because one mine produces fine gold another near by will do it also. The first attempt to collect statistics on this subject was made by A. P. Molitor, in 1859, and the data he collected was of value to gold buyers. Men buying dust in these days are more careful than formerly, and give enough less than the real value to always be sure. Gold is bought up in the mining towns and camps, mostly in small quantities, from miners at work in various directions around the camps. The large lots thus accumulated are melted and assayed, and then the true value ascertained.

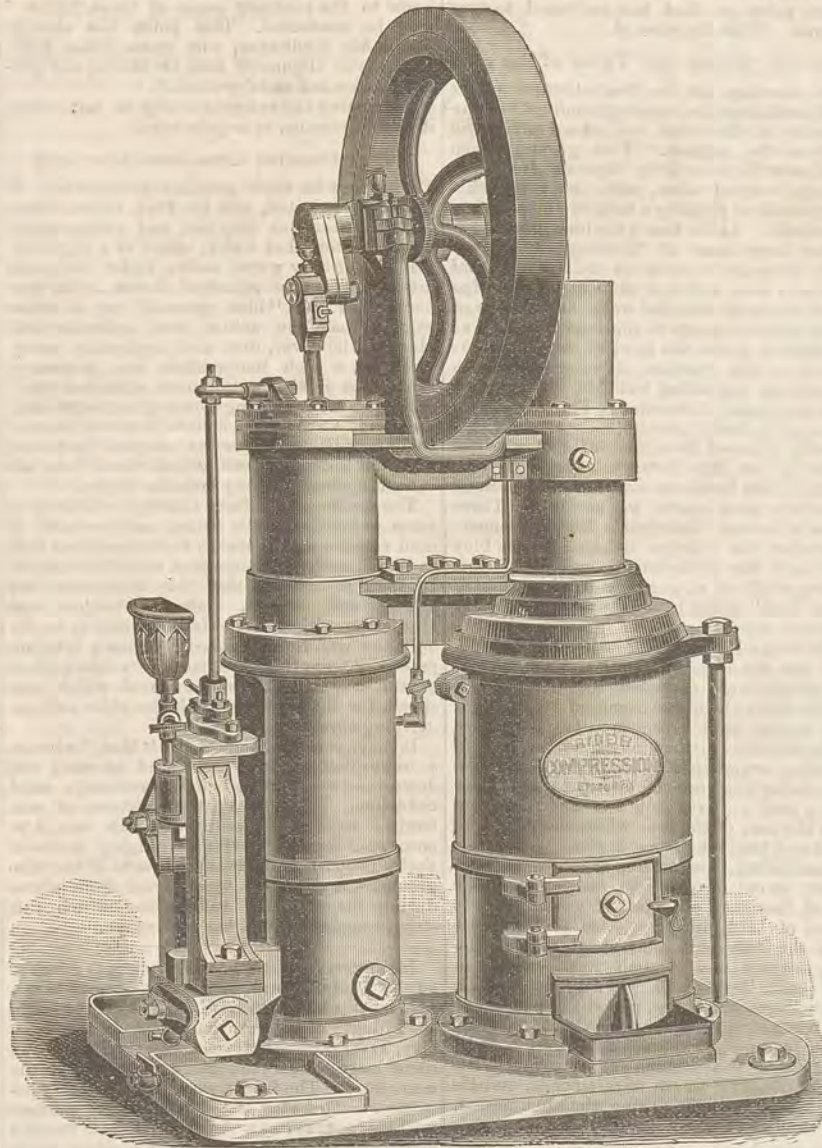
## The Mote in their Neighbor's Eye!

Certain of the Eastern papers have of late been criticising the mining industries of California with some asperity, much stress being laid on the small returns realized on mining investments in this State. These journals, in support of their views, point to the fact that even the dividend-paying companies have disbursed not more than six per cent per annum on their nominal capital. Precisely so; but do not these journalists know that in most cases the nominal capital of these companies is many times greater than the amounts that have been actually paid in by the shareholders? As a general thing, it will be found to have been from three to five times as great, establishing that the net earnings of these companies are, in fact, very large.

What these papers have to say about the jobs that have been put up on those buying mining properties in this State, the gross misrepresentations that have so often been made, and the evils attendant on stock operations here, if not altogether timely, are just enough. They are things all deserving of the deepest condemnation. But why come so far to find and comment on abuses of this kind? Could not these, our critics, have found subject-matter for their caustic pens nearer home? A lecture on stock gambling comes with a good grace from a New York editor. Why, there is hardly one of these publicists but can, where he sits and writes, hear the orgies daily practiced in that veritable pandemonium, the Stock Exchange, on Wall street, where there is more financial ruin wrought in a single week than was ever accomplished here in an entire year, taking even the worst period of the Comstock craze.

Then, too, these guileless speculators in the East gamble in everything—in gas, water, railroad and mining shares; in coal and coal oil; in beef, pork, lard and live-stock; in wheat, flour, butter and all the other staples of subsistence, to say nothing of innumerable smaller things; whereas we on this coast have confined our gambling operations mostly to mining stocks, a business on this side now nearly extinct, being restricted to that class who make a precarious living by the practice of poker, euchre and other small games of chance.

WELSH GOLD MINES.—The following are some Welsh mines, in which gold has been found. The occurrence of this precious metal is hardly as remarkable as the names of the mines: Caegwian, Tyddingwladis, Dal-y-frwynog, Cwmheisian, Berthllwyd, Caerwernog, Llanfachreth and Mowddachtynyllwyn.



IMPROVED RIDER COMPRESSION PUMPING ENGINE.

working at any speed. When the water to be raised is not over 25 feet below the engine, a rolling valve pump is furnished, which is bolted to the side of the cooler and worked directly from the compression piston, and all the water is passed directly from the pump through the cooler on its way to the tank or outlet, making the most complete arrangement possible. In cases where the vertical distance to surface of water is more than 25 feet, the patent deep-well pump is furnished.

OVERLAND SHIPMENTS.—In July last the Southern Pacific R. R. Co. shipped East, from this city, 21,460 pounds of antimony, 248,940 pounds of borax, 42,800 pounds of copper cement, and 44,690 pounds of ores. From Oakland they shipped 146,080 pounds of borax; from Los Angeles, 64,710 pounds of borax; and from San Jose, 55,360 pounds of quicksilver.

its quality. In some camps, the gold from claims a mile or so apart varies materially. The writer has known \$19 gold to come from mines in a camp where other gold was worth only \$12 per ounce.

In judging of the quality of placer gold, no one can be sure that the gold taken out of one and the same flat, hill, or bar, or quartz lead will be always the same. Very often the most surprising difference in this regard is found within a comparatively short distance. Then there are quartz leads with very low gold, surrounded by placers famous for the fineness of their metal; on the other hand, there are veins with very rich metal in the vicinity of diggings where the gold is of low value. By beautiful appearances and seemingly very rich color, many an unlucky gold-dust dealer has come to grief.

A few months since we gave some examples of the value of gold from prominent



## Diamond Mining.

## Geological Occurrences in South Africa.

The diamond is found in South Africa under two distinct physical conditions—in old river alluvium, consisting “of a heavy deposit of ferruginous gravel mixed with red sand, lime and boulders” in a somewhat analogous manner to its mode of occurrence in New South Wales—when the places of exploration are known as “River Diggings;” secondly, as one of the constituents of a very abnormal agglomerate filling certain peculiar pipes or cavities, and restricted in their distribution to a comparatively small area. The latter are known under the name of “Dry Diggings.”

The river diggings were the first opened in the Cape Colony, along the course of the Vaal and Orange rivers. Good typical illustrations of this old river drift are exhibited by Messrs. Hill and Paddon from the Vaal River Diggings, consisting of pebbles of diorite or dolerite, jasper, agate, quartz and other minerals and rocks varying in size from that of a nut to that of a small lemon, accompanied by sands and other detrital matter. On the discovery, however, of the dry diggings, diamond alluvial mining was for all practical purposes abandoned. It is stated by Mr. Dunn that the diamonds from these drifts are of fine quality, and command a higher price than those from the dry diggings. The mode of occurrence at the dry diggings, both of this most valuable of all gems and its surrounding matrix or “the blue,” as it is known to the miners, has given rise to much scientific speculation, and many theories to account for it. The agglomerate or “blue,” which is nearly identical in appearance at all the mines wherever yet prospected, has been found to fill peculiar pipe-like or elliptical cavities extending vertically to an unknown depth. These so-called pipes are supposed by Messrs. Dunn, Maskelyne and others to have been filled by the violent ejection of volcanic matter in a state of ebullition, which on consolidation became the rock now known as the “blue.”

In the London *Mining Journal* is a series of articles on the “Mineral Exhibits at the Recent Exhibition,” describing them in detail. From these we compile the following: Before proceeding to a consideration of the intricate

## Subject of the “Blue,”

It may not be out of place, for a due appreciation of the question, to give a brief description of the strata in which the peculiar pipe-like cavities occur. The superficial deposits of the country consist of a red sandy soil, usually not more than a foot or two in depth, followed beneath by a layer of concretionary limestone, or, as it is sometimes described, a calcareous tufa. Next in descending order are shales, varying in color from gray or yellow to red, and known to geologists as the Karoo shales. They vary in thickness from 35 to 50 feet, and, according to Mr. Dunn, contain the remains of saurians. Underlying these is a series of black and carbonaceous shales, very combustible, and containing thin seams or lenticular deposits of coal, and are traceable in well sections all over the surrounding country at depths varying from 40 to 60 feet. This carbonaceous shale extends to a depth from the surface which fluctuates from about 260 to 290 feet, and both these and the overlying yellow shales are, Mr. T. Reunert says, roughly horizontal, although much disturbed. The only fossils yet found in these beds are fragmentary plant remains, which Messrs. Jacobs and Chatrain say are too indistinct for determination. In descending order we next meet with a hard and much-jointed basaltic rock, of unknown depth, which has been variously described as a dolerite, or an amygdaloidal dolerite, and contains a quantity of agate. It is the “hard rock” of the miners, and in all probability forms the bed-rock of the country, as it is visible in the course of the Vaal river, about 15 miles away, with an inclination, Mr. Schute informs us, of about 150 feet in that distance. Such is the constitution of the inclosing strata or “reef” of these remarkable pipe-like apertures at the diamond mines; but at both Kimberley and De Beer's the shales are overlain by a volcanic sheet, which is usually described as dolerite, but by Mr. Hudleston is called an olivine basalt. At the latter mine it is 100 feet thick; but as this rock covers a large expanse of country around, it may be considered, as Mr. Dunn has justly remarked, for all practical purposes, to surround the whole of the mines.

At Bultfontein and Du Toit's Pan the entire mine is still in the shale, the actual presence of the hard rock not having been proved, although it doubtless exists. It has been stated by several observers, Messrs. Dunn and Reunert among others, that the edges of the shales or “reef,” where they form the circumference of the so-called pipes, are upturned, as if by a thrusting-up action from below. This has been used as one of the arguments to prove the volcanic nature of the force which originally brought about the phenomena under discussion, but we are assured by Mr. Schute, who has had as many opportunities of observation as any one, that such a case has never presented itself to him; and neither is the least indication of it shown on the excellent plans made by Mr. W. Tucker, a sworn Government land surveyor at Kimberley. Furthermore, the edges of the reef at the circumference of the pipes do not, when freshly exposed, exhibit any of the phenomena which usually accompany intense vol-

canic action, but are, on the contrary, jagged and irregular.

## Within the So-called Pipes

The uppermost stratum underlying the calcareous tufa is of a more or less yellow color extending to a depth of 100 feet, and then insensibly passing into the more permanent “blue,” of which it is, in fact, only the upper or weathered portion, and like the latter, is diamondiferous. The “blue” extends to the greatest depths to which the mines have been explored, and is the genuine diamondiferous rock, unaltered by superficial agencies.

The fear entertained at one time that increased depth meant a decrease in production of the precious stones has been abundantly disproved. This was first found to be the case on passing from the “yellow” to the “blue.” At the same time there is no doubt a great difference exists in the relative richness of the “blue” in different parts of the ground at one and the same mine. Thus, at Du Toit's the ground was richer at two spots extending across the depression than at others, and at De Beer's, says Mr. Reunert, a “belt of rich claims spans the center of the mine from north to south, running out toward the northeast corner, where some of the richest ground was found.” This localization of rich ground also holds good at the Kimberley mine. There is not the slightest possible doubt now that with increased depth the supply of diamonds becomes larger, a fact which appears to hold good in all the mines. This is nowhere better illustrated than at De Beer's, for according to the sixth annual report of the directors for 1886, the ground at the 150-foot level was worth about one-half carat a load (two-thirds of a ton); but now at the 350-foot level, at the west end of the mine, the average value per load has increased to over one carat. With the view of

## Practically Testing the Value of the Blue

Toward the deep, the De Beer's Company took 10,080 loads from their underground galleries in the center of the mine, and at a depth of 380 feet from the surface. This ground when hauled was kept entirely separate from any other, and washed alone, with the very satisfactory result of yielding a total of 16,048 carats of diamonds. At De Beer's the blue ground below the large mass of “floating reef” in the United Company's claim at the south side of the general mine and near the edge of the pipe yielded during 18 months' work at the rate of one and one-half carats to the load, and this at least 150 feet below the level of the hard rock. Not only is this increase of value with depth noticeable at the sides, but Mr. Schute says also in the center of the mine. This increase of richness with depth has also been corroborated by results obtained from the 500-foot shaft at Du Toit's, for Mr. Reunert says that “the finds from this level are said to be much more satisfactory than nearer the surface.” There appears to be some indefinable kind of connection between the relative richness of the blue ground and the presence of masses of this “floating reef”—i. e., portions of the country rock or “reef” which have become entangled in the larger expanse of blue ground. It has been stated by Prof. N. S. Maskelyne that diamonds are again more plentiful near diorite dikes which were supposed to intersect the blue, but from the observations of Mr. Dunn it would appear that these so-called dikes are scarcely entitled to that name, as the rock of which they are composed differs from the blue only in being fine-grained and crystalline. For our own part we have not seen any rock from within the area of the blue which could be considered as a true dike stone *in situ*.

In concluding this portion of our remarks it may not be out of place to mention that the yield of diamonds at Kimberley from 1871 to the end of 1885, inclusive, has probably exceeded the enormous amount of 17½ million carats, or three and one-half tons weight; in value about 20,000,000*l.* The produce of De Beer's between the same period “is not much under 9,000,000*l.*, representing about one and one-half tons weight of precious stones.” Bultfontein since the opening of the mine has yielded 5,000,000*l.* worth of diamonds, and Du Toit's Pan 5,800,000*l.* during the same period.

## The supposed

## Origin of these Peculiar Openings

Cannot be better stated than in the words of Mr. T. Reunert: “The generally-accepted theory is that the ‘pipe’ is the funnel of an extinct volcano, and that the diamond-bearing rock, which now fills it and forms the mine, has been upheaved from a vast depth, the diamonds themselves being of earlier date than the upheaval.” With that part of this theory which likens the pipe to a volcanic funnel, and ascribes the origin of the blue to an ordinary volcanic outburst, we cannot for a moment agree. The want of any crater-like outline at the present surface has been attributed by Mr. J. Dunn to the immense amount of denudation which this part of South Africa appears to have undergone. This supposition of Mr. Dunn's would undoubtedly hold good provided it could be shown that volcanic action, as we now understand it, was the motive power and producer. The evidence, however, hitherto adduced to support this theory is of the weakest. So far as we are aware, the drifts of the neighborhood have not yielded any trace of either scoriae, ashes or basaltic lava such as usually accompany volcanic outbursts. On the other hand, diamonds resulting from the denudation of the blue ground, as Prof. Cohen believes, are met

with in local drifts, and there is no reason, therefore, why the products of a volcanic eruption should not also, had they existed. Whatever disturbances of this nature took place were at too remote a period to leave traces of their existence other than as the superimposed dolerite sheet at De Beer's or the lower-seated “hard rock.” Neither does the former appear to have any connection with the inclosing material of the pipes beyond the fact that, in common with the shales and hard rock, it forms the inclosing medium, and is to some extent, Mr. Dunn states, one of the constituents of the “blue.” There is no evidence to show that the sides of the “pipes,” where they have been exposed up to the present time, display the slightest trace of subjection to any extreme degree of heat. Nor does the “blue” present the appearance either of a substance which has been in a state of igneous fluidity or the product of a volcanic eruption, or, as Mr. Hudleston very justly remarked, submitted to any great degree of heat. Although we are in accord with this gentleman in believing that the mass of blue ground “once flowed,” we, for our part, are inclined to consider the movement more that of a semi-plastic mass rather than one having the amount of fluidity his remark would imply. Certain it is that the blue is not a lava, nor is it scoriae, nor yet a volcanic ash; but, on the contrary, a rock in the formation of which water has played a very important part. Another fact which would strongly detract from a volcanic origin is the remarkable mixture of which it consists, no less than 80 different rocks and minerals—in fact, “a catalogue of all it contains would fill a page.”

So far as our information goes, it is only at Kimberley that the “hard rock” has been found to encircle the whole mine, and for all we know to the contrary some of these “pipes” may be connected. This point has already struck Mr. Hudleston, who states “that Kimberley is in alignment with De Beer's, and perhaps connected underground.”

Dismissing the volcanic theory as untenable, it simply remains to inquire what

## Other Theories Have Been Advanced

To account for their peculiar phenomena. It has been suggested, first by Prof. Cohen, afterward by Stanislas Meunier, and subsequently by Hudleston, that water, either at a high temperature or only warm, acting under enormous pressure, was the principal factor in the production of the “blue ground,” or, in other words, that the action was hydrothermal. Meunier, however, does not apparently recognize that a high temperature was necessary, though, as in the well-known *alluvions verticales*, the water coming from a great depth may have been warm. We believe that the views of these savants will cover the accepted facts and meet all the objections which have been advanced against a purely volcanic origin.

The cause and effect, although differing to some extent from the action and products of mud volcanoes, induces us to believe that it is in this direction a comparison should be sought. In fact, it appears that this impression has also struck Messrs. Cohen, Meunier and Hudleston, although the latter seems to be the only one who has so stated. Cohen's first impressions were that the pans were the centers of tuff eruptions, the materials of which consisted, for the most part, of the older and underlying crystalline rocks.

It may, perhaps, be that the “blue,” when in a semi-plastic state, oscillated upward and downward many times before assuming a solid condition. In this way the existence of carbonized wood and fossiliferous shale would be accounted for, for we think it highly probable that a proportion of the upper parts of the blue ground was recruited by material from above during the churning and mixing which this strange agglomeration has undergone.

**INTERESTING FOSSILS.**—Well-diggers employed by Adolph Sutro, at the San Miguel tract, just south of Golden Gate park, recently found at a depth of 30 feet, imbedded in the solid clay, several pieces of well-preserved cedar and some large bones that resembled those of the mastodon. The fossils were preserved as curiosities. Thursday last, while sinking another well there, they, at a depth of 22 feet, found a piece of what was evidently a gigantic thigh bone of a giant mammoth. This was also in the clay, and what is an odd feature, and indicates that they may have lain there for centuries, is the fact that clean sand, to the depth of many feet, and other more solid debris, lie above. The bones were found on the high mountain, sometimes called Sweeney's point, which is 800 feet above the level of the sea. These fossils have been taken in charge by Mr. Sutro, at Sutro Heights, where they are open to the inspection of scientists.—*S. F. Bulletin, Aug. 30.*

**THE Little Sulphur Lime Works**, five miles northeast of Geyserville, are coming into noticeable prominence. This is a new enterprise, A. H. Ingham being the originator and proprietor. Not long ago Mr. Ingham discovered a ledge of lime rock, and after experimenting with it he concluded that he would put it on the market. A warehouse has been built at Geyserville, and the business of selling the lime is conducted there.

**SOUTHERN CALIFORNIA** is to be topographically surveyed with the view of reporting upon a site for a base line and for connecting it with the coast survey triangulations of the region.

## American Tin.

In a very short time a new American industry will, says the New York *Ironmonger*, be born, and American tin will make its bow to the commercial world and begin a vigorous competition with the foreign article. Almost three years have passed since the first deposit was discovered in Pennington county, Dakota, among the Black Hills. To-day the Harney Peak Tin Mining and Milling Co. has almost ready for operation a mill run by a 200 horse power engine, capable of reducing in its powerful embrace 200 tons of tin ore daily, and 100,000 tons of that ore has been opened up and is now awaiting the ordeal. A specimen pig, said to be the first ever made in the United States for strictly commercial purposes, has been placed on exhibition at the Metal Exchange; and at the New York Metallurgical Works, on Washington street, may be seen a monster specimen of the ore weighing 9000 pounds, which is destined to astonish John Bull in his own balliwick. This specimen was blown out of a mass of ore taken from a tunnel in the Etta mine, on Tin mountain, that was estimated to weigh 20 tons. How rich the deposit is may be judged from the fact that the treatment in the metallurgical works of five tons of average ore from the Etta mine resulted in the production of 51 pounds of metallic tin to the ton—a considerably higher percentage than is shown by any mine in Cornwall. Moreover, it is said that the deeper the workings go the greater is the percentage of metallic tin to the ton. Nor is the Etta group of two lodes the only source of supply owned by the Harney Peak Co.; 13 miles away is the Hill City group, comprising 43 lode claims containing true fissure veins of unusually rich tin ore. Here a small mountain of mine ore is piled on the dumps awaiting the completion of the mills. What is to be the future of this industry? The United States imports \$8,000,000 worth of tin yearly, and the consumption is increasing as fast as new uses for the metal are being found. The mines of the Old World are nearing exhaustion, and the new supply must be American. The richness of the deposits and the peculiar natural advantages in the matter of water and facility of transportation about the district reduce the cost of production to ridiculously low figures—the estimate being \$1 per ton for mining ore and \$1 per ton for milling it. With all these advantages for facilitating a large output, the promoters believe that the market cannot be materially affected for five years to come. In the meantime it is proposed to still further invade the English domain and enlarge the American field by the manufacture of tin plates, and a syndicate of prominent Pittsburgh iron men—after a thorough investigation into the causes that made earlier attempts unsuccessful—are preparing to make tin plate from the Harney Peak product so intrinsically superior that the English article will be unable to compete with it.

## The Mines of Valparaiso.

Acting Vice-consul Stahmer, in his report to Lord Rosebery on the trade and commerce of Caldera for 1885, writes: “The principal occupation of the people inland was, and probably always will remain, the working of mines of copper, silver, gold, cobalt, etc., although the price of the first two metals has fallen continually during the latter years that many mines are not remunerative, and others had to be abandoned for the time. Formerly scarcely any capitals were kept out of the often fabulous proceeds of the mines, so that the absence of reserve funds put a stop to working in adverse times; but lately some more foresight has been observed, and mines which yield are at least put upon a good footing of working cheaper by the aid of extensive machinery. Also, fresh capital is invested in mining, and establishments for the elaboration of ores. Thus the year 1885 has added three valuable enterprises, of which two are giving large profits to their owners, while the third has recently been concluded to commence work very soon. Same refer to the gold mines and connected amalgamation works of Cachiuyo, Puquios (85 miles from Caldera); the Bordes silver mines (about 80 miles distant on a different branch of the railroad line), which give work to about 1200 men and women; and the copper concentrating works at Lantaro, San Antonio (90 miles from the sea). The latter dispose of sufficient water for the washing of ores and for their extensive crushing machinery, and are expected to turn out over 3000 tons of ore per month. The old and famous Chanarcillo mines have also drawn again upon themselves the attention of miners and capitalists, as various discoveries, principally that in the Manto Ossa mine, produced good and plenty of silver ore. The amalgamation works have again sufficient to attend to, and commerce in general has been revived considerably, steamers passing north from Valparaiso bringing large quantities of provisions, merchandise, ingredients for the extraction of metals, machinery, etc.; while sailing vessels arrive with coal (British, Australian, and Chilean), coke, rocksalt from Peru, and timber from California and the south of Chili. There is no bulky article of exportation for sailing vessels, since the shipping of borate of lime, owing to low quotations in Europe, has been stopped.



## American Tools in England.

## Quite a Suggestive Discussion.

A very suggestive discussion took place some time since in Sheffield, England, in regard to the comparative merits and salableness of American over English saws and some other tools in Great Britain and Ireland. Mr. George H. Page, of Belfast, in a communication to the *Sheffield Daily Independent*, expressed the highest admiration for American-made saws, in particular, and also included in his preference many other tools. He said that when Irish and English mechanics—carpenters, joiners, coopers, plasterers, bricklayers, stonemasons and others—were offered a choice in the purchase of their tools, they almost invariably chose those of American make rather than English. Mr. Page asserted, moreover, that there was abundant ground for the preference. He writes that he once challenged a Sheffield traveler to produce a hand-saw equal to one of American make which was then selling in Ireland, and which he submitted to the traveler. After two months, Mr. Page says, the traveler sent one which was "wanting in all the properties of a good instrument."

Messrs. Crownshaw, Chapman & Co., of the Iron Saw Works of Sheffield, who undertook the defense of the English manufacturers, admitted that the English sometimes made inferior tools for special markets, but held that they could and did turn out saws, especially, equal to the best American make. This firm "absolutely and totally" denied that English mechanics prefer American to English saws; but, "as to the Irish," they admit with great sorrow that there is "a great deal of truth in it." The firm's personal experience is, they say, that they have "nothing whatever to fear from American competition when patriotism, as we suppose the Irish call it, and high tariffs, do not stand in the way."

## A Flaw in the Logic.

While this Sheffield firm "absolutely and totally" denied that English mechanics show the preference for United States tools, which they admit exists in Ireland, they yet publicly tell Mr. Page that they "can take him to places in England where goods are packed up in American style and sold as American, although entirely manufactured in England."

Why should an English manufacturer do this, unless it was because he could not sell them as English goods? Mr. Page further says: "We could point out even where a certain article of English make was offered to the trade at a certain price and not a single order was taken. The manufacturer took off his name, put it up in the American fashion, and offered it again as American, and sold, and is selling, large quantities; and what is really astonishing, at a considerably higher price than what he offered it for as of English manufacture."

## Ditto in the Colonies.

The above facts are collated from the English correspondent of the *American Manufacturer*, who adds: "I had got thus far in my letter when I learnt that quite another Sheffield manufacturer had received a letter from his son, who is stationed in Sydney, which contains the following interesting items: 'Foreign competition is playing—well, we won't say what—with the English colonial trade. English agricultural implements, axes, shovels, forks, picks, hoes etc., ain't in it with the Americans. Our people are importing American chisels and scissors, and they sell quite as readily as home-made.'"

## Further Confirmation and More Discussion.

The correspondent above alluded to says that Sir John Brown, an eminent English authority, said, in a recent public address: "I remember I was reproved 12 months ago for having hinted that some Sheffield houses were not producing good articles, and it was assumed that I had condemned Sheffield. I repeat the same thing now. There are houses in Sheffield who do not give sufficient attention to the quality of their wares. It is more than ever essential when you have such strong competition all round you, that you should produce a good article and that the article should be produced as cheaply as possible."

## United States Competition with England.

Sir John laments the loss of custom. Fifty years ago, he reminded his hearers, the population of the world took their supplies almost entirely from Great Britain. All this he showed was now changed. Sir John ventured the very pretentious observation that "America now is a very large manufacturing place. We used to send seven-eighths of the articles there; and to France and Germany we sent nearly everything. It was the same with Russia and our own colonies. Now we are almost dependent upon our colonies for such trade."

## Sir John's Two Remedies—Free Trade.

One of the remedies, he said, would be a grand federation of all English-speaking people in the world. The other would seem to be an abandonment of what he says is altogether misdominated free trade. So federated England would then be master of the position.

As to the second remedy, Sir John observed: "It is all very well for England to call herself a free-trade country; but how can she really be so when we have duties upon some 21 or 22

articles, representing something like nineteen millions of money? Yet with all this, we are weak enough, foolish enough, to stand up and say that we are a free-trade nation."

## What Sir John Would Do.

"I say banish your custom-house and your tariffs, and then call yourself a free-trade nation, but do not let us carry a flag that does not belong to us."

## England to Set Her House in Order.

"Then let us try what we can do to set our house in order, and insist on the Government making a thorough searching inquiry into the effect of free trade, whether it has served us, or whether it is equal to serving us now."

## Free Trade or "Sham Trade?"

"I ask that there shall be a thorough inquiry into the system so that it may be proved whether we have flourished under the system of free trade, which I call sham trade, for it is neither free nor fair trade." He further stated that the working people are also unhappy. Certain of their conspicuous leaders are likewise repudiating free trade; they, too, demand an inquiry. Meanwhile they would complicate matters by reducing the hours of labor. At Liverpool and at Edinburgh, trades councils have passed resolutions advocating eight hours as a day's work, and desiring that the scheme should be thoroughly discussed also by the working classes the kingdom over. For they, too, like Sir John Brown, have generally arrived at the conclusion that the world's current production is largely in excess of the world's current needs.

## Nevada County Mines.

## A General Sketch of a Rich Region.

Nevada county is the chief of all the mining counties of the State of California. It has a middle situation in the State, but is generally ranked as a northern county. The summit of the Sierra Nevada runs through the county, the towns of Truckee and Boca being east of those mountains and within Nevada county. The *Foothill Tidings* says:

The chief industry is mining, although farming is carried on with profit in the western part of Nevada county. No equal area in the world has produced more gold than has Nevada county, and no region known has the promise of an equal mining permanency. The gold is found in both quartz ledges and gravel beds. Nevada and Grass Valley townships are the principal portions in which quartz mining is carried on. Eureka and Washington townships, farther east and higher of altitude than the two first named, have also many valuable quartz ledges. The mines in Grass Valley and Nevada townships have been systematically worked and developed for many years; those of Washington and Eureka townships are now receiving the proper kind of attention. Some good quartz gold mines have been developed in Washington township within the last two years. In Eureka township, near Graniteville (Eureka South), several mines have paid well for a depth of from 100 to 200 feet, and then these mines were allowed to stop. Some of these properties are now being worked again. Meadow Lake has also many quartz ledges, which, in former times, attracted so much attention that a city was built in almost a day near the very summit of the Sierra Nevada. The Meadow Lake mines are idle now, and time alone will tell if the ledges there have gold sufficient to cause mines to be made. Rough and Ready township has many gold-bearing quartz ledges in its eastern portion, while in the western part are valuable deposits of copper.

The great gold gravel region of the county is in the townships of Bridgeport, Bloomfield, Eureka, Little York and Washington. These are of immense extent, and of incalculable richness. These beds were worked by the hydraulic process for the most part, and enormous values of gold were washed out of them. The hydraulic process of working mines is now under the ban of the law, but doubtless a way will be found for lawfully taking the gold from those rich gravel beds. There are some gravel mines in Nevada, Grass Valley, and Rough and Ready townships, but they are not extensive—excepting at Mooney Flat in Rough and Ready, where is the extension of the famous gravel leads of Timbuctoo, Smartsville and Sucker Flat.

The most famous of the present active quartz mines are the Providence and the Wyoming, of Nevada City district, and the Idaho, Empire, North Star and Crown Point, of Grass Valley district. One of them, the Idaho, on the first Monday in June, 1886, paid its two-hundredth dividend to its stockholders, the dividends having been monthly, and only about four skipped months occurring during the history of the mine, and then when "dead-work" was being done. The Crown Point may be called a new mine, although it was long ago located and a little worked under the name of William Penn. It is situated between the town of Grass Valley and the Idaho mine. The Crown Point is a coming mine. The Empire is the oldest working mine in the State, and has taken out millions of dollars' worth of gold and promises an indefinite continuance. The Allison Ranch mine, about four miles down the Wolf creek from the town of Grass Valley, has been idle

for some years, after having had from four to five million of dollars taken out of it, with a working of only 200 or 300 feet in depth. Arrangements are pending for the starting up of the famous old Allison Ranch mine, where cabbages grew on top of the rich ledge way back in 1851.

Water-power for running machinery has been partially introduced into Grass Valley district, and the water system will soon be extended pretty much throughout the district. This cheapness of power for pumping mines, hoisting ores and running stamping mills insures the profitable working of many quartz ledges now idle. Working the mines gives a home market, with the top prices, to the farmers and fruit-raisers of the vicinity.

## Win a Front Seat in Life.

Here is something from the pen of a Boston teacher of metaphysics that is worth reading, and remembering, too:

Make up your mind that you will have a front seat in life, and you attract to you the powers that carry you to the front seat. If (in mind) you take the back seat, you get only the back seat. The confident, determined mood of mind, steadily kept up, brings to you other confident people. Confidence in the business world means both cash and credit. There is not half money enough in this country for doing its daily business. What is lacking in coin and bank notes is made up by men's names written on bits of paper promising to pay certain sums in a certain time.

## Don't be a Screw.

What keeps thousands of noses on the grindstone of hard times is that they have no confidence or courage in themselves to take risks or responsibilities. They keep a poorhouse in their minds and live in it. They aspire to be only a screw in the business machine instead of striking out and making a machine of their own. The screws are book-keepers, telegraph operators, clerks, and all who never plan anything beyond a situation and steady wages. Confidence and brains combined find such screws ready-made by the thousand. It makes the screw do as much work for as little money as possible. When one screw is worn out it throws it aside and gets another.

The screws find fault with the monopolist. Their real slavery is in their own minds. They never think, aspire, plan or demand in thought to be anything but screws. They think there is no place for them at the head of a business. Their first and great step toward staying permanently at the tail of a business lies in thinking that they must remain at the tail. Because what is assumed or kept steadily in thought always frames an outward exact like of itself in what can be seen. If you think clean clothes you will always have clean clothes.

## Always Aim High.

A workingman ought never to look at a millionaire's palace without saying: "I am going to have a palace like that." His saying this in dead earnest is one thought among many others which pushes him toward and into his own palace. Because it is your thought that pushes you to do things. If you are in the apple trade, and a thought suddenly comes to you that you can sell a hundred barrels of apples at a certain place, you can't stay away from that place. The idea will push you on.

## Well-directed Industry.

Real business does not lie alone in being industrious. The goody-goody books and maxims have only told half the story about industry. A great deal depends on what you are industrious about. If you spend all your time and strength in polishing tin pans or blacking your boots your industry won't carry you very high. The industrious mind in a rested body plans in an hour what brings in more money than a tin-pan polisher may earn in a year. People who work only or mostly with their bodies have as good a right as the capitalist to work with their minds. The world always wants newer things, more curious things, more improved things, more amusing things. No workman in any trade, any art, any profession, should be content with doing what some one has done before him, even though he does it well. He should aim at doing something better than any one has done before him. When he can do this he must next push it on the world's notice.

## Push.

Push is a talent as much as skill in any art. You can commence pushing by imagining yourself a pusher. Keep yourself before yourself in your mind as a pusher, and such frame of mind will at length make you push. There is a power in a continual imagination of yourself in any certain character which does make you more and more like such character. Imagine that the best belongs to you and will find the best coming to you. Imagine the worst, see yourself in the poorhouse, and the poorhouse comes to you. Success, like charity, must commence at home in the mind. If now you are compelled to live in a poor room and on poor fare, do so only under protest. Keep your mind on the better room and the better fare. Don't say, "I s'pose I must always take up with this." Say instead, "I am going to have better things than these." You are then creating for yourself strength instead of weakness. You are then ever strengthening this inexplicable mental attraction which will bring these things to you.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

TRACE AND WHIFFLETREE GUARD.—E. E. Stephenson and L. A. Lasher, S. F. No. 347,899. Dated Aug. 24, 1886. The guard consists of a cup-shaped shoe or cap, within which the end of the whiffletree, the connecting links, and the end of the trace are inclosed. The outer surface of the guard is rounded and smooth, so that it forms a direct continuation of the trace, and thus prevents any injury to the trees or vines when it is applied to cultivators or other agricultural implements to be used in orchards or vineyards.

CAR-COUPLING.—John H. Buster, Spenceville, Cal. No. 347,919. Dated Aug. 24, 1886. This invention is of that class of car-couplings in which a spring actuated latch, pivoted in the drawhead, is forced back by the incoming link and springs down again to engage it. The object of the invention is to provide a coupling, automatic in its action, thus obviating the necessity of passing between the cars, the fruitful cause of so many accidents. The coupling consists in the novel and simple arrangement of the latch, the means for releasing it from the top of the car, and the means for holding it back when desired.

ORE CONCENTRATOR.—William A. Woods and Charles C. Garcelon, Santa Cruz, Cal. No. 347,909. Dated Aug. 24, 1886. This machine is adapted for concentrating by either the dry or wet process. It comprises a main frame, a suspended frame, means for eccentrically shaking the latter frame, pans with distributing plates, discharge spouts under the pans, a hopper above them, the pans, spouts and hopper all being carried by the shaking frame, a feed chute above the hopper, means for longitudinally reciprocating the feed chute, and other details of construction. In the shaking pans the concentrations remain near the outer rims, while the worthless particles work upwardly and are discharged centrally.

RELIEF VALVE.—James O. Rusby, Chico, Cal. No. 347,892. Dated Aug. 24, 1886. The object of this valve is to prevent hose from bursting when the nozzle is closed or when there is any obstruction to the stream. It consists in a short section of pipe, provided with means at each end for readily coupling it to the sections of hose at any portion, said pipe having formed on each side a hollow lug in which is made a valve seat, the lug itself communicating with the interior of the pipe. Spring actuated valves are seated in lugs on each side of the pipe and control the ports of the hollow lugs. The valves accommodate themselves to the pressure and relieve it only to the extent desired, so that the hose will not burst.

GATE.—Samuel Stephens, Central House, Cal. No. 347,898. Dated Aug. 24, 1886. This is a new and simple form of those gates which are usually termed "automatic," and are operated by the traveler without putting him to the necessity of alighting from his conveyance. The principal points of novelty lie in the manner of hinging the gate so that it will not sag; the means for releasing the latch, and the means for swinging the gate. The first of these features consists in simply making the hinge-rods longer than usual and attaching them at or near the vertical center plane of the gate. The latch releasing and the turning of the gate are accomplished through cords and levers, one of the latter being a spring lever, the intervention of which simplifies the construction of the entire system and effects in the easiest manner the double result intended.

ADVERTISING OPTICAL APPARATUS.—Augustin Duboce, S. F. No. 347,926. Dated Aug. 24, 1886. The inventor has christened this device by the very appropriate name of "Ondulescope." This title is applicable, because of the effect produced, there appearing a succession of waves or undulations, sometimes parallel, sometimes radial and divergent, and sometimes converging to a center or central line, giving an effect at once fascinating and indescribable, and resembling the softly-undulating surface of a gently-agitated lake. The whole effect is produced by a design of any character, moving behind a transparent or semi-transparent sheet, such as glass, the surface of which is corrugated, broken or uneven. There are many ways in which to effect the movement of the design strip, and many different ways in which to heighten the effect by reflecting surfaces; but in all, the general result is the same. The apparatus can be used for entertainment or for advertising purposes.

THE STATE GOVERNMENT.—We are indebted to the courtesy of Hon. Thos. L. Thompson, Secretary of State, for a copy of the pamphlet compiled by him and entitled "Governmental Roster, 1885-6, State and County Governments of California—Executive, Judicial and Legislative Departments." The work includes in its 150 pages the secretary's report for the two years ending June 30th last, lists of the various officials and tables of election returns, and is indexed in so thorough a manner as to make it very handy and valuable for reference.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER..... SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.  
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Sept. 11, 1886.

## TABLE OF CONTENTS.

ILLUSTRATIONS.—Improved Rider Compression Pumping Engine, 165. Slag and Matte-Pot with Sectional Bottom, 168.

EDITORIALS.—Improved Pumping Engine; Quality of California Gold; The Mote in their Neighbor's Eye, 165. Passing Events; Lead Mining in Brazil; Cause of Earthquakes, 168. Sectional Slag and Matte-Pot; Reduction of Ferrie Solution; Coal Mining Abroad; A Sensitive Mining Lamp; Blowing Whistles Without Steam, 169.

MISCELLANEOUS.—Diamond Mining; American Tin; The Mines of Valparaiso, 168. American Tools in England; Nevada County Mines; Win a Front Seat in Life; Notices of Recent Patents, 167. A New System of Preserving Food, 171.

MECHANICAL PROGRESS.—Working and Tempering Steel; Cylinder Condensation; Rapid Adoption of Steel Railway Sleepers; Sheet Iron in Construction; New Process for Making Steel Pipe; Improved Barbed Wire Fence, 170.

SCIENTIFIC PROGRESS.—Salt-water Ice; Polarity in Tadpoles; Scientific Survey of Southern California; Photographing Cannon Balls; An Electric Mining Locomotive; Sugar and Sweets; Sea-serpents; Sun Spots and the Wheat Product; Ignatite, 170.

USEFUL INFORMATION.—A Lubricant for Brass; A European Street Car Rail; Alloy of Aluminum and Tin; Danger from Electric Lights; Carriages in China; Utilizing Escaping Gas, 171.

GOOD HEALTH.—Sunstrokes in California; Fatal Effects of Alcohol; Salubrity of our California Climate; Variety in Food; Successful Treatment of Sciatica by Massage; Fatality in Mining, 171.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 172-73.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 176.

## Business Announcements.

Paper Pulley Covering—Charles McCormick.

See Advertising Columns

## Passing Events.

The great earthquake in the East still continues a topic of conversation, and several shocks have occurred since the first disastrous one. In another column we give the views of a distinguished geologist on the subject of the causes of earthquakes.

The great yacht race between American and English types of vessels, at New York, is attracting the attention of designers and the people generally. As was the case in the last international race, the American yacht won the first of the series of races. If Americans have no navy to be proud of, they can congratulate themselves that designers of vessels are not idle, but have been able to build vessels to beat the fleetest of the English craft.

Silver mines continue to shut down on account of the low price of silver. In some places the owners of mines are reducing wages in preference to closing down; but the miners are dissatisfied with this.

Thursday, September 9th, being the birthday of the State of California, was a legal holiday, during which business was generally suspended.

NEW CARS.—The Central Pacific Railroad Company are constructing at the Sacramento shop 200 new and improved fruit cars, in season for the next fruit crop. These cars will carry 25 tons, and are about 30 feet long, of heavy construction and special adaptation to the work. The bearings will be seven inches long and four inches diameter, an increase on all similar cars.

## Lead.

There is so much lead mining going on everywhere on this coast that everything concerning that metal will interest the miners who are working on it. We have compiled a few facts concerning the metal which may be useful for reference.

In order to compute the weight of lead the following rule is useful: Ascertain the number of cubic inches in the piece; multiply the sum by .41015 and the product will give the weight in pounds. For example: What is the weight of a leaden pipe 12 feet long and 3.75 inches in diameter. By rule in mensuration of surfaces, to ascertain the area of cylindrical rings:

$$\text{Area of } (3.75 \times 1 \times 1) = 25.967$$

$$\text{Area of } 3.75 \times = 11.044$$

$$\text{Difference, } 14.923 \text{ or area of ring.}$$

$$144 = 12 \text{ feet.}$$

$$2148.912 \times .41015 = 881.876 \text{ lbs.}$$

In this rule the weight of a cubic inch is given as .41015, as for ordinary metal; when, however, the specific gravity of the metal under consideration is accurately known, the weight of a cubic inch of it should be substituted for the unit (.41015) here given. Cast lead has a specific gravity of .11352, and a cubic inch of it weighs .4106; rolled lead has a specific gravity of .11388, and a cubic inch weighs .4119. According to the lead under consideration, these units should be used to compute weight under the rule we have given.

The weight of a square foot of lead from 1-16 to one inch in thickness is given in the following table:

Thickness.	Lbs.	Thickness.	Lbs.
One-sixteenth.....	3.691	Nine-sixteenths.....	33.222
One-eighth.....	7.386	Five-eighths.....	36.913
Three-sixteenths.....	11.074	Eleven-sixteenths.....	40.604
One-quarter.....	14.765	Three quarters.....	44.296
Five-sixteenths.....	18.450	Thirteen-sixteenths.....	47.987
Three-eighths.....	22.143	Seven-eighths.....	51.678
Seven-sixteenths.....	25.839	Fifteen-sixteenths.....	55.37
One-half.....	29.53	One.....	59.061

## Mining in Brazil.

The following notes are taken from a report recently published by the Minister of Agriculture of the Empire of Brazil:

## Gold.

Reports have been handed in from only five provinces. In Minas Geraes gold-mining is continued with greater or less profit. There are no statistics of the total production, but those of exportation are as follows:

Fiscal year.	Grams.	Value in U. S. coin.
1882-83.....	1,121,854	\$ 479,750 88
1883-84.....	1,166,855	502,278 84
1884-85.....	1,354,794	582,771 84

It is supposed that the gold production of the empire is much larger than these figures indicate, and, therefore, that considerable gold is smuggled in order to avoid the export duty.

## Iron.

The Minister thinks the mining of iron and coal in the empire of more importance than that of gold. The province of Minas Geraes has already more iron than gold mines in operation. In the province of Sao Paulo, the Ypanema iron mines are the only ones operated. These mines belong to the imperial government.

## Coal.

A Brazilian company is mining coal at Arroio das Ratas, in the province of Rio Grande do Sul. This company is said to turn out about 2000 tons a month, all of which is used for local consumption. At Tubarao, in the province of Santa Catharina, an English company is also mining. Some of its coal has been shipped to the River Plate, but the results of the shipment are not yet known. The quality of the coal appears to improve as the mines go deeper.

## Oil.

At Taubate, in the province of Sao Paulo, a company is working, to advantage, the oil-producing shales.

In the province of Bahia, the turfa deposits have been worked for oil, and have yielded, during the year, about 666 litres.

## Phosphate of Lime.

The imperial government has asked for and received tenders for the working of the phosphate deposits on the islands of Fernando de Noronha, a small group about 200 miles off Cape St. Roque. Two other concessions have already been granted for the working of deposits upon other islands along the coast.

The gold excitement at Los Gatos seems to have simmered down, as such affairs usually do after a careful investigation.

## Cause of Earthquakes.

## A Discussion of the Various Theories.

At the last meeting of the California Academy of Sciences, Prof. Joseph Le Conte, at the request of Prof. Davidson, the president, delivered a lecture on "The general cause of earthquakes, with special reference to the recent ones at Charleston." The lecturer spoke without notes and gave a very interesting discourse to a large audience. He spoke substantially as follows: There is no subject which has more interest than the subject of earthquakes, and the cause is obvious. It is because the origin of earthquakes is hidden from direct observation. Really the phenomena of the earthquake is complex, and that which has most tended to retard investigation is the suddenness with which they occur, creating terror and surprise.

## The Seismograph.

This difficulty will soon be gotten over by the use of the seismograph, which will not admit of surprise or other emotion. These instruments are being introduced into all earthquake countries, and principally in Japan, where the most satisfactory observations have been made. There will soon be one at Mount Hamilton, and another at Fulton, and we will then have a better opportunity of comparing notes with observations made in other places. We will have a better opportunity to notice the principle of induction. A feature of earthquakes appears to be, that in proportion as we extend our observations of them, they become more common. In Japan there are about 700 a year, or two a day. There is not an hour in any day in the year that the earth is not shaking somewhere. What we want is some theory that will give significance and coherence to the phenomena.

## Immediate and Remote Cause.

There are two kinds of causes. One is the immediate cause of the observed phenomena; the other is the remote, ultimate real cause, hidden deep in the bowels of the earth. As to the immediate cause, this we know: It is a rising of the surface of the earth from some hidden force, and spreading on the surface of the earth in a series of elastic earth waves. These are similar somewhat in origin to sound waves. The difference in sound waves and earth waves is a difference merely of rapidity of vibration. If they are so rapid that they are not noticed by the nerves, they are sound waves. If heavy, they become more or less dangerous, and we call them earthquakes. The phenomena are similar. The smaller ones we notice as sound; the heavier ones are from earthquakes. Suppose a concussion, no matter from what cause—say several tons of nitro-glycerine, buried deep in the earth. (Here the lecturer showed a diagram to represent a portion of the earth's crust, 40 miles long, 20 miles broad and 10 miles deep, the focal point being in the lower center of the figure, and the effect shown by concentric waves similar to that produced on the surface of the water when a stone or other substance is thrown in.) These concentric waves move with great rapidity, and it is the passage of these waves that constitutes what we call an earthquake. We must keep in our minds the direction of the wave motion and the direction of their propagation. Another thing we must notice is the velocity of the earth's motion and the velocity with which the wave is transmitted. The latter is by far greater than the former. By means of the seismograph we shall be able to accurately record these motions, and not only that, but the day, hour, minute and second at which they occur. The pencil, as soon as the earthquake is felt, will mark the time, the duration and the rapidity with which it is traveling, and even the motion of the wave will be recorded. There are several pencils doing duty, and these will also tell the direction of the wave and its angle of emergence, by which means the probable point of focus can be arrived at.

Several cases have proved that the focal point can be fixed. In the earthquake of 1834 the subject was discussed largely, and it was thought that the starting point of the shake was 50 to 100 miles in the interior of the earth. It was nothing of the kind, being only about nine miles. The one in Italy started from a depth of six miles. One in Japan was only three miles. One great earthquake recorded was found to have its focal center only half a mile in depth. This was in consequence of ex-

ceedingly limited character. It has been shown in many cases that the focus was not a point, but a fissure 8, 9 or 10 miles in length. This is a most important discovery. As to immediate causes of earthquakes, they are the result of a series of elastic shakes, and like all waves, subject to refraction, interference, etc.

The more remote cause of the concussions, the more remote the true cause of the earthquake. The agencies of the earthquake are of two kinds—the igneous and the aqueous. The one rough-hews the features of the earth, and the other shapes those features. One makes the great sea-bottoms and mountain chains, and the other makes the beautiful scenery and details of form of the earth. The earth forces we know about; the other is from the sun.

## Earthquakes and Volcanoes.

The association of earthquakes with volcanoes is natural. Take any map and you will note the similarity between the earthquake and the volcanic countries, although sometimes there is no connection. They never have volcanic eruptions in the Hawaiian Islands without earth shocks. There are also, of course, earthquakes without volcanic eruptions. But when volcanic activity ceases we are apt to have earthquakes. After Stromboli stopped its eruptions earthquakes were frequent. On the contrary, where they have had shocks for years the sudden opening of a volcano seemed to stop them. Some people think that there are cavities in the earth filled with steam, which finally discharge one into the other, causing earthquakes. In my opinion the fracture is more apt to produce them than the escaping steam. It is a curious fact that the Italian and French hold to gas being the probable cause, while the Americans, Germans and English hold different views. In 1835 there was an earthquake on the coast of South America, after which the entire coast line was elevated from 10 to 12 feet. There had evidently been a fracture and a slip, or likely a readjustment of an old slip. It is a well known fact that the interior of the earth is shrinking faster than the shell and something must give way, and it does give way by the crashing of the shell. Now, perhaps, an earthquake is produced by the snapping or readjustment of old fractures—a readjustment of broken parts. In South America changes are constantly going on. If the earth yields gradually to the forces which are constantly raising the coast of South America, there will be no earthquakes; but if it resists the force will eventually oblige it to yield suddenly, and an earthquake is the result.

Again, it is well known that the interior of the earth is contracting more rapidly than the surface, and the shrinkage of the shell on this is apt to cause motion of the surface; it gives way by crushing or folding. Every time the crust thus moves, we have an earthquake. Suppose the earth is composed of great crust-blocks, each hundreds of miles in extent. As the interior shrinks, those blocks must settle. If you look at the Coast Range of mountains, you will see there are at least five bends one way and five another, and if those were spread out, it would be found that two miles had been mashed into one. In one place 16 miles spread out would make 96 miles. This is not extreme. It is the Appalachian chain. In the highlands of Scotland there are immense masses folded over each other. These forces are almost inconceivable. It did not take place slowly. The whole surface of continents is broken by fissures, some 200 or 300 miles long. This breaks it up into great blocks, which slip and slip.

I know no better illustration than the

## Great Plateau of the Colorado.

That region is traversed by north and south fissures, 200 to 300 miles long, separated 20 or 30 miles, thus making great, oblong blocks of earth—sometimes very high. Some of the slips are 5000 or 10,000 feet and the escarpments 2000 feet. In the Basin region there are great earth blocks tilted on edge. These great escarpments did not occur at once, but every paroxysm caused an earthquake. This is by far the most frequent cause of earthquakes.

## The Electric Theory.

The most popular theory concerning earthquakes is that electricity causes them. I do not care to go into this, because it does not deserve more than a passing notice. Still, some scientists of repute uphold this theory. I will not assert there is "nothing in it," but only be-



cause the true scientist is not disposed to be bigoted. But this I can say: I never heard or read the slightest scientific proof of this theory. Electricity has taken hold of the popular imagination, so that any inexplicable thing is explained by "electricity." For example, vital force, nerve force, etc., are inexplicable, so many lay it to electrical force. So also with earthquakes—electricity is made the scape-goat. They have said we have earthquakes in California on account of the "glorious climate" and the absence of thunder storms. Others have said our last great earthquakes were before the railroads came in 1869: we have none now. As to

#### California Earthquakes.

Fissures and slips of crust may occur anywhere. But there are certain places where there are lines of weakness. One of these places is at the line of the foot of a chain of mountains on one side, where the bending of the up-lifted earth is great. Another place is along the line of continents. Along the base of mountains, say the Sierra Nevada, there is a chance for frequent shocks. The great Inyo earthquake occurred at such a place. There is a split right at the base of the mountain going for 40 miles with a drop of 20 feet. The Sierra Nevada, in rising, dragged up the more level land gradually with it; but a final readjustment caused an earthquake, as it always will.

The cliffs at the Wasatch mountains are of similar formation, and some day Salt Lake may be destroyed. On this side of the Coast Range, near Niles and Haywards, there is a line which adjusts itself from time to time, as the foldings of the mountains show. On the Atlantic coast there is a line of weakness extending from New York to the gulf, the formation being of tertiary origin, and the consequence is frequent oscillation. When I heard of the Charleston disaster I made up my mind that it was an off-shore line. Earthquakes all over the globe have had points of resemblance to this one. It is usually a movement of the sea bed off shore that gives rise to the sea wave and earthquake. Along the old primordial continent margin is a place where there is a bend in the earth, that makes the ocean bed, and a readjustment of the old contracted margin makes earthquakes possible. Sometimes waves occur, and sometimes not. The old Archæan rocks are covered by tertiary and other rocks. These rocks broke and slipped and affected less and less the sea-bottom. My object in speaking to you to-night is to put your minds in a position to judge for yourselves when the details of facts of the late earthquakes are available.

#### Sectional Slag and Matte-pot.

Slag and matte, in lead and copper smelting, are, for convenience of removal, tapped into pots of small capacity, usually of paraboloid form, of cast iron, weighing 275 to 300 pounds, and holding the same weight of slag.

As in many smelting districts one ton of ore makes a ton and a quarter of slag, a large number of pots is needed to equip an ordinary plant.

Sudden and frequent expansion of the solid bowl causes the pots to crack at the bottom in a few months, and the matte, a very fluid sulphide, enters these rough fissures and speedily corrodes its way through the vessel. With a slag-pot having a movable bottom, this cracking tendency is entirely overcome.

The pot invented by Richard H. Terhune, of Salt Lake City, and described by him before the American Institute of Mining Engineers, is cast with a six-inch hole cored in the bottom. This results in a stronger casting than a solid one of the same form. Into this hole is inserted a flanged bottom, as shown in plan and section in the accompanying figures.

Mr. Terhune finds that four rivets, countersunk inside, make a tight and permanent joint, although the patent claims every possible mode of securing the bottom, as well as all forms and sizes of the same. The castings are made rough, and cost less for founder's charges, because they are lighter than the solid bowl.

GOLD mining in Hawthorne district is increasing. The early prospect of a mill makes a number of mine and claim-owners feel rich.

WORD comes from Granite district, which is about 18 miles south of Cherry creek, in the Egan Range, of a most flattering nature.

#### Reduction of Ferric Solution.

At a recent meeting of the American Institute of Mining Engineers, A. L. Beebe, of New York, read a note on the reduction of ferric solutions by the use of amalgamated zinc and platinum foil. In the determination of iron on sulphuric acid solutions by titration with potassium permanganate, amalgamated zinc and platinum foil are very generally employed to reduce the iron to the ferrous state. As ordinarily employed, their use for this purpose is frequently attended with two practical difficulties. The first is the amalgamation of the platinum strip through its contact with the zinc, and the consequent cessation of all reducing action. The second is encountered in transferring the solution from the reducing bottle to the beaker in which the titration is to be made. Unless great care is exercised in this operation the zinc will fall into the beaker, fracturing it and causing the loss of the analysis.

The following simple modification of the usual method has been found by Mr. Beebe to obviate entirely the difficulties above referred to. A strip of thin platinum foil, about one inch square, is perforated with pin-holes over its entire surface. It is then bent into the shape of a letter U, and its opposite corners are

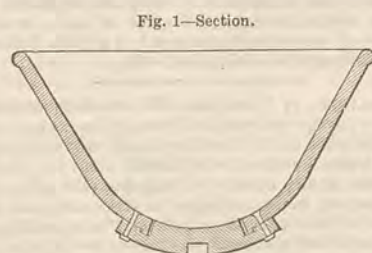
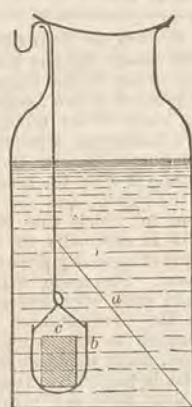


Fig. 1—Section.

connected by short pieces of platinum wire, so as to form a sort of basket. In this is placed a piece of amalgamated zinc of convenient size, and the whole is suspended by a stout platinum or silver wire in the bottle containing the solution to be reduced. Another strip of platinum foil, about  $1\frac{1}{2} \times 2\frac{1}{2}$  in size, is then dropped into the bottle, in such a way as to lean against the wire supporting the basket and zinc, without coming into contact with the latter.

Galvanic action at once commences, and hydrogen is evolved in abundance from the surface of the foil, which never becomes amalgamated, as it comes into indirect contact only with the zinc.

When the reduction is complete the platinum



Apparatus for Reducing Ferric Solutions.

basket containing the zinc is removed from the solution, washed in the titrating beaker and laid aside, all danger of fracturing the beaker being thus avoided.

In the accompanying figure which shows the arrangement of the apparatus when in use, *a* is the large platinum strip, *b* the basket, and *c* the piece of amalgamated zinc.

DURING the month of August all work was suspended in several of the producing mines of Montana. On the 21st ult. the Anaconda mine was closed down, thereby throwing nearly 200 men out of employment. Two weeks previous to that about 150 men were laid off from the same mine, making a total of 350 miners who have been deprived of their means of support.

#### Coal-mining Abroad.

In California we get a great many cargoes of coal from Great Britain and Australia in ships which come here for our wheat and bring the coal at low freight rates. And England is very glad to get rid of her coal, for her coal exports are on the decrease. The reason of this is easily seen in the fact that her best customers are developing their own resources. Even our local conditions show this, for as our needs for coal expanded, while more was naturally imported, the coast mines were also developed and increased their output largely.

In the first half of 1885 England exported 11,433,338 tons of coal, while the first half of this year she only exported 10,659,066 tons. The principal falling off has been to Russia, Denmark, Sweden and Norway, countries now developing their own resources. In Russia, particularly, inducements are held out to capital to open the mines. Russia has immense coal fields, second only to those of the United States; and her fields can be easily worked. Her production is greatly increasing, while English exports continue to decline. Referring to this, the *London Mining Journal* says:

In the first half of 1884 we exported 671,716 tons of coal to Russia, and 769,271 tons to

Fig. 2—Plan.

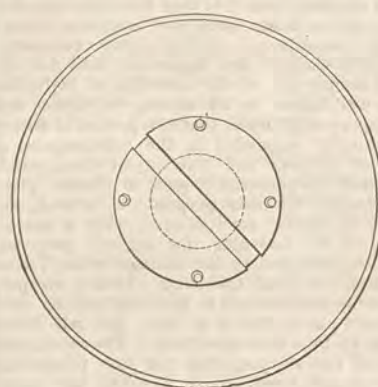


Fig. 2—Plan.

Sweden and Norway; but in the same period of 1886 the quantities were respectively 507,338 and 713,252 tons. Sweden and Norway, however, in the first half of 1885 took from us 773,404 tons of coal, making the decline during the present year of a still more marked character. Indeed, there is no mistaking the fact that the falling off in our exports of coal to the leading continental markets is becoming more pronounced, and must seriously affect our own mine-owners and miners. There are no fresh markets to be opened, while our hold of many of those in which we have done a very large trade is fast being relaxed. We are now doing less than formerly with France, Italy, Denmark, Sweden, Norway, and British India, and seeing that our exports have been equal to one-sixth of all the coal raised in Great Britain, those connected with coal mines at home may well think it worth considering as to what is likely to be the future of our export trade in coal. With respect to the mining progress made by Russia it may be stated that the quantity of coal mined in that country in 1867 was 437,625 tons; in 1877 it had increased to 1,769,785 tons. In 1884 it had increased to 4,200,000, and last year the production was estimated at 4,500,000 tons.

CHANGED TO A COAL-BURNER.—The ferry steamer *Piedmont*, on the San Francisco and Oakland route, has had her furnaces changed from a petroleum refuse oil to coal friction. It was found by experiment that the coal—Carbon Hill—steamed more freely than the petroleum refuse heretofore used, the difference being seven per cent in favor of the coal burning. This change is induced by the peculiar style of boilers of the *Piedmont*, they having been built for coal. The company continue the use of the petroleum refuse in the *Solano* and on the Oakland freight-boats, their boilers favoring an "oil burner."

The long strike at the Union Iron Works in this city is practically ended. The Union molders have gone back to work again. The original object of the strike was to force the company to make a shipwrights' Union yard of the shipyard, and in this it has utterly failed. The Wood, Iron and Steel Shipbuilders' Association remains in the ascendancy, and the members of the Shipwrights' Union remain out. The shops now have a full complement of men; but the boiler-makers have not given up yet.

WORK has been commenced on a second railroad into the Cœur d'Alene, and it will be open for traffic by the last of October.

#### A Sensitive Mining Lamp.

In Germany, where it was invented, the Pieler safety lamp for mines is now commonly used, having displaced the famous Davy in a large number of mines. In Belgium it is largely used, and the French are also adopting it. This lamp is solely intended for testing purposes in mines. It burns alcohol and reveals the presence of fire-damp when the latter is present in any proportion greater than one-fourth per cent. In this extreme sensitiveness lies the value of the lamp for miners. It is described in the report of the Royal Commission on Accidents in Mines as follows:

Pieler's is a large Davy lamp constructed to burn alcohol with an Argand wick. The air supplied to the inner part of the flame is admitted by a tube, protected by superposed disks of gauze, which passes vertically through the vessel containing the alcohol. Around the flame is a short conical chimney, open above and below, and the flame is so regulated that it does not appear above the chimney, its height being, therefore, from 1 to 1.25 inches. In gas this spirit flame yields a much more conspicuous cap than can be produced by the flame of ordinary vegetable or animal oil. \* \* \* The Pieler lamp is obviously a most sensitive gas detector, but in its present form it is quite inadmissible for use in well-ventilated mines, for the following reasons: The flame is easily extinguished by a very moderate current; and if the lamp happens to come into an explosive mixture of gas and air an explosion is almost certain to be caused in a few seconds. The lamp could be rendered less dangerous for general use by inclosing it in a case, and, as far as we have been able to observe, its power of indicating the presence of gas would be but little if at all impaired.

These remarks of the Commissioners are evidence that their work has, in some at least of its particulars, not been brought up to date. The defect here alluded to was long ago remedied. In the earlier construction the combustion of the spirits and the gas caused the gauze to become red hot in a few seconds, but in the lamps now in use the flame is extinguished by the ignition of the gas.

#### Blowing Whistles without Steam.

Oscar Reichling, engineer of the Kennedy, has solved the problem of how to blow a steam whistle by water power. Water is turned into a boiler to which an ordinary whistle is attached, and the air in the boiler is compressed, thus generating sufficient force to produce a successful toot, which is now regularly heard. It is necessary to turn the water into the boiler about 12 minutes before the show is to come off. Mr. Knight, of Sutter Creek, has also made a successful blow by the use of the same means, but the credit for the discovery must be awarded to Mr. Reichling, as he had the idea six years ago, and, in fact, told both Mr. Knight and Mr. Murray, of the foundry, of it.—*Amador Sentinel*.

This can hardly be called a new invention, as it has been in practical use for many years at the Spring Valley Hydraulic mine in Butte Co.

It was introduced by Mr. Gardner F. Williams, while superintendent of that mine. The method adopted by Mr. Williams was as follows: An air receiver (used during the construction of a bedrock tunnel) was placed on end and connected with the large hydraulic pipe by means of an inch and a half gas pipe, with a valve to control the flow of water. An ordinary steam whistle was attached to the receiver.

Water is let into the receiver under a pressure of about 80 pounds per square inch. In about one minute's time the air is compressed sufficiently to blow the whistle. After the compressed air is exhausted the water is discharged from the receiver through a waste pipe, and it is again ready for refilling.

AN EASTERN OPINION ON GRAIN SHIPMENTS. The *St. Louis Railway Register* seems to think that the Pacific Coast people don't keep abreast of the times. Hear it: "When the people of the Pacific Coast learn to use elevators instead of sacking their grain they will reap a larger profit." The elevator is "an institution" out West, and in its place is very useful and a cheap way of handling grain, but the requirements of our foreign shipments are sacked grain and none other. In fact, we could not sell a pound of unsacked grain for shipment, so we think we know what we are about, the *Railway Times* to the contrary, notwithstanding.

THE Reno Milling, Smelting and Reduction Works Company have made the survey and located the ditch from the river to the point on which the works will be located.



## MECHANICAL PROGRESS.

## Working and Tempering Steel.

To work steel, never heat above a light cherry red for hammering, says the *Iron Trade Review*; then hammer light and quick until nearly black, as this improves the steel and will make tools that will double the work over that not so treated. The hardness of steel is governed entirely by the heat when it is dipped in water; for instance, a piece of steel dipped at a bright cherry color and drawn to a straw will be very much harder than a piece heated to a dark cherry red and then dipped and drawn to a straw. Try it.

The forging, hardening and tempering of steel is an art that but few understand, as its knowledge is only gained by experience, and but few ever give it to others; yet in a few words I will try and give some of the principal elements to workers of steel, which if followed will save you many losses and give you a reputation for working steel that will insure you good and serviceable tools, as well as increase your gains.

Please remember that the heat at which steel is worked and that at which it is hardened are two of the vital elements to produce good and serviceable tools. If heated above a light cherry red, some of the vitality of the steel is destroyed, and it would in heating too many times return to iron. If heated too hot when hardening, it would fly to pieces, destroying your labor as well as giving you a poor reputation.

Remember, also, to hammer your work lightly at a low heat, as this improves chisels, drills, lathe tools and edge tools most wonderfully; also take as few heats as possible, as overheating and too frequent heating reduce the steel to iron by destroying the carbon.

To harden taps, rimmers, chisels and drills, always dip them slowly to the depth desired in as near vertical line as you can by the eye and hand, then move in a circular position until cold, but never any deeper in the water than first dipped, as this prevents them from cracking, which they would be likely to do if held perfectly still and the water formed a line around them. Do not change the water in which you temper, but as it wastes fill up the tank. If you are obliged to use fresh water, always heat a piece of iron to put in it and bring it to such a warmth as is perceptible to the hand, as steel is liable to crack when dipped in cold water. When you have heated your article to be tempered, take it from the fire and examine it to see if any flaws are observable in the steel, as this will prevent your having poor pieces of steel, laid to your carelessness in hardening.

In cutting up steel a thin, sharp chisel should be used, as a blunt one is liable to splinter or crack the bar, which will not be seen until it is tempered, and then the labor is lost with the steel.

## Colors of Different Articles for Use.

Taps should be hardened and then brightened by rubbing emery and oil on the clearance, and then draw on a hot plate or in a heated ring to a draw straw color.

Dies should be a bright straw color and drawn on a hot plate or in sand.

Drills for iron should be a dark straw on the cutting part and the rest a blue.

Chisels for iron should be a violet color; for cutting stone a purple is required.

Milling cutters should be of a yellowish white. Gear teeth cut the same color. The usual way to dip these is to have a rod with three prongs to pass through the hole after it is heated to dip with, lower slowly until all the cutter is under the water about two inches, then move in a circular position until thoroughly cold, remembering that a great many things break by taking from the water before they are cold, especially large pieces of steel, as the center retains the heat, and when taken from the water it expands the outside and causes it to crack.

In tempering pieces, have a thick and thin edge, always the thickest part first. Study the pieces you have to harden and it will help you very much. Large centers in work for tempering should be avoided, as they are liable to cause the end to split open.

**CYLINDER CONDENSATION.**—Though cylinder condensation is a well-recognized foe to fuel economy in engine practice, it is not always that even the simplest precautions against it are adopted. It may therefore be sometimes well questioned whether steam users are as well aware of the advantages of using dry steam as they ought to be. If steam in a perfectly dry state could be used, cylinder condensation would, of course, be reduced to a minimum, since dry steam, like any other gas, conducts heat very slowly. With wet cylinder walls, however, due to the use of saturated steam, the moisture will often evaporate freely, taking up the heat necessary for evaporation from the surfaces on which it rests. Still, saturated steam, which, incidentally remarked, is steam in the critical condition, the slightest loss of heat causing condensation, does not by any means offer the best possible conditions for such condensation, as many popular forms of boilers supply steam which contains a much larger percentage of moisture than is generally supposed. With them it would be advisable and obviously profitable to adopt some arrangement

by which the cylinders could obtain a supply of dry steam. Moderate superheating would accomplish the object admirably; but even a judicious planning of the pipe connections, the use of baffle-plates in extreme cases, or the addition of suitable traps, would result in direct benefit.—*Iron Age*.

## Rapid Adoption of Steel Railway Sleepers.

Notwithstanding the unfavorable reports of many engineers and railway superintendents in regard to the use of steel or iron railway sleepers, on account of their large cost as compared with wood, they are coming into quite extensive use in Belgium, Germany, France, and other European countries, and lately large quantities have been sent from English steel-works to India. The London & Northwestern Railway Company has introduced Mr. Webb's sleeper on various parts of its system. It is highly spoken of by several railway engineers, and is reported to have given very satisfactory results. The Midland Railway Company has laid down several miles of steel sleepers similar in section to Mr. Webb's, but with a cast-iron chair, bolted with Ibbotson's patent bolts; and it is about to lay a further portion of its road with the same sleeper. The Metropolitan Company has also determined to lay down steel sleepers, and other companies in England will, without doubt, soon follow these examples.

London *Iron* says that one of the most promising outlooks at the present time in the steel business is undoubtedly the extended adoption of steel sleepers, and adds that it may be assumed that, before many years are over, this branch of steel manufacture will be largely extended at English works. An important field for the steel sleeper lies in the direction of collieries. It is well known to all mining engineers and managers of collieries that a large sum of money is annually expended in the maintenance of wooden sleepers and tramways under ground, and steel sleepers would seem to possess great advantages for this purpose. A strong, yet light, corrugated steel sleeper, with a special steel clip for fastening, for colliery purposes, has been patented by the manager of the Tredegar Iron and Coal Company. In this sleeper, two holes are punched in each end and the steel clips are put in after it is laid, the rail being keyed up by a steel taper-key. The corrugated sides of the sleeper, with the two protecting fangs at either end, enable it, when laid down, to become very firmly attached to the ballast or road, thus preventing any movement when loads are passing over sharp curves. The weight of the sleeper, with two steel keys and clips, is 16½ pounds. It is stated to have been at work for some time in collieries in South Wales, where sharp curves and steep gradients exist, and has been found to work very satisfactorily.

**SHEET IRON IN CONSTRUCTION.**—It will require very little observation to convince one that the use of sheet metal in building construction has of late very considerably extended, while its adaptations in this important field have likewise gained in variety and importance. It may safely be affirmed that at the present time tenfold more sheet metal is used for building purposes than was used less than ten years ago; and its advocates claim, and not without good cause, that its utilities are only beginning to be appreciated at their proper value. New uses are being found for the material every year. Among the more recent of such applications may be named, for example, fire-proof corrugated iron arches for ceilings; finely corrugated sheet metal, tastefully decorated, for the interiors of public halls, theaters, offices and stores, to say nothing of other special uses in building to which the material readily adapts itself, and not omitting mention of the well-known and successful use of sheet iron for roofing and siding, for which purposes immense quantities are annually consumed. Of these products, it is not invidious to say that the corrugated forms of sheet metal are for most purposes decidedly the most useful, and the enormous increase in the demand for these products is the best evidence that could be presented to demonstrate the fact.

**NEW PROCESS FOR MAKING STEEL PIPE.**—The Berlin *Eisenzeitung* contains an account of a new process for manufacturing steel pipe and tubing, of which it speaks in an enthusiastic manner. A syndicate has been formed to build works at Burbach. A large firm in Paris proposes to apply the method to the manufacture of copper tubing. The following is the process alluded to: As soon as the steel is cast into the round mold a core is thrust down into the steel, so that a tube is formed between it and the walls of the mold. In order to prevent cracking of this annular casting during the cooling, the core is so made that it follows up the shrinkage of the steel. The steel cup thus obtained may then be rolled in an ordinary train. Trials made at the Burbach works have been very successful.

**IMPROVED BARBED-WIRE FENCE.**—A Pittsburg mechanic, Charles Rogers, has secured a patent on an invention which, it is claimed, will revolutionize the barbed-wire fence business. The invention is for barbing metallic strips about three-fourths inch wide, and with the machine bars are cut ranging from one-fourth to one-sixteenth inch in thickness.

## SCIENTIFIC PROGRESS.

## Salt-water Ice.

Marine ice was formerly regarded as formed of solidified pure water, retaining, by mechanical adhesion, traces of the saline liquid. These traces could be expelled by energetic pressure, when acids and gases would be found in the residue of the desiccation in invariable proportions, as it existed in the sea.

The question of the chemical composition of the ice of the Arctic ocean is complicated in other ways. But it gains in interest what it loses in simplicity. When salt water is frozen artificially a small part escapes solidification. The uncongealed residue is insupportably better, and analysis shows that nearly all the manganese is concentrated in it. The solid block, if it is homogeneous, and is not full of holes, and if previously drained, may furnish a passable drink. The ices of the Northern ocean are frequently moistened with a kind of brine, which sometimes embodies crystals of a special character, easy to distinguish from the ice around them.

With congelation a sorting of matter takes place; most of the sulphuric acid passes into the part that solidifies, while magnesia and chlorine prevail in the part that remains liquid. Under the influence of variations of temperature all the chlorides in the ice will gradually disappear—some go into the sea and are dissolved, while the rest appear on the surface and form hydrated crystals or a kind of "salt snow." The sulphates thus prevail exclusively in old ices, which constitute mixtures of solidified water and a peculiar chemical compound—the cichydrate of sulphate of soda, a body which, containing 5 parts of soda to 95 parts of water, is decomposed at a little below the ordinary freezing point.—*Ex.*

**POLARITY IN TADPOLES.**—We recently copied a short paragraph from the *Scientific American* corresponding under the above head, which stated that when a current was passed into the dish containing any number of tadpoles (the poles of the battery being immersed in the water), all of them without exception took up "one position, that in which the head was turned to the anode and the tail to the cathode." From this fact it was assumed that tadpoles possessed the principle of polarity. A later correspondent of the same journal writes as follows: "I see nothing really surprising in this, and certainly nothing that would prove 'polarity' in the tadpole. The 'shock' from the cathode is always a great deal stronger than from the anode; also, the head of the tadpole (as in all animals) is the more sensitive portion of the body, electrically; hence the cathode presented to the head, if the current be strong, becomes quite powerful, whereas, if presented to the feet or tail, the current is much less severely felt. The arrangement of the tadpoles with their tails to the cathode is the position they should assume in order to reduce to a minimum the unpleasant sensation of the passage of the electrical current through their bodies. Confine a man in such a way that the current from a battery must pass through his body from head to feet, and he would very soon arrange himself with his feet to the cathode and his head to the anode, and yet this would be far from providing 'polarity' in the human body. There may be 'polarity' existing in the tadpole, but a different experiment than that made by Prof. Herman is necessary to prove it to me."

**SCIENTIFIC SURVEY OF SOUTHERN CALIFORNIA.**—James Stevenson has just been instructed by the Director of the United States Geographical Survey to proceed to San Diego for the purpose of making plans for the topographical survey of Southern California, especially with the view of reporting upon the site for a base-line and for connecting it with the coast survey triangulation of the region, and for determining the best season in which this work can be performed. He is especially to learn if the work can be advantageously prosecuted during the winter season. Stevenson will also be instructed to make such ethnological notes and collections as the circumstances will permit without detriment to the work. Stevenson will, while there, make explorations of several of the small islands just off San Diego, on which it is reported that there are many important and interesting Indian remains and relics. It is believed that much interesting data respecting these subjects, as well as information regarding the fauna of these islands, will be obtained, as they have not hitherto been carefully examined in a scientific way.

**PHOTOGRAPHING CANNON-BALLS.**—It is well known that cannon-balls have been most successfully photographed when on their flight from the cannon's mouth, but it seems that quite recently such photographs have been obtained, many of which show, in a remarkable manner, the head of condensed air which precedes the shot. It is this head of condensed air which makes it almost impossible, even for the most skillful rifleman, to hit an egg-shell suspended by a longish thread; and doubtless it is this "head" of condensed air which first wounds when an animal is hit by a rifle shot.

**CREOSOTE** is spoken of rather widely among scientific men as promising to play an important part in the future in the generation of both heat and light. An apparatus has been in-

vented for the making of steam for ships of war by its aid, and also for utilizing creosote as an illuminant, mixing it with about four times its own weight of air. The lights are said to be highly satisfactory, the light obtained being useful at a distance of nearly 200 yards from its center.

**AN ELECTRIC MINING LOCOMOTIVE.**—Electricity has for some time been employed by the Trafalgar Collier Company for underground ventilating and pumping, with so much success that it was resolved to extend the use of this agent also to its underground railroads. In Germany, there are several collieries so worked; but in these cases the current was sent to the locomotive by fixed conductors. In the Trafalgar colliery, the electric locomotive carries its own store of current with it, in a series of accumulators, the weight of which represents so much useful adhesive weight on the rails. Where the underground lines have sharp curves, haulage of trains by wire ropes presents great difficulties, and horses are generally employed. This locomotive has been designed by Mr. A. Reckenzaun, and has been in use for several weeks. The construction of the motor and driving gear is similar to that adopted in electric street tram-cars, but the conditions to be satisfied were widely different and more difficult than those obtaining in an ordinary tramway. The space is very limited, and since both sharp curves and heavy gradients occur at frequent intervals, it was somewhat difficult to stow away the necessary power in so limited a space. Within the narrow gauge of two feet seven inches, and an extremely short wheel-base, there had to be arranged an electro-motor of eight-horse power, with suitable gearing, brakes and attendant details.

**SUGAR AND SWEETS.**—Sugar is charcoal in another shape, established by another way of blending the three elements of which it is composed. The principal members of the sugar group in the order of the quantity of water they may be supposed to contain are: Woody fiber, starch, gum arabic, cane sugar, fruit sugar, grape sugar, milk and sugar inosite or the sugar of animal muscle. All these will ferment and are called true sugars. There is another class also possessing great sweetness, which will not ferment, and are somewhat differently constituted, as, for example, the sugar of manna or licorice. Though all these are called by the same generic name and are allied in constitution, they are perfectly distinct bodies, each with its own properties. There are some sweet compounds, sweeter even than sugar, that are anything but eatable, as glycerine, sugar of lead, chloroform, salicilate of soda and the new sweet recently found in coal tar, known as saccharine—which is several times sweeter than cane sugar. Previous to discovery of saccharine the sweetest compound known was a solution of chloride of silver in hyposulphite of soda.

**SEA-SERPENTS.**—The belief in the occurrence of "sea-serpents" in the ocean of to-day, though hardly openly avowed, is not discounted by not a few scientific men whose opinions are entitled to the highest consideration. Dr. J. B. Holder, after giving (in the *Annals of the N. Y. Academy of Sciences*) a historical account of a "sea-serpent" observed near Boston, corroborates the adduced testimony by the description of a carcass of a large and unknown animal found off the coast of Florida, as related by highly credible witnesses. The creature described was over 40 feet in length, and nowhere of more than two feet in diameter. Unfortunately the specimen was in an advanced state of decomposition, and no portion was saved. The discovery of the giant squids off the Atlantic coast within recent years demonstrates the possibility of other large animals yet inhabiting the ocean, of whose existence science is yet wholly unaware. May not some descendant of the cretaceous mosasaurs or plesiosaurs yet be among them?—*Science*.

**THE TEMPERATURE OF SPACE** is, at the present day, generally assumed to be much less than the lowest temperature yet produced by artificial means; and it is interesting to note the efforts made to produce extreme cold. Stewart on "Heat," p. 110, gives an example in which a temperature of 220° F. was obtained, but very recently (Van Nostrand's *Eng. Mag.*, xxxv, p. 57), in solidifying oxygen, a temperature of 330° F. is said to have been produced, which is only 131° F. above absolute zero.

**SUN SPOTS AND THE WHEAT PRODUCT.**—A writer in *Nature*, basing his statements upon observations in India, maintains that there is a remarkable correspondence between the periodicity of sun spots and the recurrence of high or low prices of wheat in that country; but as regards the United States, facts are at variance with any such theory.

**THE OBELISK** in Central Park, New York, seems to be by no means safe from destruction, as it has recently been found to be suffering from exposure to heat and moisture. The plan for protecting it against the climate has not only utterly failed, but it is said to make matters worse.

**IGNATIEFFITE—A NEW MINERAL.**—General Ignatieff has presented to the Mineralogical Society of St. Petersburg a mineral recently found on his estate in the Government of Elizabetgrad. It belongs to the class of aluminates and has not hitherto been found in nature.



## A New System of Preserving Food.

A new system of preserving fresh food has been under trial for the past year or so, and, having satisfactorily survived numerous severe practical tests, is now being publicly introduced. This process is the invention of Mr. August R. Roosen, of Hamburg, and its novelty consists in the fact that it is carried out without reference to temperature, while its importance is due to its economical character and its proved success. It partakes of the chemical and the mechanical nature, and consists in placing the food to be preserved in an innocuous antiseptic solution, and submitting it to continued pressure until required for use. So far the main experience has been obtained from the preservation of fresh fish, and with fish, therefore, we will deal, our own observations, too, having been made with this class of food.

In practice large steel barrels are provided, having lids which can be hermetically closed. The fish as captured are placed in a barrel, which is nearly filled with a solution consisting of 97 per cent of fresh water and three per cent of boracic acid, tartaric acid, and salt in certain proportions. The lid is then fixed on, and by means of a small hydraulic hand-pump water is pumped in until the cask is full and the air expelled. This condition is ascertained by a fine stream of water spurting through a hole in a screw nut, which is then screwed down and the orifice thus closed. The hydraulic pump is then worked until the pressure reaches about 80 lbs. per square inch, when the pump is detached, a small valve in the cask lid being closed by back pressure from within. The process is now complete, and by it fish is preserved for lengthened periods.

It will thus be seen that the process is simple and can be easily carried out by any ordinary laborer or fisherman. In the case of fish, smacks or steamers would be provided with the steel barrels, in which the fish would be placed, either gutted or ungutted, and treated as we have just described; the operation of filling the barrel, exhausting the air and putting on the pressure occupying only a few minutes. On being discharged from the vessels the casks can be forwarded to the inland centers of consumption, or they may be emptied and their contents forwarded by rail, as the fish will keep in a perfectly fresh condition for a number of days after being taken from the casks. Within a few weeks, more or less, the efficiency of the process is not affected by the length of time the casks remain unopened. These casks will hold about 300 pounds of fish, and it is intended to let them out at a charge which will, it is stated, with the cost of the solution, and assuming that they are only filled 20 times in the course of the year, cause the total expense not to exceed one-fifth of a penny per pound of fish.

The Roosen process appears destined to become very important in connection with the food supply of this and other thickly populated countries. It will effectually prevent the enormous waste which, in the fish trade particularly, has been hitherto unavoidable; but it is stated to be equally applicable to meat and any other kind of food. Large quantities of perfectly fresh fish can be forwarded from the fishing stations to the large cities and towns, and placed on the market for immediate sale or kept until there is a demand for them. Numerous practical tests have been made to demonstrate the commercial value of the process. Fish have been sent from Norway to London and Paris, and from Shetland to different parts of Scotland, and recently the process has been shown in Edinburgh, Leith, Hamburg and Berlin, and has been pronounced by the highest authorities in the fish trade to be a complete commercial success. On July 1st a steel cask in which a quantity of beef had been placed under pressure on February 5th, or about five months previously, was opened at Copenhagen, and on part being boiled and part roasted both were eaten and were stated to be of perfectly good flavor. Lobsters have also been kept for 14 days, and then eaten and found to be quite fresh.

It is claimed for the Roosen process that it absolutely arrests putrefaction, and kills or destroys the germs of any putrefactive or other bacteria which may have been present in the blood, body, or viscera of the fish or meat submitted to its action. It is said to preserve for an indefinite period the muscular tissues of fish and animals in the first stage of the changes which follow death, and which, under ordinary circumstances in summer, does not last more than 24 hours. These important results are achieved by the pressure on the antiseptic solution in which the fish or meat is immersed, which pressure causes a direct inhibitory action upon the vital processes forming part of the development of putrefactive and fermentative bacteria. The antiseptic solution used, of which, as we have stated, boracic acid is the base, does not impart any taste whatever to the food treated, and is claimed to be absolutely innocuous to human life and health, although destructive to the lower organisms which cause decomposition.

WORK on Stoneman hotel in the Yosemite is progressing rather slowly because of difficulty in hauling lumber in sufficient quantity from the mill at Gentry's station. The daily product of the mill is about 12,000 feet, and it is hoped that the needed supply for the new hotel will be sawed by September 15th. The contractors expect to have the building inclosed by Nov. 1st.

## USEFUL INFORMATION.

**A LUBRICANT FOR BRASS.**—Lard and grease have, as is well known, a corrosive action on brass and copper, and this is a drawback to their use as lubricants for these materials. It has been pointed out that, while both melted india rubber and vaseline are without corrosive action on brass, each alone has a disadvantage. Thus melted india rubber is too glutinous and in course of time hardens. Vaseline never hardens, but it is deficient in tenacity and adhesiveness. A mixture of both substances is therefore recommended, consisting of one part by weight of melted india rubber and two parts of vaseline. The rubber should be pure, not vulcanized, and cut into shreds, then melted at the lowest possible temperature in an iron cup while being pressed down against the hot cup and stirred into a uniform glutinous mass. The vaseline of the common thick brown sort should be added to the india rubber and the whole thoroughly stirred and blended together.

**A EUROPEAN STREET-CAR RAIL.**—A notable advantage which the chief European cities have over most American cities is the method followed in using the streets for railway purposes. A style of rail is laid that offers advantages both to the railroad company and to the owners of ordinary wheeled vehicles. The iron is molded as a broad flat bar or slab of about six inches width and one and a half inches thickness. The upper side is slightly crowned or rounded, and midway along it is a concave groove of about seven-eighths inch depth and seven-eighths or one inch width. This groove takes the flange of the car-wheel, and the tire or broad part of the wheel runs upon the upper surface of the rail. An important part of the method is in having the rail the full breadth of the upper edge of the timber on which it rests. This permits the paving blocks to be crowded up against the edge of the rail.

**THE DECLINE IN THE SHIPBUILDING INTERESTS** of the United States, noticed for so many years, at last appears to have been arrested. The Commissioner of Navigation is now engaged in compiling the shipbuilding statistics for the last year, and from the results already reached forms the opinion that the aggregate tonnage built in the United States during 1886 will be shown to have been fully equal to that for the fiscal year 1885. The increase in the number and tonnage of iron ships built continues steadily, but it is not sufficient to affect the continued decline in wooden shipbuilding. The tonnage of iron vessels constructed, which was 25,582 tons in 1880; 28,392 in 1881; 40,097 in 1882; 39,646 in 1883; 35,631 in 1884; and 44,025 in 1885, will show further increase, probably in as large proportion as the increase of 1885 over 1884. The decline of the tonnage of wooden vessels constructed will be more rapid than heretofore.

**ALLOY OF ALUMINIUM AND TIN.**—The applications of aluminium are now considerable, and M. Bourbouze, a French physicist, has added to their number by employing an alloy of the metal with tin for the internal parts of optical instruments, in place of brass. The alloy he employs consists of 10 parts of tin and 100 parts of aluminium. It is white like aluminium, and has a density of 2.85, which is a little higher than that of pure aluminium. It is, therefore, comparatively light, which is an advantage for apparatus where lightness is desired. It can be soldered as easily as brass, without special means, and it is even more unalterable than aluminium to reagents. The attention of electrical instrument makers should therefore be called to it, especially for apparatus of a portable character.

**THE ECCENTRICITIES OF TRADE** between the United States and South America are illustrated by a Valparaiso letter in a late number of the San Francisco Bulletin, saying that "an amalgamating machine was shipped from Chicago to New York, thence to Germany and thence to Coquimbo, Chili, all to save time and money." The letter adds in another paragraph: "Fancy for a moment that the German steamer has just gone in with a lot of American goods on board, which were shipped to Germany from New York and thence here, and that this has been going on for months and months, daily increasing; that coming this way is cheaper than Panama or direct around the Cape, and quicker besides. Of course those goods are credited in the custom-house as German importations, the United States losing these heavy items in their statistics of Chili trade."

**SOUTHERN SAW-MILLS** are occasionally cutting into a grape-shot imbedded in trees during the late war, and a firm that makes saws publishes as an advertisement the statement of a saw-mill owner that the finely-tempered saw he bought of the said firm had sawed clean through one of the shot one and one-fourth inches in diameter without hurting the saw, that he could cut two more logs into lumber before stopping, and then needed only 35 minutes for filing before going on as good as new.

**DANGER FROM ELECTRIC LIGHTS.**—On the morning of July 31st, for about three hours before daybreak, those streets in New York lighted by electricity were left in absolute darkness. The private electric lights at all stores, hotels, etc., were also extinguished. Electricians say

that the lightning which accompanied the storm was the most vivid ever seen in that section, and threatened to work considerable damage to the wires throughout the city. Perceiving the force of the current, and the likelihood that some of the machinery at the works would be burned up or twisted to pieces, orders were given to shut down altogether, and no light was furnished until after the storm. It is believed that a fire would have occurred had not this precaution been taken. In the old city proper all the old gas lamps are kept in good condition, to be used in case of an emergency of this kind.

"MOONLIGHT nights are the bane of railroad engineers," recently remarked a head official of the Baltimore & Ohio Railroad. "All engineers dread moonlight nights. They try the nerves to the utmost. Engineers like to run on dark nights. On a moonlight night the trouble with them is no trouble at all—shadows. An engineer, looking out from his engine, sees before him all manner of shadows. He is sure that the dark shadow across the track he sees is a man or a rock, or some kind of an obstruction. He doesn't know, and he is kept in a state of nervous excitement all the time. Going around curves, along hillsides, many curious shadows are outlined on the track, and very often an engineer is so worked up over a night's ride that he is scarcely able to perform his duties."

**CARRIAGES IN CHINA.**—A paragraph is going the rounds to the effect that the Emperor of China has ordered a carriage in this country, the implied inference being that they have hitherto been unknown in the Flowery Kingdom. As a matter of fact, as far back as the days when Lord Macartney went on embassy to that potentate, he took with him English carriages as presents from Great Britain. They were found still unused in the summer palace when it was looted by the French 20 years ago.

**A BASTING MACHINE** capable of doing the work of 25 girls is being used experimentally by a large clothing firm in Boston, and the Knights of Labor are giving it their attention.

**UTILIZING ESCAPING GAS.**—It is reported that the natural gas escaping from the mains in Pittsburg is to be used in illuminating the streets.

## GOOD HEALTH.

## Sunstrokes in California.

**EDITORS PRESS:**—In an article in your paper of recent date there was some speculation in reference to the cause of sunstrokes that have occurred in California during the past summer. Now, it occurs to me that the cause of these sunstrokes will be found in the fact that thunder showers have been so much more frequent this season than in previous years. These thunder showers, wherever they occurred or wherever there was cloudy, damp weather, during which they were likely to occur, produced exactly the same kind of an atmosphere that causes sunstrokes in the Eastern States. I think that if the facts are ascertained, it will be found that in every instance where these cases of sunstrokes have occurred there existed a humid state of the atmosphere, which has been so much more common during this season than during previous years. H.

Covelo, Aug. 28, 1886.

**FATAL EFFECTS OF ALCOHOL.**—According to Dr. Richardson, alcohol cuts down by disease, in England and Wales alone, 1000 persons a week. What, adds the doctor, if any other cause of mortality did the same? What if 1000 persons per week died, in the same area, from the bite of the rabid dog or the snake, by the swallowing of arsenic, opium, or prussic acid? What if some thousand persons a week were known to be killed by the secret devices of the slow poisoner, who, under the guise of friendship, went about and instilled into his victims some subtle drop which led to the shortening of their life and to the production of lingering organic fatal disease? What, indeed, then would be the cry and the action? Why, all through the ranks of the great profession of medicine there would be a tumult of labor and toil, such as never before was seen, to remove the calamity. Men would be ambitious to be first to discover by experiment, by experience, the cause of so fearful an evil, and to remove it instantly; while he who won the victory over the calamity would be extolled as illustrious, and, crowned with honor, become a household word from among the children of Esculapius. Yet here one single cause making this deadly havoc, a cause well known and easily removable, in spite of its evils and in face of its easy removal, is permitted to remain in sight with a majority of the army of medicine looking on in apathy, pitying us "poor foolish fanatics" who are exercising our limited powers to uproot it, and some, with the rest of the world, so sharing the calamity as to become copartners in the destruction which follows from the participation.

**COCAINE**, which has heretofore proven a useful remedy for such a variety of ills, is now claimed to be a preventive of seasickness. A Russian physician, having occasion to make several journeys by water, claims to have thoroughly tested its virtues in that direction, with

almost magical effect. Several others have tried it under his advice, with equal success. The same physician, M. Manassein, of St. Petersburg, also claims that the drug is an effective remedy for cholera morbus, and thinks it probable that it may also be found useful in cases of Asiatic cholera.

**SALUBRITY OF OUR CALIFORNIA CLIMATE.**—The salubrity of our California climate is becoming quite universally noted. Perhaps the most satisfactory test of its salubrity is found in the number of deaths among children of a tender age. It is among these that the heat and steam-bath atmosphere of an *unsalubrious* climate show their death-dealing power. The unusually hot season on this coast presents a good opportunity for comparing the mortality in this city with that of the East, where there has yet been apparently nothing more than the usual summer heat. In San Francisco, the hot days of summer are usually confined to three or four, when the thermometer stands at 90° or above. But this year we have had a long period of warm weather, during which the usual fogs and cool winds of summer have been absent. But the records of the Health office show that during one of our recent hot weeks there were only 78 deaths, and of these only 22 were of children under 5 years of age. The death rate for all classes was only .24 per 1000. In New York, in the corresponding week, there were 111 deaths, of which 683 were of children under 5 years of age. These deaths, therefore, of children under 5 years were, in New York, 61 per cent of the whole, while in San Francisco they were only 28 per cent. The death rate of all classes in New York was .74 per 1000, and for children under 5 years of age .45 per 1000. This shows the mortality of all classes in New York to have been three times greater than that in this city, while the mortality of children under 5 years of age was nearly six times greater. It is not probable that any other large city in the United States can make so good a showing during the summer months as San Francisco has during the warmest season that she has experienced for many years.

**VARIETY IN FOOD.**—Often a sickly, waning appetite can be stimulated by some exceedingly simple change in the commonest articles of daily food. Slices of dry bread are uninviting, but the same bread, lightly browned, with a delicately poached egg resting on the crisp toast, becomes altogether another item in the bill of fare. Cold beef and mutton have become standard dishes for wash-day or other slim dinners, but an accompaniment of pickles for the one and jelly for the other makes all the difference in the world between tasteful and barely utilitarian housekeeping. Oatmeal porridge is a most excellent breakfast dish, yet it is well to occasionally substitute in its place berries or other fruit, or even a change to pearl hominy, or cracked wheat, or cornmeal mush. I know there are 40 different ways in which to prepare potatoes, and should not be surprised to learn that there may be 50, yet how few are the tables, especially in the country, where one sees this vegetable except in the stereotyped boiled whole, mashed or fried. A great variety of delightful dishes can be made with apples at all seasons of the year, whether one has fresh or canned fruit. Breakfast, dinner or tea need not lack a healthful relish if one has a dozen or so of apples within reach. I do not enumerate the host of what are known as "made dishes," which can be so quickly and easily concocted out of remnants. I know it is worth the trouble to set on the family table, not courses of elaborate dishes, but a wholesome, agreeable and yet economical diversity of food.—*American Agriculturist*.

**SUCCESSFUL TREATMENT OF SCIATICA BY MASSAGE.**—Prof. Max Schuller, of Berlin, is convinced of the superiority of massage over other measures employed in the treatment of sciatica, and relates his experience of 15 cases—all in males, and except in one or two instances due to exposure to cold. Most of the cases were dealt with from the first by massage; but in a few instances electricity, vapor baths, etc., had been fruitlessly employed prior to coming under his care. The *modus operandi* is as follows: The patient lies on the unaffected side, with knees and hips slightly flexed. The course of the sciatic nerve is rubbed from below upward, partly with both thumbs, partly with the ball of the little finger or thumb; sometimes struck with the closed fist, sometimes the muscular mass over the nerve pressed and kneaded with both hands. The pain evoked by these manipulations soon passes away, and after a short time becomes less and less at each sitting. The neuralgic pains very soon abate, diminishing after a severe and painful massage, then recurring with less severity, and gradually disappearing entirely. The power of walking improves after each sitting. On an average the treatment lasts about two weeks and a half, but in one case nine days, and in several from 10 to 14 days, sufficed. One patient abandoned the treatment after five days, owing to the pain caused by it, and tried, without relief, a fortnight's course of electricity and vapor baths; he then returned to the massage treatment and was cured in two weeks and a half.—*Lancet*.

**FATALITY IN MINING.**—In England in coal mines alone, since 1851, over 36,000 lives have been lost, and during the last 10 years upward of 12,000 lives have been lost, giving an average of more than 1200 a year.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**REPAIRING SHAFT.**—Amador Ledger, Sept. 2: The repairing of the Zeile shaft is about completed, and it is expected that the mill will be started to its full capacity in a few days. At the Kennedy the framework of the new 40-stamp mill is going up rapidly, but it can hardly be expected to be in running order before November.

**SUTTER CREEK.**—Cor. Amador Ledger, Sept. 2: The work of taking out the pump and stripping the Eureka shaft is progressing as rapidly as possible. The track is about all out, and the pump is nearly all on the surface. The prospect of any more work being done anywhere on the premises is not very encouraging. Rumor has it that everything will be offered for sale in a few days, which, if it proves true, means the abandonment of the property.

## Butte.

**BIG BEND TUNNEL.**—Butte Record, Sept. 3: It is reported that men are engaged enlarging the Big Bend tunnel. A flume has been constructed to convey the waters of the river while the work in the tunnel is going on. The flume is 1007 feet long, 18 feet wide and 3 feet deep, and will carry 18 inches of water at the rate of 10 feet a second.

## Calaveras.

**THE GOLD CLIFF'S NEW MILL.**—Mountain Echo, Sept. 1: It is said that the Gold Cliff Mining Company is making the necessary preparations for erecting a 60-stamp mill on Angels creek, several hundred yards from where the mine is located. The mill is to be run by water power, and the company will have the advantage of free water the greater part of the year. This project will necessitate the employment of many more men than are at present required. The Gold Cliff has been well tested of late and found to be a valuable property, warranting all the improvements in view of construction.

## Inyo.

**KEELER.**—Register, Sept. 3: A brief visit to Keeler and the valley generally shows that section to be apparently quiet. But there is much that doesn't show boldly, but in the end will count solidly. Darwin, Cerro Gordo and lesser points are all doing something in the mines; at least half a dozen teams are kept busy hauling ore to Keeler. Steady shipments are being made. Luce's marble quarry is being worked by a small force. Mr. Wrinkle, superintendent of the soda works, has been away lately; in the meantime, however, the work of excavating the vats is going on; and the enterprise, it is hoped, will soon develop into an assured success. There are some idle men at Keeler, but cash appears to be plenty.

**MAXIM.**—The Maxim mill is running at present, it having started up last Saturday. A side track has been laid from the C. & C. main track, thus saving rehandling the ore at the mill.

**RAILROADING VS. TEAMING.**—Enterprise, Sept. 3: The experience of H. G. Chickering in shipping ore from Panamint to San Francisco is a good illustration of the value to a mining country of a railroad. From Panamint to Keeler, a distance of 72 miles, cost per ton hauling, \$20. From Keeler to San Francisco, a distance of 575 miles, cost per ton by rail, \$10. If hauled all the way at the same rate, the cost would be about \$148 a ton, therefore not a pound of the ore would ever be taken out of the ground. This ore is what is known as "dry" ore; that is, it carries very little, if any, lead, and to be worked must be mixed with ore that has a surplus of lead, or must be dry crushed in a mill. This is why it must be shipped to San Francisco, or held until the mill at Panamint shall be ready.

## Mariposa.

**MACHINERY FOR THE MINES.**—Gazette, Sept. 4: W. T. Turner, of Hornitos, passed through town yesterday with his teams and several wagons loaded with machinery, including a large compressor for the Vanderbilt mine. This looks like business, and it is to be hoped that the enterprising owners will realize their fullest anticipations. The mine is extensive and contains an inexhaustible supply of quartz which the present owners have prospected. Taking into consideration the great amount of work done preparatory to permanent operations, the owners must be well assured of the richness and character of the rock to make further expenditures and improvements, as present appearances would seem to indicate.

## Nevada.

**GOOD CLEANUP.**—Foothill Tidings, Sept. 2: A crushing of 14 loads of rock from the Defiance ledge (old Merrimac) was cleaned up yesterday at Rodgers' mill, yielding, not including sulphurets, \$38 per load. L. Payne & Co. have leased the mine for one year, and are making first-rate progress in the work of development. The ledge looks well and there is great promise of a fine mine there.

**A STUPENDOUS ENTERPRISE.**—Transcript, Sept. 2: D. R. McKillican owns a tract of several thousands acres of placer mining ground lying above North Bloomfield between the South and Middle Yuba rivers. The same gravel channel that is being worked at North Bloomfield and Durbec is supposed to extend through this ridge, under the surface of which the bedrock lies at a depth of from 400 to 600 feet, preventing its being worked at reasonable cost by the hydraulicking process or by sinking shafts. It is to be developed by tunnels, one of which is being run from the Middle Yuba at Snow Point. Within the past four or five years two others have been put in from the South Yuba slope at a point in the vicinity of the old Roscoe ranch. Several thousand feet of tunnel will have to be dug to determine the extent and richness of the auriferous deposit, and if the results are as favorable as the present indications appear to promise, the most extensive drift mine in the State will be opened up.

## Placer.

**THE RISING SUN MINE.**—Herald, Sept. 4: The Rising Sun & Big Oak Tree mine, at Colfax, is now

running in full blast. Between 50 and 60 men are employed, and the mill has been busy lately crushing some of the low-grade ore; but the mine is now down 175 feet where the ledge averages 15 inches in width, and the rock will produce from \$40 to \$50 a ton. Some splendid specimens of quartz, showing free gold, and masses of sulphurets, have recently been taken from the mine. The new hoisting works are now completed, and add materially to the facilities for working the mine.

**GRAVEL MINE ATTACHED.**—We understand that C. Hudspeth, of Dutch Flat, has sued and attached the Liberty Hill Con. Mining and Water Co., to recover \$5776.54 due on promissory notes. There are several attachments on the property, but it is supposed, or at least hoped, by the creditors that enough will be realized to pay all outstanding indebtedness.

## Plumas.

**ARCADIAN MINE.**—Greenville Bulletin, Sept. 1: The Arcadian mill started Tuesday on custom ore from the mine of the Forest King Co. It is expected that the mill will run as long as the roads will admit of hauling over them before winter begins, as the Forest King mine now shows a large quantity of good milling ore.

**CRESCENT MINE.**—The water in the shaft of the Crescent mine has been successfully removed, and further sinking will be immediately commenced. The bottom of the shaft looks exceedingly well, and under the energetic management of the present superintendent, Mr. A. L. Whitney, we hope soon to see the mine resume its old-time place among the producing properties of this locality.

**INDIAN VALLEY MINE.**—The works of the Plumas Con. Co., at the Indian Valley mine, present a scene of much activity. The recent development of the Union chimney, by a drift west from the main shaft, is showing some fine ore and in sufficient quantity to enable the mill to be mainly supplied from that point. This reopening of the Union with the Indian Valley proper virtually adds another mine to those now being worked in this district, and outlines a brilliant future for the property of this company.

**GRANITE BASIN.**—Plumas National, Sept. 3: Messrs. Rockfellow & Wright, of the Granite mine, have completed their overshot wheel, and will be ready to start up the mill next week. They have also built a tramway from the mine to the mill, a distance of 600 feet, which will do away with the expense of hauling the quartz by team, and enable them to run during the winter months. The mine is being opened in a workmanlike manner, which shows good judgment and sound sense as to the advantages to be obtained in future working of the mine. The ledge is on an average about two feet in width, and the quartz is easily extracted, and timber and water are abundant for all purposes. The quartz already tested yielded \$18.00 per ton, in free gold, and with a concentrator and grinding pan, which they expect to add to the mill, the yield will be greatly increased, as the gold is rusty, and the sulphurets are very rich. Mr. A. Swan is taking out some very fine ore at the Homestake mine. The ledge in the lower tunnel makes a good showing. Mr. Groves is making a test run from the Flowerpot mine, which, from present appearances, will be satisfactory, and another mill will be needed. These hills are full of mines that will pay if worked judiciously by individuals that are willing to put their shoulder to the wheel, and will pay far better than farming.

## Shasta.

**LOWER SPRINGS MINES.**—Cor. Democrat, Sept. 1: The great mineral belt lying west of the Sacramento river is, no doubt, the most extensive in this part of the country, and the least capital has been expended upon the veins of any camp in the State. Why this is so is a mystery to practical miners. If mining men would properly investigate these mines they would certainly be well pleased with the prospects. This camp is fast showing up its rich mineral resources. Many very good prospects have been found here of late. The Muchmore mine is now turning out excellent ore. The owners are not at all anxious to part with their property, as they have as much in sight or more than they ask for the property. They are making preparations to work the mine themselves, and have faith in opening up something better than they have already found. The White Oak and Eastern Star mines are yielding ore that will pay for hand mortaring. The Bulkhead mine, lying to the east of the Muchmore mine, and supposed to be the same ledge, is being tapped with a tunnel at right angles, which will strike the vein 50 feet from the surface. This mine has produced splendid ore. The Rockford, known as the Jones mine, is having a shaft sunk 15 feet west of the old shaft sunk 20 years ago, and some very fine ore has been extracted. In early days 100 tons of ore from this mine yielded \$22.25 a ton, besides some assorted ore milled \$500 a ton, and the greatest depth obtained is 35 or 40 feet. This vein is pitching south at an angle of 45°. Hargrave mine has a shaft down 35 feet on the vein, and shows good milling ore. The ledge is large and pitches a little north. There are several fine prospects on patented lands, but this will not induce prospecting on these lands, for the owners will not give a reasonable percentage to the prospector. This, of course, is a detriment to the camp. The best ore we have here is ribbon quartz. Where gold does exist here in this character of quartz, the gold and sulphurets increase as depth is attained, and the veins hold a more uniform thickness. The miners here are striving hard to develop their mines, but cannot do much for the want of a good mill. There is a very poor show for tunneling here, as the ground is rather low, and sinking shafts is expensive, as extra help and pumping is required to handle the water; nevertheless, we will hang on to our claims to the last.

## Sierra.

**GIBSONVILLE.**—Mountain Messenger, Sept. 4: Tabor Co. will resume operations in a few days running its main tunnel, in now 2300 feet, and expect to strike through to pay gravel in about 200 feet. Gravel Hill Co. is putting a tunnel through bedrock, and thinks it will ere long tap the back channel. The Union Co. is putting down an incline for new ground. Elias Squire and his father are still engaged in mining, and are developing new and valuable property. C. O. McQuesten is, as of yore, at the North American drift mine with the Schofield Bros.

**HOWLAND FLAT.**—This noted mining burg, usually buried up with snow during the winter months, at an elevation of over 5000 feet above the sea, though rather quiet just now, has bright prospects of a prosperous future, when the extension of the rich auriferous ancient river channel, part of which has been so profitably worked in and near Howland Flat, shall have been reached northeast up the ridge, toward and through Mt. Fillmore. Lincoln and Virginia Companies are in about 1700 feet from daylight, 1600 feet of which is an air-line, about two-thirds of the distance being in hard, blasting rock. With two shifts, of 10 hours each, they make eight feet a week through what is evidently the rim. Soft bedrock or gravel may be struck most any time. But 350 feet northeast, the Virginia Co. found soft bedrock and pay gravel overhead, and was obliged to temporarily cease work for lack of funds, and afterward was convinced that this new passageway to the gold lead was the shortest and most practicable. It is believed, with good reason, that the extension of this rich auriferous ancient river lead, part of which has been worked by the Union, Pittsburg, Hawkeye, Monumental, Empire and Bonanza Companies, continues up to and through the ridge to Mt. Fillmore and the west branch of Canyon creek. When this valuable mining ground is fairly opened for thorough development, Howland Flat may once more have an era of prosperity unequaled in her past brilliant history. Gibraltar Con. Co. has got out a lot of timbers, and will soon resume work on the tunnel to run 300 feet ahead to tap the shaft where pay gravel is expected. Good paying gravel is expected to be struck soon in the Mt. Fillmore claim. Howland Flat mine, under Mr. Denoon as foreman, has not kept even this year, but it was not his fault. No one mined at Pine Grove this summer but D. Conlan, and it is reported that he has done well. The St. Louis mines, under Mr. Donahue, have made a fair profit. Pioneer mine, at Grass Flat, under control of Geo. W. Cox, receiver, has yielded fairly well this year—over \$30,000. The hydraulic companies from Grass Flat to Gibsonville have paid out for labor this year over \$40,000—to white men, \$30,000; Chinamen, \$10,000. This shows a large percentage in favor of the former. All the white help that could be obtained has been given steady and profitable employment.

**BULLYCHOOP.**—Courier, Sept. 4: The sale of mining property in Bullychoop district has been consummated. Messrs. Potts, Finch & Robinson dispose of their interest in a group of mines there, C. F. Foster retaining his interest. Captain Potts retains his ownership of the toll road, George N. Cornwall and other gentlemen of Napa are the purchasing parties. Captain Potts, Robinson, Finch and Foster still own a couple of mines which were not included in the sale mentioned. It is understood that a capital of from \$75,000 to \$100,000 will be expended on the newly purchased mines. The development of Bullychoop and Sunny Hill districts will prove a great boon and a big boom for Western Shasta and Anderson, which is the railroad shipping point for these mines.

**FIFE'S MILL.**—Andrew Fife's quartz mill, which has been in successful operation on Spring Creek, will be removed to the east side of the Sacramento, about 150 yards from the site of the old Chauncey bridge and proposed new bridge, where it will be set up in remodeled shape, and in first-class order. The water needed in operating the mill will be taken from the Spring Creek ditch, and run across the Sacramento in iron pipe. The development of mines on the east side justifies Fife in making this move, and he has put in a boat to facilitate work.

## Tehama.

**MORE CHROME.**—Red Bluff People's Cause, Sept. 3: Job Comings and Frank Brotherton, of this place, have made a discovery of a fine chrome deposit in the Coast Range, upon which they have located four claims. An assay shows 58 per cent oxide of chromium and 1 1/2 per cent peroxide of iron. The deposit is extensive and of fine quality, yielding chrome yellow, blue, green, chocolate and a beautiful red. There is also in the vicinity of this deposit of chrome protoxide of barium, yielding a snowy white, which is also of considerable value. This is the second discovery of chrome within the past few weeks in the foothills and mountains of the Coast Range, besides other ores, the characters of which have not yet been made known by assays. Samples of these are still under examination by experts, showing that the mineral wealth of Tehama county has not been half told.

## Tulare.

**MINERAL KING.**—Visalia Delta, Sept. 2: We had a fine shower of rain here Sunday, Aug. 29th, that completely laid the dust for a short time. The mines here are booming, especially the White Chief and old Baigalupi claim, though the White Chief had a rest for a few days. The party that contracted to sink the shaft 100 feet has departed for Iowa. It is said that he was a coal miner and contracted to sink the shaft at the rate of \$12 per foot; and, having sunk a little over 40 feet, found out that he was losing money, and that rock mining was a little harder than coal mining. It is reported that Harry Trauger has now taken the contract to sink the shaft, and the mine is booming again. Prospectors that are at present working their assessments are finding some fine-looking ore, and we expect a boom here next summer, if not before.

## NEVADA.

## Washoe District.

**BEST AND BELCHER.**—Enterprise, Sept. 4: On the 600 level west crosscut No. 1 has been extended 31 feet, making a total of 214 feet, passing through a vein of quartz during the week 12 feet in width, looking finely but assaying poorly. Crosscut No. 1 east on the same level has been extended 45 feet, making a total of 168 feet—material, vein porphyry with streaks of quartz. The heavy stone bulkhead in the north drift from the Osborn shaft, on the 2500 level, is completed, and as soon as the cement is sufficiently hardened the water gate will be closed. This will effectually shut off the heavy flow of water coming from the northward, and materially decrease the amount of pumping work hereafter. Sinking the shaft deeper will be next on the program.

**ALTA.**—On the 700 level the drift south from the main west crosscut is being continued, following the east wall of the Keystone ledge. It is now in Alta

ground again. The main north lateral drift on this level passed to the westward of the old Lady Washington shaft, and now a drift is being run to the northeast from its face, beyond the Lady Washington shaft, to cut an ore body known to exist in that direction. Some months ago, on this same level, two short crosscuts west in the north half of Alta ground, cut through a very promising vein of good pay ore, 15 or 20 feet wide, which evidently extends all along the west side of the main north lateral drift. Good results are anticipated from crosscutting this as well as the Keystone vein shortly.

**CON. CALIFORNIA AND VIRGINIA.**—Last Tuesday, owing to the reduced state of water in the Carson river necessitating a partial suspension of operations at the Eureka mill and a corresponding decrease in the ore supply, 60 miners were drafted from the working force of the mine—30 men from each shaft. This arrangement will have to continue until more water flows down the arid bed of the Carson. The daily yield of the mine is now less than 150 tons principally from the lowest working levels, the average assays from mill battery samples being about \$16 per ton. The exploration and development work on the 1300, 1400 and 1650 levels goes actively ahead, with good prospects at each point.

**CHOLLAR.**—The repairs to the Cornish pump-rod in the Combination shaft being completed, the pumps were started into active operation again on Tuesday. The water had raised to the top of the station of the 3200 level, completely submerging and stopping all operations on that level, but it was soon reduced to where it was before in the sump below the level. The south lateral drift has been cleaned out and work resumed in its face, for further advancement southward along the east side of the vein.

**SAVAGE.**—On the 600 level, development and exploration work goes actively ahead, with a continued fine showing of ore to the southward, as well as in the crosscuts west. On the 800 level considerable work has had to be done in retimbering and repairing, and the lateral drift south is being pushed ahead in good vein material, to intercept the rich ore vein thought to extend downward from the 800 level.

**HALE AND NORCROSS.**—Work on the 3200 level, which was suspended by reason of the repairs to the pump in the Combination shaft, has been resumed. The water rising and submerging this level caused a little caving at the deep winze station and some repairs to the lagging, timbering, etc., as well as some clearing up of debris. A better report of progress will be made next week.

**POTOSI.**—On the 3100 level a station is being cut out for another diamond-drill hole east, 220 feet north of the last drill hole, No. 7. This is properly in Chollar ground, being 500 feet south of the Hale and Norcross' south line; but the work is being done by the Potosi Company in exploration of the great quartz vein lying to the east and extending south through both mines.

**CROWN POINT AND BELCHER.**—The repairs to the incline engine are completed, and work was to have been resumed in both mines on the 1st inst.; but owing to the very low stage of water in the Carson river not furnishing the requisite motive power for the mills, it was deemed advisable to defer further ore extraction for the present.

**GOULD AND CURRY.**—On the 450 level an upraise has been made from north lateral drift No. 1 to the height of 42 feet, exploring a promising point. It is in low-grade quartz thus far. It is 150 feet north from the main west drift. The west crosscut No. 2 from the north end of the lateral drift No. 1 has been advanced 36 feet; total length, 64 feet.

**OPHIR.**—On the 1300 level the south lateral drift is advanced to the distance of 335 feet, showing good vein porphyry formation with a little quartz. On the 1465 level the southwest drift is 150 feet in length. Material, vein porphyry with considerable quartz and clay seams.

**SIERRA NEVADA.**—On the 520-level crosscut No. 3 west, recently started from near the face of the north lateral drift, has been advanced 50 feet, making a total length of 79 feet. Material, vein porphyry with a little quartz.

**YELLOW JACKET.**—Daily yield, 100 tons, which is all that can be produced without overcrowding the Brunswick mill, with the present low stage of water in the Carson river.

**MEXICAN AND UNION.**—The exploration work on the 700 level, drifting north and crosscutting west, makes good progress, showing promising vein material.

**MONTE CRISTO.**—Work confined to running the main drift west on the 150 level from the new shaft to the ore vein.

**KENTUCK.**—The regular daily yield of 40 tons continues of low-grade ore from above the 800 level.

**OTHER MINES.**—Work is resumed in the Utah and Occidental mines, and it is reported that work is also to be resumed in the Andes mine shortly.

## Aurora District.

**AURORA ASSAYS.**—Walker Lake Bulletin, Sept. 1: The Esmeralda Con. Co. is vigorously prosecuting work upon the Durand and Juniata. In the Durand a winze is being sunk from the tunnel level; some of the ore is very rich, and the ore body is widening, and the prospect is that it will lead to a large ore chamber of rich ore. "85" mine has an increased force of 11 men at work; three wagons are employed in hauling the ore to the Miners' mill for reduction. The last cleanup was very satisfactory. Work is being diligently prosecuted on the large drift in the Antelope mine; the ledge will probably be cut in about 20 feet. Mr. F. M. Smith, a capitalist of San Francisco, and largely interested in the Silver Lining mine, was here on the 27th ult. He visited the mine with a view of starting work upon it and of employing the Silver Hill mill near the mine for the reduction of the ore.

## Columbus District.

**MOUNT DIABLO.**—Candelaria True Fissure, Sept. 4: The incline is now 102 feet below the 8th level, and the formation is rather more favorable. We are sinking on some low-grade ore in the intermediate between the 5th and 6th levels. The raise from the intermediate between the 4th and 5th levels is up 30 feet, and the south crosscut from this raise is in 8 feet.

**CANDELARIA WATER-WORKS AND MILLING.**—The mill resumed crushing Georgene ore Wednesday.



day morning. The furnaces are working better than before. The grading for hoisting works at the Georgene has been completed. The lumber has all arrived and the carpenters have begun framing the timbers. The force of miners is being gradually increased.

**POTOSI.**—The lessees are taking out ore from the first ledge and prospecting the second. There are about 20 tons of ore on the dump that will assay about \$150, and it will be shipped as soon as silver is worth anything. Besides that, there are about 20 tons of \$50 ore that will be offered to the Candelaria Water Works and Milling Company (Limited).

**GLADSTONE.**—It is the intention of the owners of this Lone Mountain property to make a shipment of ore. Thomas Edwards has gone out to the mine to superintend the work. He has with him Joe Wells and Cy. Reed, both of whom are experienced miners.

#### Dun Glen District.

**CHINESE WORKING PLACER CLAIMS.**—*Silver State*, Sept. 4: William Nelson, who was over from Dun Glen yesterday, says there are about 60 Chinamen working placer mines in Barber canyon, and several more are at work in Auburn canyon. They wash the gravel with rockers, and, notwithstanding the scarcity of water, continue steadily at work. They do not tell what they make to the hand, but the gravel must be rich to pay anything the way it is worked.

#### Eureka District.

**JACKSON MINE.**—*Eureka Sentinel*, Sept. 4: Quite active prospecting work will be done shortly in the Jackson mine on Ruby Hill. Supt. Powell is advertising for sealed proposals to run a 4½x6½ foot drift on the 200-foot level of the property. The mine is looking well, and the output of ore during the coming month promises to exceed that of any like time in the present year. The Jackson is a dividend-paying and, to a great degree, a "virgin" property. The stock, though listed, is held principally by a few parties in San Francisco.

#### Gillis District.

**THE BURNLEIGH REOPENED.**—*Walker Lake Bulletin*, Sept. 1: The Burnleigh mine, in Gillis district, has been reopened and already a quantity of rich rock has been taken out. Wilkinson and Kennedy have acquired the title and are in a fair way toward making it a very profitable piece of property. They are both experienced miners who do their own work, and the prospect is excellent. The ore from this ledge is frequently extremely rich, and they can, with ordinary good luck in discoveries, stand the discount on silver and still make a handsome profit.

#### Ophir Canyon District.

**CHICAGO CO.**—*Reese River Review*, Sept. 2: D. H. Jackson has resigned his position of superintendent of the Chicago Mining and Reduction Co., at Ophir canyon, in order to pay attention to other matters which command his attention. Thos. A. Oliver is his successor. Mr. Oliver is the present foreman and is a thorough miner and a competent gentleman.

#### Wild Rose District.

**STRIKE IN THE GINTZ MINE.**—*Silver State*, Sept. 1: J. W. Jackson, who arrived yesterday from Spring City, tells a *Silver State* reporter that excellent ore has been found in the Gintz mine at that place. This mine is situated across the canyon from the Paradise valley and is supposed to be a continuation of that valuable mine. Mr. Gintz recently disposed of his interest in it to W. P. Todd-hunter, and a few days' work developed a body of good ore.

**ORE SHIPPED.**—*Silver State*, Sept. 4: E. Reinhart & Co. shipped a car-load of ore from the Paradise valley mine to Argo, Colorado, yesterday.

**BULLION TAX.**—County assessor Riley paid into the County Treasury yesterday \$1107.58, tax on the net proceeds of the Paradise valley mine for the last quarter. The Paradise valley is the only mine in the county at present that pays any tax.

#### Willow Creek District.

**ARASTRA WORKINGS.**—*Cor. Silver State*, Sept. 2: The depression in the silver market has so affected its production here that developments are not being made of sufficient importance to justify notice in your columns. Nevertheless, hoping against hope for a reaction, the proprietors of a few claims still continue operations, notably the Ohio and Iowa mines. As you are aware, some washed gold has been found in all of the gulches and canyons hereabouts, and this fact has led all the real energetic bone and sinew of the camp to prospect for gold quartz. These efforts have been attended with what I regard as complete success. A number of gold claims have been staked off, several arastras built, and considerable rock worked by that process. I am not at liberty to state the net results of these workings, but they were so satisfactory that none of these claims are for sale. The boys are living on the fat of the land, and swear by the arastra process. I hope to be able to give you facts and figures in the near future.

#### ARIZONA.

**METCALF AND LONGFELLOW.**—*Clifton Clarion*, Sept. 2: Work at the Metcalf mine is progressing favorably under the management of Capt. Kelly. The ore is turning out well and in good quantity. A large amount of low-grade ore which has been on the dumps for some time past is now being shipped to Clifton and run through the concentrators with highly favorable results. Some sickness is prevalent at the Metcalf, but there are no serious cases. At the Longfellow everything is running along as usual, and the regular shipments of ore to the smelter are being made. Mr. A. B. Ferrie has been doing quite an amount of work in the way of surveying about the mine of late, and we understand will shortly proceed to the Metcalf for the same purpose.

**GROOM, CREEK.**—*Prescott Courier*, Sept. 1: Twenty-six and one-half tons of gold rock from the Kelly mine, Groom Creek district, was recently worked in the Aztlan mill by Chris. Linde, with the following result: Free gold, \$283.85; silver, \$6.35; 1½ tons of concentrations worth, at least, \$200; total, \$490.24. Concentrations may run higher. Mr. E. Stahl has made a nice bar of the bullion. Chris. Linde does not pretend to be a millman, but

his work proves that he did better than some "mill-men." A new shaft was recently driven in the vein, 200 feet from the old workings, and the ore body is large and well defined. In the same district Mr. Lambert has bonded the Black Hawk and Gray Eagle mines, from Rupert & Son. Shafts will immediately be sunk and a 10-stamp mill erected. The mines are near the north fork of Groom creek, about six miles south of Prescott. Messrs. W. A. Rowe and A. J. Park, of Hassayampa district, came in yesterday. Park tells of a pretty good strike by Mr. Schofield, of Big Bug, and Mr. Rowe believes the Davis is a great mine.

**TOMBSTONE.**—*Epitaph*, Sept. 3: The Grand Central mill will probably start up about the 15th, on tailings and Emerald ore, eight pans being run on tailings and eight on ore, all of which will be concentrated after leaving the pans. There is enough tailings on hand to run eight pans from two to three years.

#### COLORADO.

**RAISING WATER.**—*Georgetown Courier*, Sept. 2: David Hill's process for raising water from shafts is in operation in the Lebanon tunnel. The plant is placed over the shaft, on No. 5 lode, with a small engine attached, which is run by compressed air. When in operation it is stated that a stream of water two inches in diameter is easily thrown to the surface from a 75-foot shaft. Mr. Hill has applied for a patent for his invention, and when it becomes known it will probably take the place of the different mining pumps now in use.

#### DAKOTA.

**MINING NOTES.**—*Black Hills Tribune*, Sept. 1: It is said that two feet of steel galena has been cut in the Big Chief tunnel. The mine is located near the head of Little Strawberry gulch, about a mile and a half from Whitecloud. It now appears that the Iron Hill smelter was not stopped on account of any breakage to the engine, but because of its freezing up. The Sitting Bull mill is being renovated, and it is expected that operations will soon commence in that camp which has laid quiet so long. Work is soon to commence on the Richmond mine.

#### IDAHO.

**WOOD RIVER.**—*Ketchum Bulletin*, Sept. 1: The leasers have stopped work on the King of the West until hoisting works are put up, when they will resume work again. Joe Montgomery has gone to work on the Smuggler, which has every indication of becoming an ore-producer in the near future. A small shipment of Maud and May ore has been sampled at the Ketchum Sampling Works this week. Other shipments will soon follow. The leasers on the Niagara mine have six tons of ore sacked and ready to ship. Ore is being taken out every day and the mine promises good returns for the leasers. Work is progressing in the new tunnel on the Irving mine by the leasers. Ore in small quantities has been found, but the main vein is expected to be struck in a short time. The King of the West mine, Smoky, continues to take out large quantities of fine ore, and the ore bodies get larger and richer as they go down, but the great drawback is machinery. B. X. Boone returned from a two-weeks' prospecting trip over on Lost River yesterday. He says the mining outlook in that section is most encouraging. He located a claim near the Star of Hope mine, on which he found good ore croppings in several places. The Alva mine, Warm Springs creek, is showing up finely. A new tunnel is being run to tap the vein under the old workings. It is now in 130 feet, but will have to be run 30 feet further before an upraise will be started. The upraise will be 80 feet to strike the old works. Good ore was found in the old tunnel, and it is expected the upraise will be cut through an ore body. The new tunnel is now in ore-bearing rock.

**THE KING OF THE HILLS.**—*Wood River Times*, Sept. 3: Superintendent Gibbons, of the King of the Hills, came down from Bullion today, to look after the sampling of a 20-ton lot of ore. It went 60 per cent in lead and 140 ounces in silver. Mr. Gibbons says this ore was run against in driving a portion of the 600-foot tunnel which is running for the main Eureka vein. He will begin making regular shipments ere long.

**SMOKY NOTES.**—George Montgomery came in yesterday from Smoky, and went on up to Ketchum today, intending to return to his King of the West mine by the way of Warm Springs creek. He reports the King yielding large quantities of second-class ore, and just about enough first class to pay expenses and keep the owners in fairly good humor. The Carrie Leonard is a good mine; the Stormy is looking well; the Silver Star and Smoky-Bullion are likewise, and Smoky will probably poll between 150 and 300 votes this fall.

**ONE MAN'S DOING.**—S. J. Friedmau and Jos. K. Morrill visited the Lucia Company's mine, on the east fork of Wood river, a couple of days ago, and were shown through by Theo. Olsen, who owns a fourth interest, and has done all the work himself. There are three tunnels in the mine, one 250 feet, and the others about 90 feet long, each; there is also a shaft 20 feet deep, and quite a length of drifts. Mr. Morrill says that there is a considerable quantity of low-grade ore in sight, and that track, blacksmith shop, etc., are "neat as wax." He never saw so much work done by one man before.

**EAGLE CREEK.**—*Coeur d'Alene Eagle*, Sept. 3: Placer work on the east fork of Eagle creek is not entirely suspended for the season. Ellensburg is deserted, however, and the only work in progress on the creek is about a mile and a half below there, where Jack Reinhart and two partners are putting in a bedrock flume. They have whipsawed 3000 feet of lumber this season, and have quite a long line of boxes in place. Bedrock has not yet been reached, but sufficient pay has been obtained in the gravel to meet expenses.

**ROCKY BAR.**—*News-Miner*, Sept. 1: Work on Ada Elmore, at Rocky Bar, is being vigorously prosecuted by the Alturas Gold Mining Company, under the superintendency of Capt. Beckford Anthony. The grading and leveling for a 50-stamp mill, with capacity for 100 stamps, is going on as fast as possible. Casey, Holland & Co. have contracted to furnish 4000 feet of lumber for the mill and out-buildings. The mill is already on the road, and the

superintendent expects to have it running by the middle of November. The ore vein in this mine is from 4 to 15 feet wide and works on an average about \$40 per ton. The company will employ about 150 men. The old town of Rocky Bar is already beginning to boom, and will be the liveliest camp in the county.

#### MONTANA.

**A RICH STRIKE.**—*Inter-Mountain*, Sept. 1: Several times in the past fortnight paragraphs have appeared in these columns, mentioning the very promising development in the Gold Hill, just north of the courthouse. The mine was leased early in August by Messrs. J. B. Deitrick, Joe Young and James Bannon. The only work that had been done on the property at that time was to sink a prospect hole which had disclosed nothing of a very promising character. But Mr. Deitrick, who is a miner of much experience, not only here but in other mining sections in the Rockies, especially in Nevada, thought he could see something there which had escaped the attention of others, and so on the 4th of August, after a good deal of urging, he got his present partners to go in with him. A week or two ago, after sinking only a short distance from the bottom of the old shaft, they found that the vein matter was filled with chunks of quartz and talc, netted with pure native copper. Further down they got a body of solid quartz and have been working on it since. Assays made Tuesday showed it to carry about 152 ounces in silver to the ton, besides a good percentage of copper and some gold. This condition of affairs continued until about 1 o'clock this afternoon, when a blast laid bare the treasure which Mr. Deitrick had all along believed to be there. The ore carries a large percentage of copper (pyrites and black sulphurets) and is very rich in native silver, the rock being literally covered with it. No assay has as yet been made, but it is safe to say that it will run very high in silver as well as copper. This strike is at a depth of about 60 feet. The property is owned by W. A. and H. S. Clark and N. J. Beilenberg—the first named owning a half and the other two a quarter each.

#### NEW MEXICO.

**ORGAN.**—*Cor. Rio Grande Republican*, Sept. 1: A year ago or more the smelter boom at Las Cruces turned public attention to that point to such an extent that when the smelter was removed from here and erected there, many seemed to think that the Organ mines, the Organ mining camp and the Organ mountains all moved to Las Cruces. But it was soon found not only that Organ mountains stood firm with their treasured ores, but that the removed smelter itself was so embarrassed at its completion that it has stood still and lifeless to this day. I am glad to learn that it has recently been relieved of its embarrassments, and promises to show signs of life at an early day. But what I wish now specially to say is that all this time discovery and development have been silently at work in the Organ mines uncovering the hidden treasure until now there are, you may say, thousands of tons of valuable ore lying on the dump or in sight awaiting orders. And this ore is found not in one or two places only, but in more than a score. The Stephenson has the most, perhaps, but claims like the Bennett, the Little Buck, Memphis, Gerard, Black Quartz and a dozen others, are prominent as yielding valuable ores in quantities for shipment, and of a character fitted for concentration. At the Stephenson alone there are probably 20,000 tons ready for concentration, and it may be truly said that Organ camp is to-day more prosperous and promising than ever before, so far as the development and character of ores are concerned. Now what will be done about it? Shall we have a concentrator added to the smelter at Las Cruces and begin to give shape to this immense mineral wealth at our doors, or shall we still wait indefinitely while millions of wealth thus lies dead and unproductive?

**SOLD.**—*Silver City Enterprise*, Sept. 3: A Kingston correspondent of the *El Paso Times* says it is understood that the Bullion mine has changed hands for the sum of \$112,000, Colonel Lockhart, of Deming, being the purchaser; also that work will be prosecuted. We understand that the Pueblo people propose this fall to start a large branch of their smelting works here in Deming. This is got from reliable information. The large smelting plants are looking for lead mines, carrying silver, and Deming is well known as the pivotal point for such mines.

**COONEY.**—The time is now close at hand when the fulfillment of the promises that have been held out by the mines of Cooney camp must be realized. The beginning of the season of 1886 witnessed a degree of activity among its veins of mineral that attracted toward them the attention of mining men from all quarters. The indications seemed so highly promising that a great deal has been looked for from a class of work done upon the mines that would be more nearly allied to legitimate mining than the surface-scratching, or "prospecting" so called, that hitherto had been the rule or custom. That such work would ultimately prove, beyond a question, the soundness of the views held by those indorsing it, is now fully admitted, and this position is about to receive additional strength from developments just made in the lower levels of the Peacock mine. With a record of over \$80,000 produced from a comparatively insignificant opening along the outcrop of the vein, there was much to hope for from what would follow deeper down on the property. This is now beginning to be made manifest. The principal exploring shaft, now down nearly 60 feet from the breast of the crosscut tunnel, though showing high-grade ore at all times, now gives every indication of near approach to a bonanza that will surpass in every point of excellence any found in the upper or surface workings of the mine. In the breast of the lower level running northwest a new ore body is also being penetrated now. This evidently is a downward continuation of the great ore outcropping, which shows with great strength and continuity at the surface above the point where the breast of the level has reached. Like the ore in the shaft, this new strike in the level promises fine things for the future, and has in store a reserve quantity that can be drawn upon at will. Sample assays made from ore from both the new strike in the shaft and level described average nearly \$100 per ton gross. These strikes will be opened with the least delay, and the addition of their value in ore to what

is already in sight and is now being drawn upon must materially enhance the productiveness and profitability of the mine. For months past a steady production of ore is kept up, and not an hour passes but what is utilized in the mine and mill by the constant output of ore from the one and the production of concentrates from the other.

#### OREGON.

**GOLD MOUNTAIN.**—*Bedrock Democrat*, Sept. 1: Mr. G. W. Tucker, who, since last June, has been working a claim located by him some four miles east of this city, furnishes the following facts in regard to this quite recent discovery: He brought into our office two shot-bags filled with concentrates, reduced by himself, and for which he has an assay, by Mr. Elmer, of our city, presenting the following figures: Number of ounces of fine metal per ton of 2000 pounds, 125.55; viz., gold, 84.96; silver, 40.59; value of gold, \$1736.27; silver, \$52.48; full value, \$1808.75. Mr. Tucker had with him a common long-handled iron shovel, also a small tin one, both of which were used in handling these concentrates, and are covered with a thick coating of gold—a circumstance which Mr. Tucker, who is an old miner, claims to be an unusual one, and its chemical action not easily solved. Notwithstanding the flattering showing given above, if a stranger should make inquiry concerning the mineral wealth of Eastern Oregon, not once in ten would this group of mines, numbering 11 locations, in the Gold Mountain district, only four miles from Baker City, be mentioned. Yet the ore is there all the same, and the day is not far distant when the noisy stamps will remind our citizens that it is no longer necessary to transport the capitalist over miles of rough road in order to show him a paying mine.

**NOTES.**—*Jacksonville Times*, Sept. 3: Prospecting continues everywhere. Alex. Orme has purchased Fred Otten's mines on Footh creek, Orme Bros., of Footh creek, have finished cleaning up for the season, and did well. They picked up a \$16 piece some time since. L. D. Brown & Son are making preparations to put up a new and first-class mill on the site of their former one, near Swinden's ledge. Work on the tunnel to tap C. C. Beckman's mines on Jackson creek is progressing steadily. Some of the machinery for Klippel, Baumle & Co.'s quartz mill has arrived, and the balance will soon be here. It will be in running order before many weeks. J. N. Casteel will finish the Jackson Mill and Mining Co.'s tunnel this week. Progress has been very slow during the past few weeks, as the rock has been quite hard. We learn that the California company, which is about engaging in placer mining on an extensive scale in the vicinity of Kerbyville, has let a contract for digging 17 miles of ditch. The Sterling Co.'s ditch, which was filled with debris for several miles by a cloudburst, is being repaired by quite a force of men, who will complete their work in the next fortnight. Walsh & Bragdon have purchased what is known as Chick's mill, formerly located at Medford, and which is at present crushing quartz from the Hope ledge on Wagner creek. It is said that the results are excellent, and that there is every probability of this mine paying well. We learn that much of the ore pays as high as \$17 to the ton.

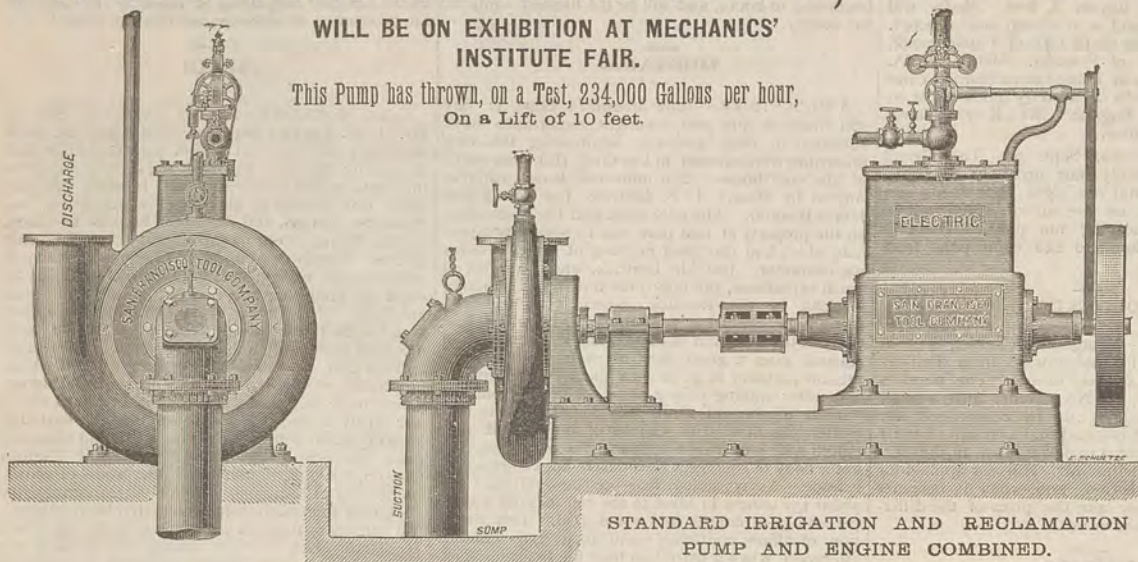
#### UTAH.

**SANDSTONE MINING NOTES.**—*Southern Utah Times*, Sept. 1: Kimple & Lewis are still working the Leeds mine. The ore is of low grade and not very remunerative. Bailey & Nesbit have secured a lease on the Bonanza, which they are working in the interest of their leasers. Mutton & Hartman are still chloriding on the Annie. The mine is looking well and they are taking out considerable ore. There is very little chloride ore being shipped to the mills, as the present price of silver leaves but a small margin, the chloriders preferring to hold back and wait for higher quotations. Henry Holling has resumed work on the Silver Gate. The pay streak is about two feet wide, dipping toward the creek. The vein has been struck on the other side, carrying about 20 ounces. In sinking there is a great probability of water being encountered. The recent heavy rains have retarded the running of the Stormont mill. On account of a break in the dam the mill shut down for repairs two days, but it is running again. The Buckeye and Thompson mines are furnishing the regular ore supply.

**WEEKLY REVIEW.**—*Salt Lake Tribune*, Sept. 3: For the 8 months of the present year, excluding all ores, the receipts of bullion in this city have been as follows: January, \$328,852.66; February, \$456,024.03; March, \$469,722.63; April, \$519,666.08; May, \$387,891.49; June, \$527,036.97; July, \$585,644.38; August, \$480,141.49; Total, \$3,755,029.73. The output of the Ontario for the month of August was 72,418.13 fine ounces, and ore sales, \$53,336.02, a total of \$125,754.15. Previous reports from this mine for the year showed an output of \$1,027,839.39; present total, \$1,153,593.54 for the eight months of 1886 that are past. Out of this have been paid eight regular monthly dividends of 50c per share each (\$75,000), \$4.00 per share so far this year, or \$600,000. The August monthly dividend was the 122d of the series, or \$61.00 per share in aggregate. The Daily product for August was 57 bars of bullion, 74,654.36 fine ounces, and \$57,880.06 in ore sales, or \$100,534.42 for the month. For the seven months previous the output of the Daily was \$389,644.78, making the total output of the Daily for eight months \$490,179.20. The receipts of bullion and ore in this city for the week ending September 1st, inclusive, were \$232,873.57, of which the large amount of \$97,702.90 was ore and \$135,170.67 was bullion. The previous week the receipts were \$104,827.81 in bullion and \$66,575.48 in ore, a total of \$171,403.29. Receipts of fine bars for the week were \$32,203.84; of base bullion, \$11,200. The Ontario product for the week was 35 bars of bullion, \$19,144.53; ore sales, lots 160 and 161, \$16,272.55; total, \$35,417.08. The Daily output for the week was 16 bars of fine bullion, \$18,557.18; lots 70 and 71 of ore, \$11,652.35; total, \$30,209.53. The Stormont sent up, on the 26th, \$2995 in silver bars. The Hanauer smelter turned out during the week \$30,860 in bullion; the Germania, 11 cars, \$18,946.80. Ore receipts for the week have been—by Wells, Fargo & Co., \$19,000; McCormick & Co. (including \$13,080 Queen of the Hills and \$2200 King of the Hills, both in Idaho), \$61,910; by T. R. Jones & Co., \$16,792.90.



# PUMPS FOR RECLAMATION, IRRIGATION, AND DREDGING.



WILL BE ON EXHIBITION AT MECHANICS' INSTITUTE FAIR.

This Pump has thrown, on a Test, 234,000 Gallons per hour, On a Lift of 10 feet.

PIT. VERTICAL, BULKHEAD, TURBINE, CENTRIFUGAL AND LOW-LIFT PUMPS.

WE MANUFACTURE ALL KINDS OF

Machine Tools, Including Engine Lathes, Drilling Machines, etc.

Horizontal, Single Acting, Compound Condensing, and Automatic Steam Engines.

Cast Iron Sectional Boilers, Horizontal and Vertical Tubular Boilers, Water Valves, Water and Steam Fittings, Hydraulic Jacks, etc.

Mill Rolls Ground and Corrugated. SEND FOR CIRCULAR.

**SAN FRANCISCO TOOL CO.**

Works, First and Stevenson Sts., San Francisco, Cal.

## H. P. GREGORY & CO.

Nos. 2 and 4 California St., San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

# MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING MACHINERY.

FRANK & CO.'S WOODWORKING MACHINERY.

NEW HAVEN MANUFACTURING CO.'S MACHINISTS' TOOLS.

BEMENT & SON'S MACHINISTS' TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND EXHAUSTS.

SHIMER MATCHER HEADS.

BRAINARD MILLING MACHINES.

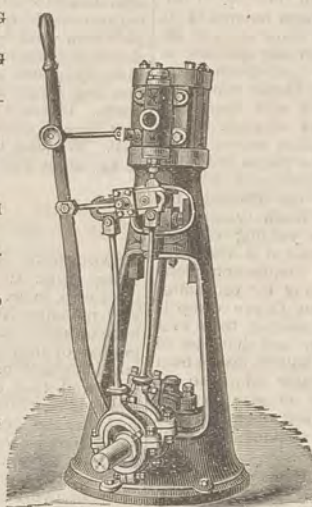
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISHERS.



YACHT ENGINES.

WILLIAMSON BROS' HOISTING ENGINES.

ATLAS ENGINE WORKS ENGINES AND BOILERS.

PAYNE'S VERTICAL AND HORIZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECTORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.

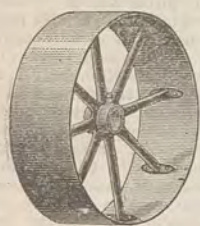
LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.



## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

**CLOT & MEESE,**

Sole Licensed Manufacturers of the

**Medart Patent Wrought Rim Pulley**

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 & 131 Fremont Street,

San Francisco, Cal.

## THE JENKINS STANDARD PACKING

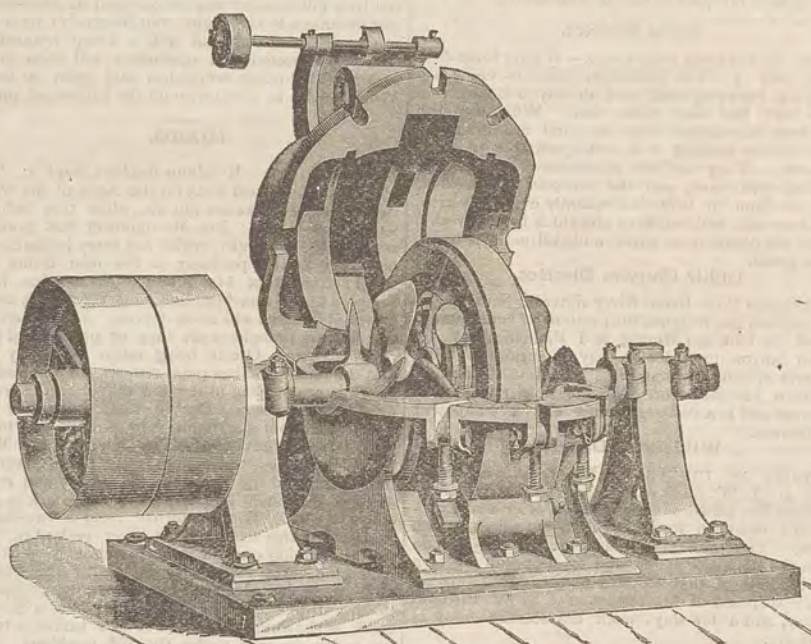


IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the **Jenkins Standard Packing** can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing," and is for sale by the Trade generally.

Manufactured only by

For Sale by **DUNHAM, CARRIGAN & CO.,** San Francisco, Cal. | **JENKINS BROS.,** 71 John St., New York

## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.

Certificates as to performance of the Mills, and any information required, furnished on application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 & 106 Washington St., NEW YORK.  
OR PACIFIC IRON WORKS, SAN FRANCISCO.

## THE SCIENTIFIC PORTABLE FORGE



## AND BLACKSMITH HAND BLOWERS.

GUARANTEED

The Lightest Running! The Strongest Blast! The Most Durable!

ADAPTED TO ALL KINDS OF WORK, AND MADE IN STYLES AND SIZES TO SUIT.

Send for Catalogue! **THE FOOS MANUFACTURING CO.,** - - Springfield, Ohio

INVENTORS, TAKE NOTICE

**L. PETERSON, MODEL MAKER,**

258 Market St., N. E. cor. Front (up stairs), San Francisco. Experimental machinery and all kinds of metal, tin, and Brasswork.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

UTAH OFFICE—SALT LAKE CITY, UTAH.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,  
JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

## Metallurgy and Ores.

**SELBY  
SMELTING and LEAD CO.,**  
416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY  
And Assay Office.**

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

....MANUFACTURERS OF....

**BLUESTONE,  
LEAD PIPE,  
SHEET LEAD,  
SHOT, Etc., Etc.**

ALSO MANUFACTURERS OF

**Standard Shot-Gun Cartridges,**  
Under Chamberlin Patent.

**Nevada Metallurgical Works.**

NO. 23 STEVENSON STREET,  
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,  
(Formerly Huhn & Luckhardt, )  
Mining Engineers and Metallurgists.

**J. KUSTEL. H. KUSTEL.  
★ METALLURGICAL WORKS,**  
318 Pine St. (Basement),  
Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.  
Assaying and Analysis of Ores, Minerals and Waters.  
Mines Examined and Reported on.  
Practical instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,  
Mining Engineers and Metallurgists.

C. H. AARON,

**ASSAYER AND METALLURGIST,**  
NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

WM. D. JOHNSTON,

**ASSAYER AND ANALYTICAL CHEMIST.**  
514 Kearny Street,  
SAN FRANCISCO, - - CALIFORNIA  
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

**JOHN TAYLOR & CO.,**

IMPORTERS AND DEALERS IN

**ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,**

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco.

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

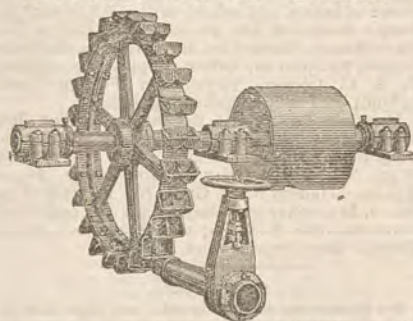


The California  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

**FLOUR AND OTHER MILLS.**  
Quartz Mill Screens a Specialty.  
147 Beale Street, San Francisco,

## PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 per cent., distancing all competitors. Send for circulars and guaranteed estimates.

L. A. PELTON,  
Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

**MACHINE TOOLS,  
PRESSES AND DIES,  
PUNCHING and SHEARING  
MACHINERY.**

**F. A. ROBBINS,**

....MANUFACTURER OF....

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

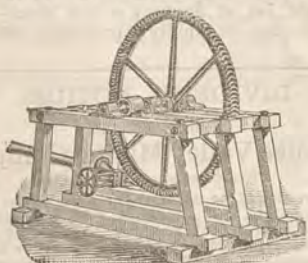
Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

## KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

**All Estimates Guaranteed.**

SEND FOR CIRCULAR.

EDWARD A. RIX & CO.,  
Sole Agent,

18 and 20 Fremont Street, San Francisco.

**Engraving** Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.

## THE CONSUMERS' COMPANY.

**VULCAN B B AND AJAX.**

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

**Vulcan Nos. 1, 2 and 3,**

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**

218 California Street, San Francisco, Cal.

## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

**GIANT POWDER or DYNAMITE,**  
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

**BANDMANN, NIELSEN & CO.,**

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.



Chicago Prices Beaten!

ESTABLISHED 1860.

**S. F. PIONEER SCREEN WORKS,**

221 & 223 First St., cor. Tehama, S. F.

**J. W. QUICK, Prop'r.**

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Churns, Cement and Soot Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed

## THOMAS PRICE'S ASSAY OFFICE,

CHEMICAL LABORATORY,

**BULLION ROOMS and ORE FLOORS,**

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.



Admission Day.

Thursday marked the thirty-sixth annual mile-stone of the State. The story of the admission of California into the Union constitutes too important a page in our country's history to be neglected. We are glad the Native Sons of the Golden West have taken it into their special keeping.

On the 13th of February, 1850, President Fillmore transmitted to Congress, by message, a copy of the Constitution of California. A motion was made to refer it to a special committee. Many of the Southern Senators were opposed to a consideration of the matter. They said it was contrary to all precedent to allow a people to organize themselves into a government without the previous authority of Congress. On the 17th of April, after a long and stormy debate, the question of admitting California was referred to a select committee of thirteen, Mr. Clay, chairman, and on the 8th of May the committee brought in a series of resolutions, humorously called the "omnibus bill," because it was loaded down with so many different objects. It was the ingenious work of Mr. Clay. It was an effort, amicably, to arrange the great slave controversy. The principal points were: That California should be admitted as a State, without slavery; that appropriate government ought to be established for the territory acquired from Mexico, without the restriction of slavery; that it was inexpedient to abolish slavery in the District of Columbia, and that more effectual provisions ought to be made for the restitution of fugitive slaves. Mr. Clay, although 75 years old, led the debate that followed with all the ardor and fire of his youth. He was anxious to crown the evening of his life with one more brilliant triumph. His speech on this occasion was the last great effort of his eventful life. In the long debate that ensued, continuing till the last of July, the bill was so trimmed and pared down with amendments that the clause providing for "the Territorial Government of Utah" was all that was left. This dismemberment of Mr. Clay's pet scheme was facetiously called "upsetting the omnibus." Subsequently, however, the other portions of the bill were passed in separate bills. The bill to admit California as a State passed the Senate August 13th, 34 to 18; the House on the 17th, 150 to 56. The Fugitive Slave Bill was immediately taken up and passed the Senate August 23d, by a vote of 27 to 12. In the House, the bill passed under the action of the previous question, without debate, 109 to 75. The Fugitive Slave Bill was the price paid by the North for the admission of California. As the witty John P. Hale said, "it was an effort to split the difference between God and the devil," and no good could come of it. By the inerring logic of events the legislation of that Congress led to John Brown and the Border war, the election of Abraham Lincoln, the bombardment of Fort Sumter, the Emancipation Proclamation, the Fifteenth Amendment, and a regenerated Union.

The news that California had been admitted into the sisterhood of States was brought to this city the latter part of October by the steamer *Northerner*, and produced a tremendous excitement. The citizens went to work immediately to celebrate the happy event. As a rule, the remembrance of this day has been left to the Society of California Pioneers, but of late their mantle has fallen on their sons, the Order of the Native Sons of the Golden West. And, as we have already said, we are glad they have taken its commemoration into their special keeping, and this year at San Jose have celebrated this anniversary in a manner worthy of the occasion.

Siphon Pipes.

EDITORS PRESS:—Replying at present only to the jocular part of Mr. Van Loben Sels' late communication on the above subject, I will, in compliance with his request, state that at the town of Alatri, Italy, there are siphon pipes said to have been erected by the Romans 200 years B. C. This was certainly "before the time of iron pipes"—15 centuries at least.

The pipes in Alatri are of earthenware imbedded in hydraulic cement. The old story of the Roman aqueduct being built on viaduct arches, because it was not known that water could be carried in undulating pipes, belongs to Wendell Phillips' category of the "Lost Arts," at least it is not, so far as I know, an engineer's construction of the facts.

If, however, the above does not place the pneumatic siphon far enough beyond iron pipes, I will add that there can be examined in this city drawings of such siphons copied from Egyptian tombs; date 1355 B. C.

Saucello, Sept. 6, 1886. J. RICHARDS.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING AUGUST 24, 1886.

- 347,919.—CAR COUPLING—J. H. Buster, Spenceville, Cal.
- 347,993.—CONCENTRATOR—J. D. Channell, Nevada City, Cal.
- 347,925.—OPTICAL APPARATUS—A. Duboce, S. F.
- 348,161.—SHOVEL—W. C. Gregg, Golconda, Nevada.
- 348,128.—ORANGE-GRADER—J. W. Keeney, Riverside, Cal.
- 347,809.—ORE-CRUSHER—S. Kendall, Angels Camp, Cal.
- 347,892.—RELIEF VALVE—Jas. O. Rusby, Chico, Cal.
- 347,834.—CAN-OPENER—Frank Sharp, Oakland, Cal.
- 347,972.—ANCHOR—R. R. Spedden, Astoria, Or.
- 347,973.—LAMP-BURNER—S. W. Spooner, Astoria, Or.
- 347,898.—GATE—Sam'l Stephens, Central House, Cal.
- 347,899.—WHIFFLETREE GUARD—Stephenson & Lasser, S. F.
- 347,853.—SLEEVE-PRESSING FRAME—Emma J. Whitman, Oakland, Cal.
- 347,909.—ORE-CONCENTRATOR—Woods & Garcelon, Santa Cruz, Cal.

FOR WEEK ENDING AUGUST 31, 1886.

- 348,372.—FAUCET—U. Bachman, St. Helena, Cal.
- 348,309.—ENGINE-VALVE GEAR—H. C. Behr, S. F.
- 348,376.—EXCAVATING MACHINE—A. Boschke, S. F.
- 378,380.—CABLE GRIP—H. Casebolt, S. F.
- 348,455.—CUT-OUT FOR ELECTRICAL CIRCUITS—J. M. Fairchild, Portland, Ogn.
- 348,456.—SWITCH FOR ELECTRICAL CIRCUITS—J. M. Fairchild, Portland, Ogn.
- 348,389.—GAS-REGULATOR—A. Ford, S. F.
- 348,277.—ROTARY WATER METER—F. T. Gilbert, Walla Walla, W. T.
- 348,341.—GAUGE FOR PLANE KNIVES—A. Potter, Portland, Ogn.
- 348,357.—FRUIT-PICKER AND HOLDER—T. C. Stark, Vallejo, Cal.
- 348,358.—LOCK AND SEAL FOR TRUNKS—A. N. Towne, S. F.
- 348,361.—FORCE PUMP—J. W. Van Orden, Arlington, Ogn.
- 348,433.—GATE—L. D. Wade, Puyallup, W. T.
- 348,368.—INCUBATOR—W. Worswick, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Mining Share Market.

Nothing at all exciting is going on in the share market. On the Comstock matters are quiet. The continued low stage of water in Carson river, causing the Eureka mill also to hang up its stamps, induced the drafting of 60 miners from the Consolidated California and Virginia mine. The repairs to the incline engine at the Crown Point are completed, but it was not deemed advisable to resume ore-extraction work in Crown Point and Belcher, the reduction mills not having the water motive power to run with, thus the 200 miners belonging to these two mines continue to be drafted, as it were, and out of employment. This unusually low stage of water in the river is attributed to the heavy rains of a few weeks ago melting off the great reserves of snow in the mountains; also to the farmers up the valley diverting the water to their lands for irrigation purposes; but the farmers themselves say there is precious little water in the river to divert. The long-continued spell of very warm weather has had considerable to do with decreasing the water resources of the river by drying up the springs in the mountains, and the reported slight increase of water in the river is to be attributed to the cooler weather of the past few days and consequent decrease of evaporation.

Good ore developments are promised in Alta before long by crosscutting on the 700 level, a good little vein being known to exist at that point, which has been held in reserve in order to go ahead with further explorations northward.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Alice, Sept. 1, \$23,776; Moulton, 1, \$11,536; Navajo, 4, \$8,437; Moulton, 2, \$14,688; Silver Bow, 1, \$14,920; Lexington, 1, \$22,556; Germania, 1, \$28,000; Hanauer, 1, \$65,700; King of the Hills, 1, \$22,000; Germania, 2, \$33,611; Silver Reef (for August), \$20,120; Hanauer, 3, \$10,665; Stormont, 3, \$30,688; Queen of the Hills, 3, \$13,550; Hanauer, 4, \$36,000. The banks of Salt Lake City report the receipts for the week ending September 1st, inclusive, of \$135,170.67 in bullion, and \$97,702.90 in ore, a total of \$232,873.57.

"The Sinews of Strength."

We would kindly request all subscribers who have not forwarded their subscriptions to this office previous to the receipt of this paper, to remit us as soon as practicable.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.		LOCATION.		No. AMT. LEVIED.		DELINQ'T. SALE.		SECRETARY.		PLACE OF BUSINESS.	
Bodie Con M Co.	.....	Cal.	ornia.	5.	50.	June 21.	Aug 23.	Oct 18.	G. W. Sessions.	309	Montgomery St
Bullion M Co.	.....	Nevada.	231.	30.	Aug 31.	Oct 5.	Oct 26.	R. R. G. Ayson.	.....	327	Pine St
Con Imperial M Co.	.....	Nevada.	23.	10.	Aug 5.	Sept 8.	Sept 28.	C. L. McCoy.	.....	329	Pine St
Chollar M Co.	.....	Nevada.	21.	50.	Aug 24.	Sept 29.	Oct 20.	C. E. Elliot.	.....	309	Montgomery St
Eureka Con M Co.	.....	Nevada.	10.	1.00.	July 28.	Sept 6.	Sept 25.	E. H. Willson.	.....	338	Montgomery St
Golden Jacket M Co.	.....	Nevada.	2.	10.	Sept 1.	Oct 14.	Nov 4.	R. G. McClellan.	.....	331	Montgomery St
Horseshoe M Co.	.....	California.	10.	62.	July 27.	Aug 30.	Sept 15.	T. P. Covey.	.....	.....	Grass Valley
Indian Spring Drift M Co.	.....	California.	6.	23.	July 26.	Aug 30.	Sept 30.	L. H. Sharp.	.....	213	Sansome St
Live Oak Drift M Co.	.....	California.	2.	05.	Aug 9.	Sept 15.	Oct 4.	T. Wetzel.	.....	522	Montgomery St
Loreto M & M Co.	.....	Mexico.	2.	40.	Aug 5.	Sept 6.	Sept 29.	C. T. Bridge.	.....	224	California St
Mount Con y M Co.	.....	Nevada.	1.	1.00.	Aug 25.	Oct 2.	Oct 23.	G. L. Brander.	.....	309	Montgomery St
Nevada M & M Co.	.....	Nevada.	1.	1.00.	Aug 25.	Oct 2.	Oct 23.	G. L. Brander.	.....	309	Montgomery St
New Coso M Co.	.....	California.	19.	20.	July 13.	Aug 27.	Sept 13.	J. L. Hunt.	.....	5	Pioneer Place
North Banner Con M Co.	.....	California.	14.	13.	Aug 7.	Sept 9.	Sept 27.	T. J. Mitchell.	.....	.....	Grass Valley
Oroville M Co.	.....	Nevada.	7.	30.	Aug 9.	Sept 13.	Oct 4.	A. K. Durbrow.	.....	309	Montgomery St
Pulgarin M Co.	.....	Idaho.	65.	11.	Aug 7.	Sept 17.	Oct 16.	A. Halsey.	.....	338	Montgomery St
Potosi M Co.	.....	Nevada.	10.	30.	Aug 31.	Oct 5.	Oct 26.	C. E. Elliot.	.....	309	Montgomery St
Utah M Co.	.....	Nevada.	53.	50.	Aug 24.	Sept 28.	Oct 18.	A. H. Fish.	.....	309	Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Jupiter M Co.	.....	Edward Land.	309	Montgomery St.	Annual. Sept 25

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Paradise Valley M Co.....	Nevada.	W Letts Oliver.....	328 Montgomery St.....	25.	Aug 25
Silver King M Co.....	Arizona.	J Nash.....	328 Montgomery st.....	25.	Aug 16
Young America M Co.....	California.			40.	May 20

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Aug. 19.	WEEK ENDING Aug. 26.	WEEK ENDING Sept. 2.	WEEK ENDING Sept. 9.
Alpha.	.85	.75	.90	.80
Alta.	.70	.75	.70	1.00
Andes.	.....	.....	.....	.25
Belcher.	.....	.....	.....	1.00
Bodie.	.....	.....	.....	1.15
Best & Belcher.	1.30	1.50	1.20	1.40
Bullion.	.....	.....	.....	.15
Bonanza King.	.....	.....	.....	.15
Belle Isle.	.....	.....	.....	.30
Bodie Con.	2.30	2.90	2.25	2.85
Con. Imperial.	.....	.....	.....	.20
Bodie Tunnel.	.....	.....	.....	.50
Bulwer.	.80	1.15	.95	1.35
California.	2.10	2.45	2.20	2.65
Challenge.	.....	.....	.....	.....
Champion.	.....	.....	.....	.....
Chollar.	1.00	1.15	.80	.90
Con. Imperial.	.....	.....	.....	.20
Con. Virginia.	2.10	2.45	2.20	2.65
Con. Pacific.	.....	.....	.....	.15
Crown Point.	.95	1.00	.95	1.00
Day.	.....	.....	.....	.....
Eureka Con.	2.30	2.60	2.55	2.80
Eureka Tunnel.	.....	.....	.....	.10
Exchange.	.....	.....	.....	.10
Grand Prize.	.....	.....	.....	.....
Gould & Curry.	1.05	1.15	.95	1.10
Goodshaw.	.....	.....	.....	.....
Hale & Norcross.	1.10	1.70	1.55	1.70
Holmes.	1.60	1.75	1.50	1.75
Independence.	.....	.....	.....	.15
Justice.	.....	.....	.....	.....
Martin White.	.....	.....	.....	.....
Mono.	2.35	2.60	2.50	2.85
Mexican.	.65	.70	.60	.80
Mt. Diablo.	.....	.....	.....	.....
Northern Belle.	.....	.....	.....	.....
Navajo.	.....	.....	.....	.70
North Belle Isle.	1.10	1.25	1.20	1.40
Occidental.	.....	.....	.....	.85
Ophir.	1.25	1.40	1.25	1.60
Overman.	.....	.....	.....	.30
Potosi.	.60	.65	.50	.55
Pinal Con.	2.50	2.85	2.60	2.85
Sage.	.....	.....	.....	.....
Seg. Belcher.	.....	.....	.....	.55
Sierra Nevada.	.....	.....	.....	.55
Silver Hill.	.....	.....	.....	.....
Silver King.	.....	.....	.....	.....
Scorpion.	.....	.....	.....	.05
Syndicate.	.....	.....	.....	.10
Tioga.	.....	.....	.....	.10
Union Con.	.55	.63	.59	.65
Utah.	.80	.80	1.00	.80
Yellow Jacket.	.....	.....	.....	.90

Sales at San Francisco Stock Exchange.

WEDNESDAY A. M., Sept. 8.	9200 Mexican.	.....	65c
200 Alta.	.....	1.85	@ 1.90
500 Andes.	.....	.....	65c
100 Alpha.	.....	.....	90c
50 B. & Belcher.	.....	.....	1.50
100 Bodie Con.	.....	.....	25c
100 Bulwer.	.....	.....	40c
170 Benton Con.	.....	.....	25c
200 Belle Isle.	.....	.....	2.40
200 Chollar.	.....	.....	55c
330 Con Va. & Cal.	.....	.....	70c
60 Eureka Con.	.....	.....	70c
2.0 Gould & Curry.	.....	.....	50c
100 Hale & Nor.	.....	.....	90c

San Francisco Metal Market.

[WHOLESALE.]		WEDNESDAY, Sept. 8, 1886.	
ANTIMONY—French Star	.....	9 1/2 @	—
BORAX—San Bernardino.	.....	— @	5 1/2
Armstrong.	.....	— @	6 1/2
IRON—Glengarnock ton.	.....	— @	22 50
Eglinton, ton.	.....	— @	21 50
American Soft, No. 1, ton.	.....	— @	24 00
Oregon Pig, ton.	.....	21 00	@ 23 00
Clippier Gap, Nos. 1 & 4.	.....	22 00	@ 23 50
Clay Lane White.	.....	21 50	@ —
Shotts, No. 1.	.....	23 50	@ —
Syracuse, English, B.	.....	10 @	15
Black Diamond, ordinary.	.....	4 @	5
Plow.	.....	5 @	6
Machinery.	.....	10 @	—
Sanderson Bros.	.....	20 @	22
COPPER—	.....	.....	.....
Brazers' sizes.	.....	20 @	22
Fire-box sheets.	.....	20 @	—
Bolt.	.....	15 @	—
Sheathing.	.....	12 @	13
Ingot.	.....	5 00	@ 5 20
LEAD—Pig.	.....	6 1/2 @	—
Bar.	.....	8 @	—
Pipe.	.....	8 @	—
Sheet.	.....	1 85 @	—
Shot, discount 10% on 500 bag.	.....	Drop, 7 1/2 bag.	1 85 @
Buck, 7 1/2 bag.	.....	2 20 @	—
Chilled, do.	.....	9 @	10
ZINC—German.	.....	7 1/2 @	—
Sheet, 7 1/2 ft. 7 to 10 lb. less the cask.	.....	36 50	@ 6 75
QUICKSILVER—By the flask.	.....	1 05 @	—
Flasks, new.	.....	85 @	—
Flasks, old.	.....	5 25 @	6 50
TINPLATE—Coke.	.....	6 75 @	7 25
Charcoal.	.....	.....	.....

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not know if it is continued through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

New York Metal Market.

Telegraphic advices dated Sept. 8th give the following New York prices:

BORAX—6 1/4 @ 7 1/4 c.  
BAR SILVER—92 3/4 per oz.  
COPPER-LAKE—\$10.37 1/2 @ 10.50.  
IRON—No. 1, \$17 @ 18.00.  
LEAD—\$4.85 @ 4.95.  
QUICKSILVER—43 @ 43 1/2 c.  
The following is the latest by mail from the "New York Metal Exchange Market Report":  
COPPER—Quiet, spot closing 10.15c @ 10.45c.  
Transferable Notices (Lake) issued at 10.30; Transferable Notices (Chili Bars) issued at 1.39 1/2.  
LEAD—Dull at \$4.75 @ 4.95 spot; \$4.80 @ 4.82 1/2 futures. Transferable Notices issued at 4.77 1/2.  
TIN—Fully steady and decidedly brisker at \$21.75 @ 21.90. Transferable Notices issued at \$21.85.  
Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$21.90 @ 22.25; Billiton Tin, \$22.00 @ 22.35; Banca Tin, \$21.15 @ 22.50; Baltimore Copper, \$9.25 @ 9.40; Orford Copper, \$9.35 @ 9.65; P. S. C. Copper, \$9.35 @ 9.65; Foreign Lead, \$4.85 @ 4.90; Foreign Spelter, \$4.70 @ 4.75.  
MAKER'S PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge, \$15.00 @ 16.00. Hudson River, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge \$15.00 @ 16.00. Southern, Grade No. 1, \$17.00 @ 18.50; No. 2, \$16.50 @ 17.50; Grey Forge \$15 @ 16.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
G. W. INGALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
R. G. HUSTON—Montana.  
Geo. McDOWELL—San Luis Obispo and Santa Clara Co's.  
FRANK W. SMITH—Utah and Colorado.  
M. S. PRIME—Alameda Co.  
A. S. LUCAS—Nevada and Placer Co's.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

CHILIAN MANGANESE.—The province of Coquimbo, Chili, has become remarkable for the production and exportation of manganese. In 1885, the exportation reached 3753 tons, and during the first half of 1886 it was 38,802 tons. Nearly the whole of this was shipped to England.

AND so they are about to put in new blowers on the Comstock! What, then, let us ask, is the matter with the old blowers who have so long done good service on Pine street and Pauper alley?

The chrome product of the Livermore mines since the 1st of January of this year—about eight months—is rapidly approaching 2000 long tons.

DIVIDEND NOTICE.

OFFICE OF THE  
**Paradise Valley Mining Company**  
San Francisco, California.  
At a meeting of the Board of Directors of the above named Company, held August 24, 1886, Dividend No. 8, of Twenty-five (25) Cents per share, was declared payable on Wednesday, the 25th of August, 1886, at the office of the Company.  
W. LETTS OLIVER, Secretary.  
OFFICE—No. 328 Montgomery St., San Francisco, Cal.

Practical Treatise on Hydraulic Mining.

By AUG. J. BOWIE, JR.  
This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdies, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump;



## ASSESSMENT NOTICE.

**Truckee Ice Company.**—Location of principal place of business, San Francisco, California. Location of works, Martus Creek, near Truckee, Nevada county, California.

NOTICE is hereby given, that at a meeting of the Directors, held on the 1st day of September, 1886, an assessment (No. 1) of Ten Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 202 Sansome Street, room 4, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 4th day of October, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 25th day of October, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

GEO. W. SCOTT, Secretary.  
Office—No. 202 Sansome St., room 4, San Francisco, California.

## REGISTRATION

—FOR THE—

## General Election.

All electors desiring to vote at the General Election, to be held November 2, 1886, must be registered regardless of any previous registration.

Registration for the General Election to be held November 2, 1886, will commence at the office of the Registrar of Voters, in the basement of New City Hall, on WEDNESDAY, August 4th, and will continue until MONDAY, October 11th, inclusive. Office hours, 9 o'clock A. M. to 5 P. M.

By order of the Board of Election Commissioners.

P. F. WALSH, Registrar.

August 1, 1886.

## ORE FEEDERS.

We direct attention to an advertisement, which appears in our journal, of the "Original Roller" Ore Feeder, manufactured by the "Joshua Hendy Machine Works," of Nos. 39 to 51 Fremont St., this city.

As the manufacturers of a similar form of Feeder, known as the "Templeton Roller," claim that it is superior to any other style, and cite those in operation at the "Bunker Hill" mill in Amador county, we expressly contradict the statement, and in substantiation submit a copy of a letter shown to us by a representative of the "Joshua Hendy Machine Works," which speaks for itself.

BUNKER HILL GOLD MINING CO.,  
AMADOR CITY, CAL., July 12, 1886.

To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: We have used the "Challenge" and "Roller" or "Templeton" Ore Feeders in our mill for the past three years, and I am free to say that I consider the "Challenge" far superior to the "Roller" Feeder, in that most important of all things in a quartz mill, namely, the regular feeding of ores to the batteries. If the "Roller" Feeder is regulated to feed finely pulverized ore, the coarser ore will choke the outlet of the Feeder, and no ore can reach the batteries. If, on the other hand, it is regulated to feed coarse ore, then the fine ore when it comes will sluice right through and fill the batteries. The "Roller" Feeder requires constant attention. Yours truly,  
(Signed) N. W. CROCKER, Supt.

Dewey & Co.'s Scientific Press  
Patent Agency.

OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

DEWEY & CO., Patent Agents.  
No. 252 Market St. Elevator 12 Front St.  
S. F. Telephone No. 658.

A. T. DEWEY. W. R. EWER. GEO. H. STRONG

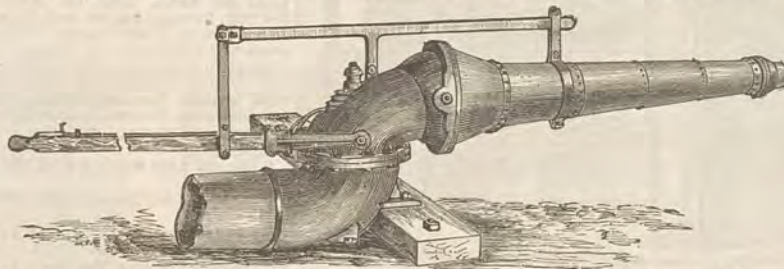
## A Good Opportunity for a Mechanic.

A variety of good Tools, Patterns, etc., with business for sale cheap by a party retiring from business. A splendid opportunity for an enterprising mechanic.

Address A. B. C., care of this paper.



## IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et al.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,  
39 to 51 Fremont St., San Francisco, Cal.



This cut represents our  
IMPROVED  
HYDRAULIC  
MACHINE.

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.  
HOSKIN & CO., Marysville, Cal.

## THE GOLDEN GATE PLUG CLOSET.



The only secure-locking device to keep sewer gas entirely away from dwelling houses.

JOSEPH BUDDE, Manufacturer, 43 Fremont Street,  
All kinds of Water Closets, Slop and Waste Hoppers  
Always on hand. Write for information

RICHARD C. REMMEY, Agent,  
Philadelphia Chemical Stoneware Manufactory,  
1100 East Cumberland St., PHILADELPHIA, PA.



NATIONAL ASSURANCE CO.,  
OF IRELAND.

ATLAS ASSURANCE COMPY,  
OF LONDON.

BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.

H. M. NEWHALL & CO.,  
GENERAL AGENTS,  
309 & 311 Sansome St., San Francisco, Cal.



THE Sign of the Arkansaw Cough Syrup is looking you all square in the face.

Do you want a sure, safe and reliable Cough Syrup? Are you troubled with a Cough, Cold, Bronchitis or Lung Complaint? Do your Babies keep you awake all night with Hacking Coughs, Colds in the Head, etc. Do you want something reliable in the house to meet these emergencies? We answer to all: "Go to your Druggist and get a Bottle of the Arkansaw Cough Syrup, and be troubled no more." Price, 50 cents per Bottle!

For Sale by all Druggists.

## THE RUSSELL PROCESS COMP'Y.

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

## QUARTZ BREAKERS!

—AND—

Pulverizers Combined.

To Run by Hand or Power.  
Mining Machinery of Every Description; Drawings, Plans and Specifications.

E. I. NICHOLS, 316 Mission Street, S. F.

HEALD'S BUSINESS COLLEGE,  
24 Post St. S. F.  
Send for Circular.

NO MORE SLIPPING OF BELTS!  
NO LOSS OF POWER!

CHAS. McCORMICK'S  
Improved Composition for  
PAPER PULLEY  
COVERING.

Cheap & Durable

A Saving of 50 per cent in Power.

SATISFACTION GUARANTEED.

CHAS. McCORMICK

Can be found at Savage's Foundry, 135  
Fremont St., San Francisco, Cal.

Refers to best firms in the city.



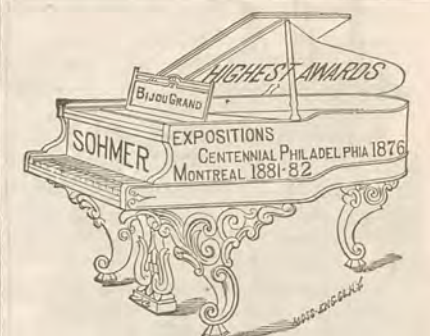
WATER TANKS! WINE TANKS!  
CALIFORNIA WINE COOPERAGE CO.

FULDA BROS., Proprietors,

30 to 40 Spear St., - San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.



SOHMER & CO. PIANOS.  
PECK & SON PIANOS.  
BYRON MAUZY,  
SOLE AGENT,

922 Market Street, San Francisco, Cal.

SEND FOR CATALOGUE.

W. E. CHAMBERLAIN, JR.

T. A. ROBINSON.

PACIFIC Business College,  
320 POST ST.  
SAN FRANCISCO.

Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Evening Sessions during the entire year.

Call, or send for CIRCULAR to  
CHAMBERLAIN & ROBINSON, Prop's.

American Exchange Hotel,  
SANSOME STREET,

Opposite Wells, Fargo & Co.'s Express, one door from  
Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50  
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

PERRY SEMINARY,  
Boarding and Day School,

1625 Telegraph Ave., Oakland, Cal.

MRS. HERMON PERRY, MISS KATE M. FULLER,  
PRINCIPALS.

Next Term will begin Monday, Aug. 2, '86



**NOTICE TO  
MINING MEN,  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.**

**Engineers' Tables of Progress**

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, etc., address:

**INGERSOLL ROCK DRILL CO.,**

REPRESENTED BY

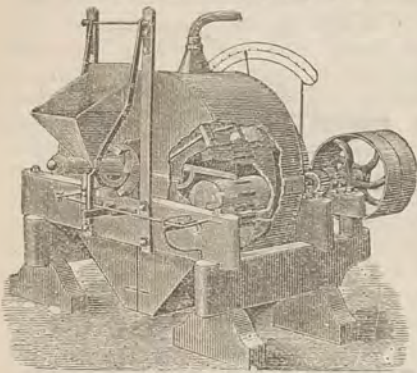
**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

**Tustin's Pulverizer  
WORKS ORE WET OR DRY**

FULTON IRON WORKS, S. F.

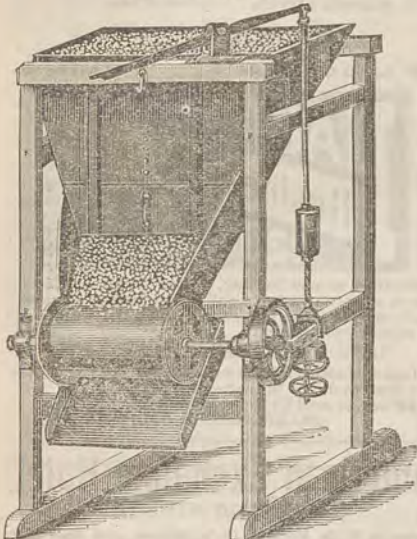


MANUFACTURED BY

**HINCKLEY, SPIERS & HAYES,**

**THE ROLLER ORE FEEDER**

[Patented May 28, 1882.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

**Golden State and Miners' Iron Works.**  
Sole Manufacturers,  
237 First Street, San Francisco, Cal.

**San Francisco Cordage Factory.**

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice

**TUBBS & CO.**

611 and 613 Front St., San Francisco.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake. The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**  
316 California St., San Francisco.

## FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

(ESTABLISHED IN 1855.)

Office, 220 Fremont St.,

MANUFACTURERS OF

San Francisco.



BABCOCK & WILCOX BOILERS.

MARINE ENGINES AND BOILERS—Propeller Engines, either High Pressure or Compound, Stern or Side-wheel Engines.

MINE MACHINERY—Hoisting Engines and Works, Cages, Ore Buckets, Ore Cars, Pumping Engines and Pumps, Water Buckets, Pump Columns, Air Compressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for Dry or Wet Crushing, Amalgamating Pans, Settlers, Furnaces, Retorts, Concentrators, Ore Feeders, Rock Breakers, Furnaces for Reducing Ores, Water Jackets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MACHINERY.

MISCELLANEOUS MACHINERY—Flour Mill Machinery, Saw Mill Engines and Boilers, Dredging Machinery, Powder Mill Machinery, Water Wheels.

## ENGINES AND BOILERS

OF ALL KINDS,  
Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish Tanks for Salmon Canneries

OF EVERY DESCRIPTION.

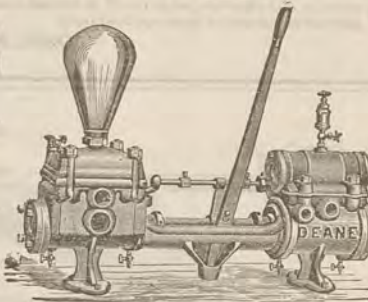
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers, Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

—ALSO—

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/2 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**



## FRASER & CHALMERS.



CHICAGO, ILL.

U. S. A.

General Office:  
Fulton and Union Sts.,  
CHICAGO, ILL.

NEW YORK OFFICE,  
ROOM 43,

NO. 2 WALL ST.

Mexico

Office:

No. 11

de la

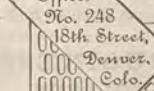
Chihuahua

Mex.

PERFORATED METALS FOR

REVOLVING and SHAKING-SCREENS,

JIGS & STAMP BATTERIES.



UTAH OFFICE—SALT LAKE CITY, UTAH.

## Iron and Machine Works.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

**EUREKA FOUNDRY,**

139 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

**CALIFORNIA MACHINE WORKS,**

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

—BUILDER OF—

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines

Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Henriksen's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. **237 ORDERS SOLICITED.**

**UNION IRON WORKS,**

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

**STEAM ENGINES, BOILERS AND ALL**

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,  
SACRAMENTO, CAL.

**Golden State & Miners Iron Works.**

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

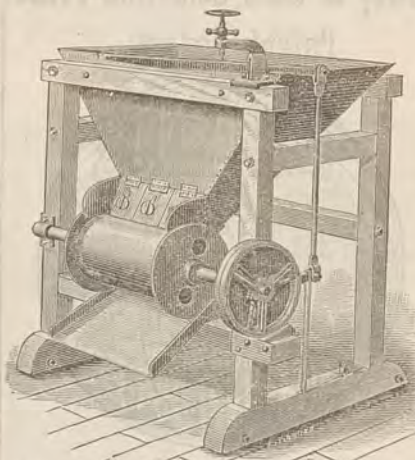
STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom Sts.

## THE ORIGINAL Roller Ore Feeder.



This form of Ore Feeder is well adapted for its peculiar work.

In reference to a similar form of "Roller" Feeder, which is being manufactured and offered for sale in this city, and of which a cut appears in this journal, we have to say that the Superintendent of the Bunker Hill Gold Mining Company states that the "Challenge" is far superior to the "Roller," he having had both of them operating side by side. We shall be pleased to show this letter, upon application, to any one interested.

We are also manufacturers of the "Challenge" and "Stanford Improved."

Prices furnished by the

**JOSHUA HENDY MACHINE WORKS,**

39 to 51 Fremont St., San Francisco.

## N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

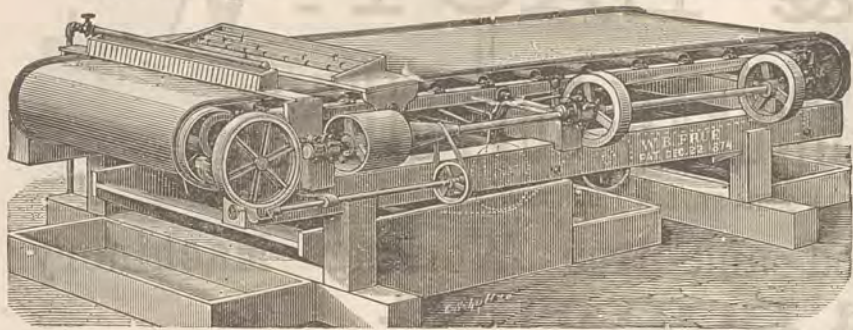
CIRCULAR

**Saws.**

SAW MILLS AND MACHINERY  
Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS.**  
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept 18, 1883. Patents applied for.

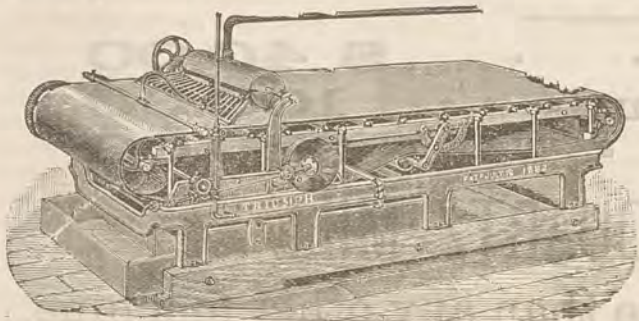
N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

# \$1,000 CHALLENGE ACCEPTED, PRICE, FIVE HUNDRED AND FIFTY DOLLARS (\$550.00).



**THE  
"TRIUMPH" ORE CONCENTRATOR.**

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

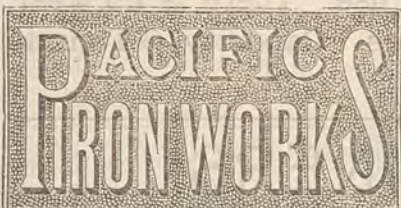
They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE, placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.



1850. 1885.  
**RANKIN, BRAYTON & CO.,**  
MINING MACHINERY.

San Francisco: Chicago: New York:  
127 First Street. 100 N. Clinton. 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

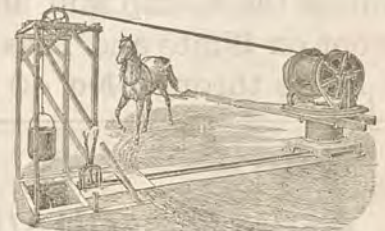
## WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



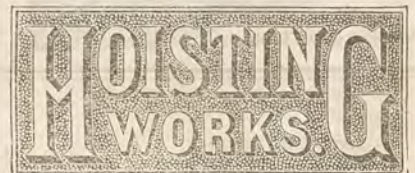
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES THE BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



## BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700 pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE of CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



Geo. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

Geo. W. DICKIE, Manager.  
J. O. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

## STEAM, AIR, AND HYDRAULIC MACHINERY.

**Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

## UNION IRON WORKS,

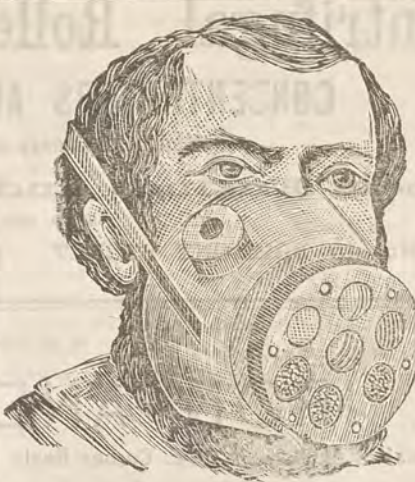
Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.



## PATENT LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning  
and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, Threshing and Stock-raising, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,  
380 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.

## CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

**STEIGER & KERR, Occidental Foundry,**

No. 137 First Street, San Francisco, Cal.

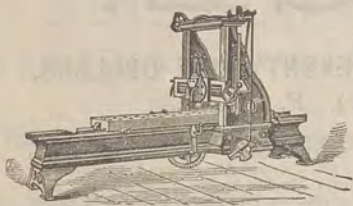
IRON CASTINGS OF ALL DESCRIPTIONS.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

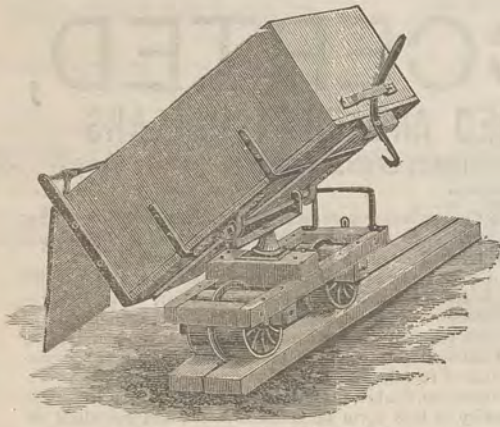
## MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Knowles Steam Pump  
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.



JAMES' PATENT ORE CAR.

## TATUM & BOWEN,

34 &amp; 36 FREMONT ST., Donahue Block, SAN FRANCISCO.

91 &amp; 93 FRONT ST., PORTLAND, OREGON

Ore Car, . . . .	\$ 40.00
Rock Breaker, . . . .	100.00
Quartz Mill, . . . .	350.00

## THE JAMES QUARTZ MILL

Saves a Higher Percentage than any other machine.

Its action is a reciprocating motion of four separate and distinct Dies attached to a heavy casting in such a way that the **WHOLE WEIGHT and FORCE OF BLOW ACTS ALTERNATELY ON EACH DIE.** In this respect it resembles the Stamp Mill, and in point of amalgamation is superior to any machine in use. There is no wear, except on Shoes and Dies, and there is no expense for setting. Weight, 3000 pounds. Capacity, 6 Tons in 24 hours through No. 40 Screen. Requires 4 H. P.



SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

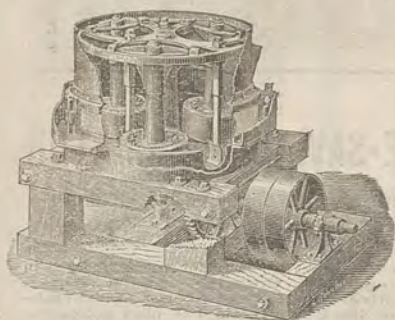
**BEST SOFT LAKE SUPERIOR COPPER USED.**

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.****E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR &amp; CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



Centrifugal Roller Quartz Mill.

## F. A. HUNTINGTON,

MANUFACTURER OF

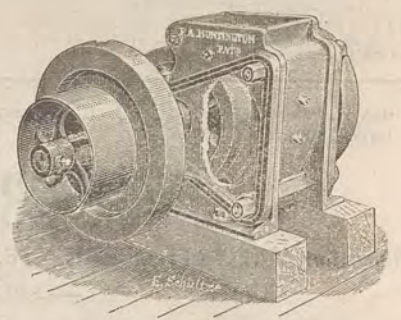
## Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,

**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

## THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

**BUILDERS OF****QUARTZ MILLS**—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.**AIR COMPRESSORS**—Rope Power Transmission.**HYDRAULIC PUMPING** and Hoisting Machinery.**WROUGHT-IRON WATER PIPE** a Specialty. **NOTE**.—Have just completed order for 35 miles of 44-inch

pipe of 1-inch iron for Spring Valley Water Works Company, San Francisco.

**SAW-MILL MACHINERY** of all kinds.**STEAM ENGINES**—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.**SOLE MANUFACTURERS** for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube);

50,000 horse power now in use.

**MACBETH PATENT STEEL-RIM PULLEYS**—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.**REFRIGERATING MACHINERY** for Steamships, Breweries, and Cellars.**WILSON'S PATENT GAS-PRODUCER.****STEAM BOILERS** of all descriptions.**SUGAR MACHINERY**—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.**STEAMSHIPS**—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamsh

Pumps, Steam Capstans, Cargo Winches, etc.

**Builders** of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 80-stamp Mill for Quartz Mountain

Mining Company

Send for Circular and Price Lists.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, SEPTEMBER 18, 1886.

VOLUME LIII.  
Number 12.

## Stamps and Rollers for Gold Ores.

In the MINING AND SCIENTIFIC PRESS of August 28th was printed an article by Hamilton Smith, Jr., giving the "Costs of Mining and Milling Gold Ores" in California, Dakota and Venezuela. The results, as stated, are those accomplished by crushing ore in stamp mills. According to the statement mentioned, the Sierra Buttes mill of 93 stamps, and the Plumas-Eureka of 61 stamps, crush the ore at the following expense: Sierra Buttes, 56 cents per ton; Plumas-Eureka, 61 cents per ton.

Both these mines are located in California, and the prices for millmen and hands are about the same throughout the State.

In this connection it will be of interest to give the cost per ton of milling ores by one of the new forms of mills, which are claimed to excel the stamp in efficiency and economy.

The Spanish mine, of Nevada county, in this State, has a plant of four of the Huntington centrifugal roller mills. Three of these are five feet in diameter each, and one is four feet. These mills have been in constant use for about 17 months, crushing 120 tons of ore daily.

The report of the superintendent of this mine, for August, 1886, places the cost of milling, including all wear and tear of machinery, at the low figure of 29 cents per ton, or less than one-half the average cost of milling with 154 stamps of the Sierra Buttes and Plumas-Eureka. These mills—the Sierra Buttes and Plumas-Eureka—are known to be the best and most economical running quartz mills to be found anywhere, and they have reduced the cost of crushing ore by stamps to a minimum.

The Huntington centrifugal roller mill has been now in practical use over four years. It has fought and won its way through all the prejudices of millmen who thought there was nothing that could take the place of stamps. But now there are over 100 of these Huntington mills successfully reducing the ores of California, Nevada, Oregon, Idaho, Montana, New Mexico, Arizona, Mexico, Chili and Guatemala.

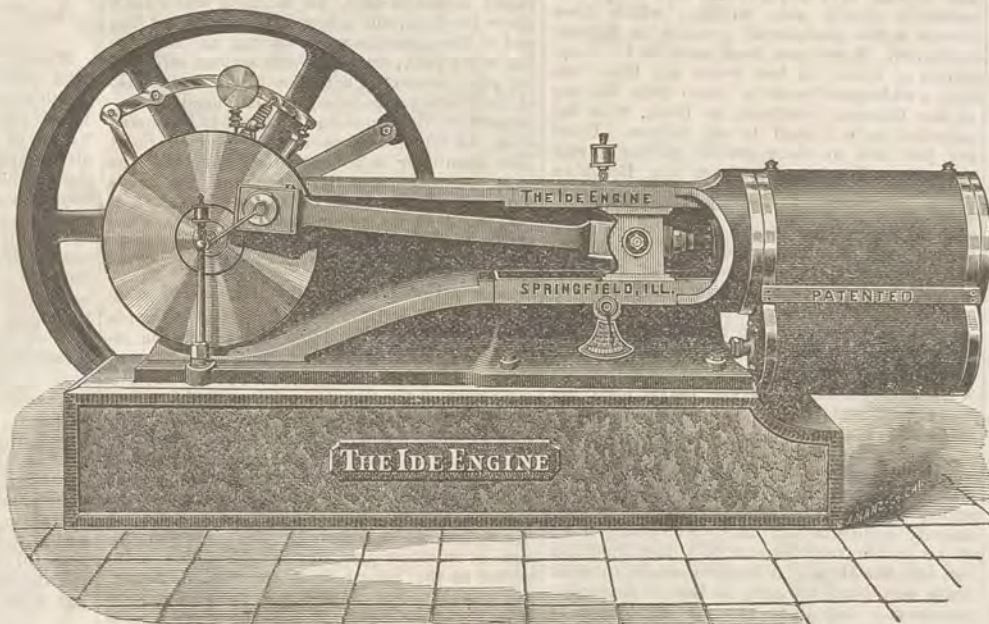
It is but simple justice to state the facts we have here given. A few years' work is worth volumes of theory. Those who have purchased these mills have ordered others after severe trial; and the users are doubtless the best judges of the efficiency of any machine. Those who have unhesitatingly condemned all roller devices for crushing ores, as opposed to the old stamp, must look at the facts squarely, and at least concede that those who are using rollers, after having used stamps, must know more of the subject than those who are wedded to stamps alone, and will try nothing else.

With such a showing in economy of crushing gold ores, as is made by these figures, it would seem that there is no business (when managed economically and on a proper commercial basis) that will give better results for the time and money invested than the mining and milling of the many gold-bearing veins to be found all over our Golden State of California. Since we have come to a better business basis in our gold mining operations, and are conducting them in a less extravagant way, we have

found that many mines, previously unprofitable, can be made to pay well. And since we have found this out our gold quartz mining industry has become much more prosperous and more important. It is an industry which is on the up-grade. It is increasing in extent as well as in profit. Riper experience and better management, with an elimination of the stock-jobbing feature, have done wonders to advance the industry; and these, added to improved mechanical appliances and more economical business methods, are still further advancing this branch of mining.

## Alaska Gold.

The last steamer from Alaska brought down more gold from Alaska mines than ever came



THE IDE AUTOMATIC CUT-OFF ENGINE.

## The Ide Engine.

The Union Iron Works of this city, sole agents and builders of the Ide Engine on the Pacific Coast, exhibit one of these engines at the Mechanics' Fair. This engine was awarded the first prize by the Franklin Institute, at their Novelties Exposition, Philadelphia, held in the fall of 1885, over all competitors. The advantages of this engine are great economy of fuel, with extreme simplicity of construction, perfect regular speed, and small space required for engines of great power.

All parts are steel, phosphor bronze and charcoal iron, fitted to templates and gauges, and are interchangeable. Every engine is thoroughly tested by running at the works; and valves and governors are adjusted and set

## Coke.

Although a good many thousand tons of coke are used on this coast every year, for smelting and foundry purposes, there is none manufactured here, aside from the small quantities from various local gas works. The coke used is imported from abroad, and arrives in the vessels which come for the wheat crop. Neither California, Oregon, Nevada, Utah, Arizona or Idaho produce any at all. New Mexico, Montana and Washington turn out a small amount, but compared with Eastern States the quantity is insignificant. Mr. Weeks, of the U. S. Geological Survey, who compiled the statistics of last year, gives the following figures of production of coke in the United States in 1885: Alabama, 301,180 short tons; Colorado, 131,960; Georgia, 70,669; Illinois, 10,350; Indian Territory, 3584; Kansas, 8050; Kentucky, 2704; Montana, 175; New Mexico, 17,940; Ohio, 39,416; Pennsylvania, 3,991,805; Tennessee, 218,842; Virginia, 49,139; Washington, 311; West Virginia, 260,571. Total, 5,106,696.

In the rank of coke-producing States, Pennsylvania still stands first, with Alabama second, West Virginia, third, and Tennessee fourth. These four States hold the same rank as in 1884. The largest coke-producing locality in the country is the Connellsville region of Pennsylvania, in which was made 3,096,012 of the 5,106,696 tons, or 60.6 per cent of the coke produced in the United States in 1885. The second largest producing district is what is called the Irwin-Latrobe, which lies along the Pennsylvania railroad, from Larimer to Blairsville, and is, in part, the northerly extension of the Connellsville coking field.

The statistics of coke in this country in 1885 are as follows: Number of establishments, 233; ovens built, 20,116; ovens building 432; coal used, 8,071,126 short tons; coke produced, 5,106,696; total value of coke at ovens, \$7,629,118; value of coke at ovens, \$1.49 per ton; yield of coal in coke, 63 per cent.

The number of establishments has slightly decreased. Part of this decrease is due to the consolidation of establishments, but chiefly to the abandonment of works of but little importance. The number of ovens in 1885 was 20,116, as compared with 19,557 in 1884, an increase of 559, 2.8 per cent. There were, however, only about half the number of ovens building at the close of 1885 that there were at the close of 1884. While the production of 1885 has increased over that of 1884, it is not as great as in 1883, the production in 1885 being 5,106,696 tons as compared with 4,873,805 tons in 1884, and 5,464,721 tons in 1883. There was no increase in the value per ton of this coke in 1885 over 1884, nor has there been for three years. There was, however, an increase in the total value in 1885 over 1884, owing to the larger amount of the coke produced in the former year. The yield of coal in coke has also increased somewhat during the past year, it standing at 63 per cent in 1885 as against 61 per cent in 1884. The yield in 1883, however, was given as 64 per cent, the largest average yield of coal given, the yield for 1880, 1881 and 1882 being but 63 per cent.

before at one shipment. This is an encouraging fact. The great gold mine on Douglas island, where they have a sort of "quarry" to work, is paying the owners handsomely, yielding about \$75,000 a month. Other quartz lodes or deposits, of somewhat similar character, are about to be opened on the mainland, companies having been formed to work them. The Douglas Island mine, however, has certain advantages of power and valuation that enable it to be worked as cheaply as a mine in this State. The country is a hard one to prospect in, there being no roads, and the forests being very dense. Settlements are few and far between, and all transportation must be done by canoe.

There is no definite news from the miners who went after the reported rich placer mines, near the Yukon river. Some miners came from there to Juneau and reoutfitted, buying a ton or two of stores, and then started back to winter; but their movements were made as secretly as possible. They are reported as having had considerable gold dust to pay for provisions and other necessities. No work can be done at the placers in the winter, but the men probably wanted to be on hand as early in the season as possible. From the nature of the climate, the seasons are not very short. We shall not probably hear any definite news as to the extent or richness of these new placers before next summer, unless some of the men not prepared to winter return to Juneau this fall.

by the indicator to operate perfectly under varying loads and any steam pressure.

The Ide is an automatic cut-off engine, made from 25 to 1000-horse power. There are safety bursting caps attached to the cylinder—a guarantee against damage to the engine by water carried over into the cylinder from the boilers.

This engine indicates the power used; and it is guaranteed not to vary one per cent in speed while the engine is running, light or full loaded. The valve, valve-gear and governor are very efficient; bearing and wearing surfaces are large. The fact that Franklin Institute gave the engine the medal is alone sufficient to prove its superiority, for there are none better qualified to judge of the performances of the modern steam engine. In some future number we shall give further details of this engine.

THE assay value of the ore milled from the Con. California and Virginia mine, on the Comstock, according to assays from battery samples, was \$20 for the Eureka mill and \$22.45 for the Morgan mill. Bullion to the value of \$52,971.69 was shipped from the mine during the week.

WASHOE ROCKS.—At the meeting of the California Academy of Sciences, to be held on Monday evening next, Prof. Geo. H. Becker, of the U. S. Geological Survey, will read a paper entitled "Washoe Rocks."



## CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eps.

## Care of Mine Cables.

EDITORS PRESS:—I was much pleased in reading your article on "Care of Mine Cables" in your issue of September 4th. You are right in saying too much care cannot be used in looking to and treating cables in mines, when life depends on their good and safe condition. I give the following treatment of mine cables—the very best I have ever tried, being a perfect anti-friction and preserving compound.

Tallow softened by heat, seven parts; plumbago, three parts; mix well. Apply thus: Make a long, hollow box or trough; gouge out a 4x6 piece of timber, 18 inches or 2 feet long. Saw down the timber previously, lengthways, and hollow out the trough sufficiently to hold several pounds of the compound, making a hole lengthways of the trough for the cable to run through. Affix to rope and secure by clamps; have the box made stationary while in use, and permit the rope to pass through it while descending or ascending. It will be then thoroughly coated. This done twice a week or oftener will preserve a steel round cable far beyond its usual time of wear. Remove when treated with the compound. I have found and proved this method to be perfect. Raw linseed oil may be used instead of tallow on flat steel cables in much the same proportions, only add a little more plumbago if necessary to get the proper consistency. If tar is used, linseed oil must be added to prevent adhesion. Both ingredients should be mixed warm to prevent the tar from sticking to the fine strands of the cables. Tar of itself wears out and destroys more cables than the casual observer has any idea of, for from its natural sticky properties it displaces the fine strands, wires, etc., by adhesion and violent disruption, while being paid off or unwound from drums—hence the damage. The plumbago and tallow is far ahead of anything known.

Then again, a mixture of common molasses and plumbago applied to the cams of quartz mills is the best anti-friction compound I have ever used, and will use no other. It is made in the following proportions: Molasses, five parts; plumbago, one and one-half parts; mixed as paint would be made so as to be thoroughly incorporated. This will save the cams and tappits from undue wear, and prevent heating. It further obviates the use of any noxious or filthy grease round the mortars, when oils are used. If any of this compound should fall into mortars it will do no harm to amalgamation. I give this from long experience of its use.

Sonora, Cal.

W. F. DRAKE.

## Quartz-grinders Again.

EDITORS PRESS:—Absence in the mountains placed your paper beyond my reach, but as I never fail, sooner or later, to peruse its valuable material, I find, at this late hour, "Censor" says: "'Old Man' has offered no facts in support of his opinion" (as to the superiority of stamps) "except that he knows exactly what he is talking about."

Well, both of these statements I accept. I have purposely avoided giving my reasons, and reassert that I have such dear-bought experience that I do know exactly what I am talking about. Since my reasons are called for, I will give them. Now why, from experience, I eschew all these pulverizing machines, in a few words is, while they are pulverizing the quartz they are pulverizing and abrading the gold also; and the more you pulverize the gold, the more you lose by abrasion and by producing still finer gold, which is so readily carried off by force of the water. The action of stamps is quite different. They reduce by concussion, and by the wash of water and concussion the released gold is carried from the dies into the interstices around them, and every vibration carries the metal to the bottom of mortar and beyond attrition. The "float" gold released, passes off at once, to be taken up by plates or other devices. As to the facilities of other machines for pulverizing quartz, I will make no comments. Still your humble servant will simply say, stamps outlive them all, and why is this? I will leave "Censor" to answer this question. OLD MAN OF THE MOUNTAINS.

French Gulch, Shasta Co., Cal.

POOR CHANCE FOR WORK.—By reason of the suspension of work in outside mining districts through the heavy discount on silver, and the rumor that work is to be resumed in the Occidental and other mines in this vicinity, says the *Virginia Enterprise*, many men are gathering into the city in the hope of employment, and there are more idle men thronging the sidewalks than have been seen for many a day. In addition to the new-comers there are some hundreds of our regular residents also idle, on account of the shutting down of the Crown Point and Belcher mines, the recent draft in the Yellow Jacket, and the chances are that more will have to be laid off through the low stage and continued decrease of water in the Carson river. Things are looking particularly blue, and it is easy to realize that this is a poor place to come to for work.

## Concerning Fools.

It may be a matter of considerable regret that the Fool-killer has ceased to make his periodic pilgrimages through the land. He would have a big job on hand on the basis of Carlyle's estimate, when he speaks of England as an island of "25 millions, mostly fools." Upon the most optimistic view of the case there would be a serious thinning out of the population, when we consider how many, even hard-working people, there are who contrive to fool away their money at "chuckaluck" games and the like. For weeks past in this city, Oakland, and perhaps elsewhere, crowds might be seen every evening at certain street corners "bucking" at the new "tiger" in the shape of the O'Leary belt swindle, when on the face of it the chances of touching the winning card were all against them. And then, what scores of people there are who can never pass one of those itinerant vendors of notions or lotions on the street without stopping to listen to his endless flow of froth-oratory; and to listen is to be convinced, and to be convinced is to buy. The amount of worthless lip-salve, eye-salve, corn-salve, shaving-soap, pens, pinchbeck jewelry and cement they manage to accumulate, the world may never know. No matter how often they have been "taken in," they never learn that street peddlers are licensed liars and swindlers, and the first harlequin who mounts a dry-goods box and shouts, "This way, gentlemen, if you would make your fortunes," will gain their attention and pocket their change. It is clear that if the Fool-killer attended to his duty there would be a lively boom in the undertaker's business.

But, perhaps, the most marvelous exhibition of the fool's mania is the extensive impulse to do something exceptionally dangerous to life and health, such as lifting of enormous weights, diving from high banks or platforms, or trying to swim rapid currents. More than half the charm of the circus or hippodrome is to see the perilous riding, jumping, somersaulting, rope-walking and the various trapeze dexterities. The feeling that enjoys this sort of sport is certainly closely akin to that which drew crowds to the gladiatorial combats or Spanish bullfights. Sometimes there seems to be an epidemic of fools. A few years ago there was such a widespread craze to jump from the top of the Column Vendome, in Paris, that the gates had to be locked to all visitors. There are just now so many cranks willing to risk their lives by jumping from the Brooklyn bridge that there is some talk of inclosing it in a network of wire. The fatal consequences that attended the first plunge from the bridge put a damper on the foolhardy jumpers; but the recent success of a crack-brained bootblack has revived the idiotic ambition. In like manner the fatal result of Captain Webb's effort to swim the whirlpool rapids threw a cold, wet blanket on all candidates to glory by that route; but since Graham went through safely in his barrel there are many men and women who seem anxious to make the voyage.

The English papers satirize what they christen the "Alpine fever," the singular fashion of making arduous and perilous mountain ascents, which no amount of suffering, fatigue or melancholy accidents can cure, or anything short of an involuntary descent of a few thousand feet into the abyss. A kindred mania, quite as acute and hard to cure, is that of Arctic explorations. But there is some semblance of glory in climbing rocky pinnacles, camping on glaciers, sliding on avalanches, or going off and getting oneself lost in the ice and fog and snow of an endless Arctic winter, and having the whole world out searching for you. But of what possible benefit can it be to mankind, or any one, that a man can swim the Dardanelles, fast 40 days or more, jump from the Brooklyn or Covington bridge and live, or go over the Horseshoe falls in a barrel or rubber vest? The *New York Tribune* demands a law "to punish persons who recklessly risk their lives for no useful purpose," but it is hardly necessary to go to that trouble, for, if the Fool-killer neglects his duty, Nature sets traps to catch all such fools and gudgeons that are very effective.

AN IMPORTANT MINING PROJECT.—The *Virginia Chronicle* says a project is now under consideration by the management of the ore-producing mines on the Comstock which, if adopted, will materially reduce the cost of the production of bullion. It is proposed to put up stamp mills in Sutro tunnel to be operated by water power. The ore pulp resulting from crushing will be flumed to concentrators, set up on the outside of the tunnel. In many of the shafts there is plenty of water flowing from the upper levels to drive a turbine wheel with the tremendous pressure of more than 1000 feet perpendicular fall. The ore extracted from the upper levels will be run out through the connecting drifts and dumped into the battery self-feeders, located in the tunnel. This will save the cost of hoisting ore to the surface by expensive machinery, of fuel for generating steam and the expense of transportation and handling the ore over several times, as is the case at present. It is estimated that by adopting this method Comstock ore can be extracted and be converted into bullion at a cost of less than \$5 per ton.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FRUIT AND FLOWER PICKER AND HOLDER.—T. C. Stark, Vallejo, assignor of one-half to Wm. A. Bruce. No. 348,357. Dated Aug. 31, 1886. The invention relates to a device for gathering fruit, flowers or other things having stems to be cut, which it is desirable to hold after being severed from the branch without handling the article itself. The bloom is not brushed off, and the grapes or other fruit are not injured by handling.

EXCAVATING MACHINE.—Albert Boschke, S. F. No. 348,376. Dated Aug. 31, 1886. This excavating or dredging apparatus is an improved form of the one patented by the same inventor, July 7, 1885. It consists of a wheel rotating in a vertical plane, having buckets or scoops, and radial continuations or passages extending from these buckets toward the center of the wheel. In combination with this are the discharge chutes or openings upon the sides of these passages. The wheel is arranged to be raised or depressed about the journals of the supporting arms.

GAS REGULATOR.—Archibald Ford, S. F. No. 348,389. Dated Aug. 31, 1886. This consists of an independent annular chamber containing a liquid to receive the edges of the bell-shaped float attached to the valve-stem, this annular chamber having a flange or means by which it may be fitted to any sectional gas regulator-chamber and take the place of a diaphragm. The invention also consists of certain details of construction and a means for discharging the condensed water to prevent its coming in contact, or interfering, with the valve.

INCUBATOR.—Wm. H. Worswick, S. F. No. 348,368. Dated Aug. 31, 1886. This incubator consists of an outer shell or casing having mounted within it an inclined floor with a raised screen-surface, an inclined water-tank above the floor, and a brooding chamber at the end of the main chamber, having an underlying water-tank; suitable water-service circulating pipes connected with the tanks and boiler of the heating apparatus; and independent egg-carriers resting upon and adapted to be moved over the screen-surface of the inclined floor. This incubator is a continuous one, and the eggs are automatically turned as the trays move down the inclined screen-plane. It is best adapted for raising chickens on a commercial scale on large ranches.

AUTOMATIC FILLING FAUCET.—Ulrich Bachman, St. Helena. No. 348,372. Dated Aug. 31, 1886. This is one of that class of apparatus used in transmitting a liquid from one receptacle to another, and which may be termed "filling-faucets." The object is to automatically shut off the flow of liquid when the receptacle into which it is being transmitted is full, thus avoiding waste. The particular use of the faucet is in transferring wine and other liquors from one cask to another. This is usually done by an ordinary siphon; but when the receiving-cask becomes full, it suddenly runs over before the siphon can be removed. The invention consists in an elbow-pipe, one arm of which is inserted in the bung hole of the receiving-cask, and the other has coupled to it the pipe or tube from the other cask. Within the elbow-pipe is a valve for opening and closing it. The valve is influenced by springs, and is drawn back from without, being held by a pawl, said pawl being tripped by the action of a float or trigger within the receiving-cask, when said cask is full, whereby the faucet is closed.

GAGE FOR PLANER-KNIVES.—Addison Potter, Portland, Ogn., assignee of one-half to N. W. Spaulding, S. F. No. 348,341. Dated Aug. 31, 1886. This invention relates to a device for rapidly and accurately setting the knives or cutters upon planer-heads, so as to insure both ends being at the same distance from the head and all the cutters being equally set. It consists of a bar, one edge of which serves as a guide against which the edge of the planer-knife may be set, and arms extending backward from this bar, and adjustable by screws or otherwise, from the rear of the planer-head. In the ordinary construction of planers, a head is journaled so as to be rotated rapidly by proper pulleys and belt connections. Upon opposite sides of this head are fixed cutters or knives, the edges of which project from the angles of the planer-head as much as may be desired for the purpose of planing. The rear portions of these knives are slotted and held in place by bolts passing through these slots with nuts upon their outer ends, the adjustments being made by loosening the nuts and moving the knives in or out. This adjustment has usually been regulated by means of a rule applied to the front side of the planer-head, just below the edge of the knife; and, the nuts being loosened, the knife is moved backward or forward, setting first one and then another until it is satisfactorily arranged. Mr. Potter's invention much simplifies the old plan and insures more accuracy.

PAPER WALLS FOR WAR SHIPS.—The walls of several of the British war ships are said to be constructed of paper.

## The Wire Age.

We have had the stone age, the bronze age, the iron age, and it is likely the future annalist will describe this period of American history as the wire age. In no part of the economy of daily life are we separated from wire. Sleeping, we repose on wire mattresses. Eating, we see foods that have passed through sieves, and which are sheltered from the flies by wire covers. Calling, we pull wires to ring curled-wire gongs. Traveling, we are conveyed by cable or electric railways, hoisted by elevators hung on wires and hurried over wire bridges. We announce our coming by telegraph or telephone wires, and we thrud our way by night through streets lighted by means of electric wires. Across the prairies of the West are stretched thousands of miles of barbed-wire fences, against which dumb brutes protest, cowboys swear and draw the knife, and lawyers, juries, judges and reporters whet their intellectual blades. Our clocks are set by wires, our watches run by wires, our books are stitched with wires, our pictures hung on wires, and our politics managed by wire-pullers.

## Comstock Pay-rolls.

Following are the amounts disbursed to employes for the month of August by the various mining companies, mills, etc., connected with the Comstock:

Con. California and Virginia.....	\$80,301 00
Gould and Curry.....	4,080 00
Hale and Norcross and Savage.....	10,221 00
Mexican.....	7,114 00
Ophir.....	4,768 00
Union Consolidated.....	1,551 00
Utah Shaft.....	455 00
Union Shaft.....	315 00
Sierra Nevada.....	3,501 00
Chollar and Combination shaft.....	20,000 00
Overman.....	1,500 00
Alta.....	1,500 00
Justice.....	300 00
Kentuck.....	9,000 00
Six-mile Canyon pay-rolls.....	4,500 00
Osbiston shaft.....	10,404 00
Yellow Jacket.....	11,685 00
Carson river mills.....	45,000 00
Best and Belcher.....	1,341 00
Total.....	\$167,980 00

MINING LOCATIONS.—The *Placer Republican* calls attention to the ambiguous manner in which many notices of mining locations read. There are so many uses of the expressions "more or less" and "thereabouts," that it is often impossible for a practical hand to go on the ground with a copy of the notice and determine its boundaries. Then again, the most usual land-mark adopted is "a pine tree," and as there is an infinite number of pine trees all nearly alike, the difficulty of searching out the lines is increased accordingly. The *Republican's* informant has seen notices intended for the Michigan Bluff district which would fit a claim at Iowa Hill equally as well as the one it was intended to describe.

ACROSS THE INYOS.—Times are said to be depressingly dull over in Fish Lake valley since the closing down of Candelaria. The farmers are busy with big crops, but the surrounding miners are not making fortunes. Nothing of consequence is being done at Lida or Gold Mountain, though in the latter a small, new mill is about ready to start, but water is scarce. Some 10 or 12 men are putting things in order at Palmetto. But as an offset, Silver Peak is said to be booming.—*Inyo Register*.

GOOD REPORTS FROM AN OLD DISTRICT.—The Silver City *Avalanche* hears the most favorable reports from Flint district. As work progresses the mines are showing up splendidly, and the expectations of the owners will be more than realized. Years ago considerable work was carried on in the mines of Flint district and a large mill was built there, but the ores were so refractory that they could not be worked profitably by the processes then in use.

COAL MINES CLOSED DOWN.—The mines of the Northern Pacific Coal Company at Timberline, M. T., have been closed, owing to the continued trouble between the owners and their men. This action is regarded as a victory for the men, as it is practically an admission on the part of the coal company that they cannot secure men enough to carry on the work. There is great rejoicing among the locked-out men and the people generally who sympathize with the miners.

APPRECIATION.—An old subscriber to the PRESS writes: "I herewith send amount for renewal of my subscription to the MINING AND SCIENTIFIC PRESS. I prize your paper very highly: so much and such a variety of interesting matter, well selected. Please continue sending it to same address."

THE new well for supplying Chico with pure water is now about 30 feet deep, and it has been discovered that there is gold in the gravel now being thrown out. County Surveyor McGann talks of filing on the property as mineral land.

A METAL that expands in cooling is made of lead nine parts, antimony two parts, bismuth one part. This alloy can be advantageously used to fill small holes and defect in iron castings.



### German Commercial and Industrial Progress.

The Germans are making rapid strides in commercial and industrial progress, but at a fearful cost, as will be seen in the sequel. They are to-day, by far, the most energetic and progressive people on the European continent. They have a most magnificent merchant marine, to which they are constantly adding. They are replacing their sailing ships with steamers, and as speed is now one of the chief factors of success, the old slow-going steamers are fast giving place to those of greater speed. They have already a fair share of the passenger traffic between Europe and this country, and report says they are about to make an effort to break the virtual monopoly which the French and English have long held in the East. Five powerful steamers are to work the East Asiatic line from Bremerhaven to Shanghai, and there is another line to Australia and the Samoan islands overland via this port. Passengers and letters are taken by this line from London and Paris to Shanghai and Hong Kong in four days less time than occupied by the Peninsular & Oriental Company's steamers, and plans are now maturing to still further increase the speed on this line.

#### German Competition in Tools, Etc.

The Germans have also initiated a strong competition with the English iron-workers in the manufacture of rails, tools, cutlery, and some other articles of hardware. Sheffield appears to be especially excited under the influence of some spicy correspondence which has grown out of this competition, in which much crimination and recrimination is involved in regard to ill-advised action on the part of the manufacturers by which it has become possible for the introduction of German tools not only into foreign but into the home market as well. The *Ironmonger* becomes quite excited and says: "If the Germans, or any other people, are able to supply our requirements better than we can do so ourselves, then we ought to retire as gracefully as possible under the circumstances, and acknowledge that we are invertebrate, non-inventive, non-progressive and beaten." "Genuine German knives" are advertised in London newspapers, which praise their excellent qualities. Only a few years ago nobody in Germany would have bought a knife which did not bear the stamp "Sheffield." An English journal says: "German nails and small tools lead the market."

#### In Regard to Rails,

The gravity of the situation is also decidedly marked. A recent correspondent of the *London Engineer*, in referring to the causes for this invasion of English industries, says: "But, may I venture to observe that if even the English workmen became ever so frugal and thrifty, and accepted comparatively low wages, it could not in the case before us, and probably in others, too, square the account with the foreigner."

"We are handicapped by three factors," he continues. "For instance, in this country, where protection is the rule, the price is sufficient to leave a tolerable margin, and £6 and above was the accepted price of a tender for rails for the Berg Markisch railway last week, while the market quotations are still higher. Such a price is not possible in England with free trade; but just this extra price obtained here enables the foreigner to hold out and compete with us outside his own country, and this without loss to himself." The other two factors with which the English rail-maker is handicapped in the race with his Teuton competitor are set down by the correspondent as the low railway freights and the easy royalties existing there. The success and

#### Persistency of German Competition

Is further alluded to by the *Ironmonger* as follows: "The energy and ingenuity of our German competitors seem to be almost inexhaustible, and it begins to be pretty plain that they have entered the lists with the firm resolve to wrest away from us as much foreign trade as possible. Having had overgrown manufacturing industries fostered by their own tariff, they find themselves burdened by an excess of production which they are compelled to dispose of abroad or find themselves surrounded by very serious difficulties. In order to evade, or at all events to postpone, this issue, they are pushing their export trade in a most determined manner, and are doing so with all the advice and assistance their Government is able to give them. In order to meet the competition of British coal in their own ports, German railway rates from Westphalia to Hamburg and Bremen have been considerably reduced, and every effort will be made to augment the consumption of German coal," etc.

#### A German Method of Obtaining Designs.

A few days ago a German was observed busy sketching various objects of china and glass displayed in a well-known London shop window. An assistant rushed out and dragged him into the shop. His book, which was taken from him, was found to contain many carefully-executed drawings of various expensive goods. He was allowed to depart, but without his book. Such a procedure on the part of a shop-keeper appears singular to an American. Here, the only recourse would have been to remove the goods from observation, and not the man;

while taking the book from him would have to be condoned by a not very brief residence in some penal institution.

#### Wage-workers in Germany.

The facts referred to above present the most effective commentary on the natural working of free trade which could well be made. The effect would be even more decided here than in England. German manufacturers secure their advantage in the markets of the world at the expense of the wage-workers. U. S. Consul Warner, at Cologne, in a recent communication to the State Department on the condition of the laboring classes of Germany, writes as follows: "The wages of a laborer, whether he works in iron or steel manufactories, coal mines, stone quarries, on buildings or railways, ranged from forty-seven to seventy cents per day, and if he is a skilled laborer, from 80 to 92 cents per day. Female labor is only allowed in a limited degree, and is only paid from 24 to 30 cents per day. Working hours are from six to six in summer and from seven

supremacy in the markets of the world, that, with the single exception of cotton manufactures, they are placing their goods at prices which are ruinous to the proprietors as well as to the workers. Statistics are given in a German journal of 30 leading companies in the iron interests, representing a stock capital of about \$51,000,000. More than one-half of the companies paid no dividend at all during the last year, while the average dividend for the whole business was only 1.5 per cent. This necessarily means low wages and hard times for the laborers, and lack of income and consequent deprivation for the small stockholders in that trouble. If the vessel goes slower than four knots an hour, the drag does not do as well, as it is apt to rise to the surface, where it is not so efficient. The gear used on the *City of Brooklyn* did not cost over \$100. The size of the drag should be in proportion to the vessel, but it should present a flat surface, as shown, and the bridle must be made as shown, to be effective. A large ocean steamer could have this gear ready at hand for use in case of acci-

twigs and the under side of the leaves, with a fine brownish down or pubescence. Upon the leaf there are 10 or 12 pairs of strong ribs or veins on each side of the central midrib. The flowers are small and appear in clusters of 10 or 12, proceeding from the axils of the leaves. There is one common stalk or peduncle and a more delicate pedicel for each flower. The blossoms are of a greenish hue, with five acute sepals and as many smaller, hooded petals divided at the point. They also have each four or five stamens, and a short style, three to four cleft. The flowers are followed by small black berries, as big as a pea, which consist of three bony seeds or nutlets, with a thin, pulpy covering. (At the lower left-hand corner of the cut are shown a flower, enlarged, and a cross-section of the fruit.)

The bark possesses active cathartic properties, and has been lately introduced into medical practice, large quantities for the drug trade being annually gathered in Oregon. The bark of *Rhamnus catharticus*, of Europe, has been thus employed since long ago, and these purgative qualities are probably common to many species. There is in this State a species called *Rhamnus Californicus*, whose bony seeds have been used now and then as a substitute for coffee; but they contain no caffeine, the peculiar principle of the true coffee.

#### Reduction Works at Reno.

The *Reno Gazette* says: The Reno Smelting, Mill and Reduction Works Company have organized with the following named trustees: H. H. Beck, A. H. Manning, Archie Farrington, John Howell and M. Carey, who have elected as president and managing director, John Howell; secretary, William Thompson; treasurer, the First National Bank, and superintendent, M. Carey. The company have purchased 10 acres of land, with a right of way to the river for ditch, flumes and dam of Messrs. Bailey and McKissick, and have commenced work on the ditch and dam. They have contracted for lumber, brick, machinery and other material, much of which will soon be on the ground, and will commence the construction of their works within ten days. It is their intention, as soon as the material and machinery arrive, to put on a force of 20 or 30 men, and push the completion as fast as possible. The building to be first erected will be the main building, which will be used for ore receiving and sampling-rooms. As soon as it is completed the company will commence sampling and purchasing ore.

They will purchase gold, silver, lead, copper and antimonial smelting ores; also gold, silver, lead and copper concentrates, slag, matte and other secondary products; also all free and base milling ores. It will be their purpose to pay such prices that the miner will be able to realize on ores which were heretofore valueless to him, or, in other words, with the facilities the company will have for working cheaply, they will be able to handle a class of ores with a profit to the miner, upon which it has been impossible for him to realize anything. Reno has, for years, been recognized as the most available point on the coast for general reduction works. Howell and Carey, both practical metallurgists, with 24 years' experience in this State and California, after very extended observations, have selected this place as the one of all others. It has been rumored that they are in the interest of the Selby Works. This the *Gazette* is authorized to most emphatically deny. The company represents no other capital or interest than that of the individual stockholders. Besides being practical workers of ores, Howell and Carey are largely interested in mines, the products of which, as well as those of the mines in which Archie Farrington, of the well-known firm of Farrington Bros., who, as a trustee, is so largely interested, will be worked here. The other stockholders and members of the Board of Trustees are gentlemen who are well known here and throughout the State. They are men of means and business experience and have taken hold of this much-needed enterprise with the purpose of making a success of it, and supplying a long-felt need. The capacity of the works will be increased like those of Salt Lake, Denver, Leadville and elsewhere, as the demands may require. These works will be the beginning of a new epoch in the mining history of this State. They will not only attract the attention of the prospector, but will be the means of drawing capital hither. Old abandoned mines will be reopened. New camps will spring up here and there. The lethargy that has existed for years will be thrown off. Agriculture, grazing and commerce will keep pace with mining. The tide of adversity will be turned to that of prosperity. The State will commence to grow in wealth and population.

GRANITE DISTRICT.—Word comes to us from this district, which is about 18 miles south of Cherry creek in the Egan range, of a most flattering nature. The mineral is gold and the mine we refer to is the property of Fred. Gotchet, and is now leased by ex-Senator Doolin, of Eureka, and Thomas Kenny, of White Pine. From eight tons of ore, crushed at the four-stamp mill in Telegraph canyon, they realized \$4900—no discount. They have out considerable more rock, which is said to be "lousy" with gold, but their water supply is too limited to crush it just now. Granite district will be more extensively heard from some of these days.—*White Pine News*.



CASCARA SAGRADA—*Rhamnus Purshianus*.

to seven in winter. One hour is given for dinner, a half hour for breakfast, and a half hour for coffee in the afternoon. The Government has no power to regulate or interfere with working hours, but it takes care that certain restrictions with regard to the employment of women and children are observed. Rent is \$2.85 per month on the average, or one full week's wages. Meals cost 24 cents per day and consist principally of potatoes. They have also peas, beans, vegetables, common pork and black bread. Occasionally they have dried fish and beef, but more often horse flesh. The laboring classes are poorly clothed, as a rule. Notwithstanding the depressed state of wages, as above described, it is well known that there are many German emigrants in this country from the very district about which our consul writes, who "kick like steers" because they can't get over \$2 a day in this country and obtain their beer and pretzels free. Most of these, however, are Socialists. What ungrateful wretches!

#### Manufacturers' Profits.

Notwithstanding the ruinously low rate of wages, so fierce is the spirit of competition, and so determined are the Germans to secure

dent to the rudder. It is the simplest device of a practical nature which has come to our notice.

#### Cascara Sagrada.

The last report of the Commissioner of Agriculture has an interesting article on "Native Medicinal Plants," by Dr. Geo. Vasey, botanist of the Department. In this we find an account of the Cascara Sagrada (*Rhamnus Purshianus*), pictured upon this page. This plant grows on the Pacific slope from Northern California to Oregon and Washington Territory, and also occurs sparingly in Idaho and Montana. It varies much in size according to location, being found in some places only as a shrub 10 or 12 feet high, in others becoming a tree 20 to 40 feet in height, with a trunk a foot or more in diameter.

The leaves are elliptical in form, undivided, from two to six inches in length and from one to three in width, with very fine teeth on the margin, which indeed is sometimes almost entire. The petiole or stem of the leaf is half an inch to an inch long, and covered, as are also the young





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER, SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Sept. 18, 1886.

## TABLE OF CONTENTS.

**EDITORIALS.**—Stamps and Rollers for Gold Ores; Alaska Gold; The Ide Engine; Coke, 181. Passing Events; The Hydrogen-Amalgam Process; Buried Booty; Electricity for Power; Minerals Found in the United States, 184. Mining Directors and Superintendents; At the Mechanics' Fair; Developing Mines; A Cheap Truck for Mining Purposes, 185.

**ILLUSTRATIONS.**—The Ide Automatic Cut-off Engine, 181. Casaca Sagrada (Rhemus Parashianus), 183. The "Montana" Mining Truck, 185.

**CORRESPONDENCE.**—Care of Mine Cables; Quartz Grinders Again, 182.

**SCIENTIFIC PROGRESS.**—Positive and Negative Electricity; Electric Motors in Mines; The Size of a Spider's Thread; Utilizing the Heat of the Sun; A Layer of Coal; Earth Temperatures; Ballistic Photography; Women in Science; How to Measure a Candle-power; Fluted Carbons; How to Separate the Layers of Insects' Wings; Height of Twilight, 186.

**MECHANICAL PROGRESS.**—Modern Progress; African Blacksmiths; Simplification of Machinery; Is Iron to be Superseded; Gas Cheating—An Invention Greatly Needed; Large Planing Machine; A New Telegraph Wire, 186.

**ENGINEERING NOTES.**—A New Boat-propelling Device; New Canals in Russia; The Hennepin Canal Scheme; High-speed Ship, 187.

**USEFUL INFORMATION.**—A Lubricant for Brass Work; Imitation Vermilion; The Adhesiveness of Iron Oxide Cement; How to Grass a Bank; Bay Window Cars; Green Varnish for Metals; Stretching Emery Cloth; How to Tin Cloth; To Construct a Rain Gauge; Lustrous Polish for Cabinet Work; Fitting Keys; A New Patent Dodge, 187.

**GOOD HEALTH.**—One Secret of Right Living; A Blast Against Beer; Diseased Eggs; Wonders of Diet; Salt and Water for the Feet; Turpentine as a Remedy for Lock-Jaw; Ventilating a Room, 187.

**MISCELLANEOUS.**—Concerning Fools; Notices of Recent Patents; The Wire Age; Comstock Pay Rolls, 182. German Commercial and Industrial Progress; Casaca Sagrada; Reduction Works at Reno, 183.

**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 188-89.

**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 192.

## Business Announcements.

Mines—J. W. Lind, Marysville, Montana.

See Advertising Columns

## Passing Events.

Within the past week we have seen quite an encouraging advance in the price of silver, which will bring rejoicing to the hearts of the many silver miners on the coast. It is on the upward grade now and is apt to go up faster than it came down.

There is very little of an important nature to speak of in the present mining situation. Work is going on steadily in all the districts. In this State the gold quartz industry continues to improve, as it has been doing for some time past.

The Mechanics' Institute Fair in this city and the State Fair at Sacramento are in full progress, and each attracts large numbers of visitors.

The resurvey of San Pablo and Suisun bays, which form the upper portion of San Francisco bay, has been commenced this week by the officers of the U. S. Coast Survey. The results of their work will not be made public for many months, probably, but will be of interest to our mining community, as they have a bearing on the hydraulic mining question.

DEPOSITS of gold-bearing gravel are reported as being discovered and worked in a ravine north of the Harrison mine, on the west side of the Mount Davidson range, and extending down to the lower Washoe lake.

## The Hydrogen-Amalgam Process.

Paragraphs are beginning to go the rounds of the press in this country referring to the success achieved in working gold ores by the hydrogen-amalgam process in England, where it originated. So far we have seen no description of the process which is satisfactory. It is stated in the English papers that the essence of the process is "that the mercury used in this process never 'sickens,' but remains absolutely quick in the presence of the most refractory ores, such as those containing sulphur, antimony, arsenic, etc., and that each particle of the ore is separately rolled in the 'quick' mercury for from 15 to 30 seconds or more. No two particles of the ore can cling together, and during the transit of the ore through the amalgamator each particle is submerged beneath the surface of the quick mercury. Everything that leaves the stamps must thus pass through the mercury under the above conditions before it can escape into the slime pits. Whether the ore be pulped to an impalpable powder or only crushed to the fineness of a 30 sieve, the action is the same. Any loss from float gold, or from suspended particles of ore carrying gold, is rendered impossible. In this direction alone the amalgamator should prove of great value. The absolute contact, continued as it is for a considerable time, renders the extraction much more efficacious than is found to be the case in any of the ordinary systems of amalgamation now in use."

All this is very unsatisfactory and confusing, and still more so in the statement that "the electro-chemical reactions which take place set free a quantity of hydrogen gas, which has a reducing action upon the ore, and further facilitates the extraction of gold."

This idea of passing the pulp through a mass of mercury is by no means new; on the contrary, there are over, perhaps, a hundred different patented appliances for accomplishing it. Notwithstanding this, none of them are at work. Theoretically, the plan of passing all the pulp through a body of mercury is all very well; practically, it does not accomplish what is expected of it. If the ore could be put into the mass in minute forms it would be all right, perhaps; but, whether forced in from below, blown in by steam or air, or carried down by screw or propeller, the pulp goes into it in small masses, from the size of a pinhead up to that of a bean. And when once in the mercury it remains in that shape, and will not fall apart. Therefore, only the outside comes in contact with the mercury, and particles of free gold inside the little pellets of pulp will pass through three feet of mercury unamalgamated. It is the same when molten lead is used instead of mercury; neither plan has been successful. We should want to see the new process accomplish this part of its work before believing it could be satisfactorily done.

The "electro-chemical" feature, and the "reducing action of hydrogen gas on ore" do not sound encouraging without detailed scientific explanations. These terms are used so frequently when they mean nothing that people are shy of processes which seem to require them. The new process was invented by an English M. P.—Mr. Bernard Molloy—and a company has been formed which is said to have treated ores for Australia, India, America, Mexico and Africa. It is adapted for gold ores, so that no doubt we shall soon hear of its introduction in California. When trials are made here on a practical scale we shall be better able to judge of the merits of the process. But we have seen in San Francisco gold ores worked with "hydrogen gas," by electro-chemical action, by molten lead, and by quicksilver bath, and after a flourish of trumpets and an exhibition, and then a final practical trial, these processes were abandoned, and we kept to the "good old fashion" to make money.

**THE V-FLUME CASE.**—The appeal bond on a writ of error to the United States Supreme Court, in the case of James W. Haynes against Edward McLaughlin and others, has been filed in the United States Circuit Court for \$3000. This is the well-known suit for infringement of patent in what is known as the V flume, and decided recently by a jury in favor of the defendants.

A KENDALL ore-stamp mill has been put up on the Ridgeway mine, New River district, Trinity county.

## Buried Booty.

So these many years has the tale of money hidden by Captain Kidd on the banks of the Hudson been extant, so little has ever occurred, however, to verify the truth of such legend, that there is need now for the promulgation of something new in this department of fiction. Timely, therefore, is the story lately told by a San Jose paper about valuables secreted by Joaquin Murietta somewhere in the hills of Santa Barbara county.

Briefly recounted, this story runs as follows: Some two years ago Abelardo Mendoza, a Mexican, charged with the improbable crime of horse-stealing, was shot and mortally wounded in Kern county by an officer who was seeking to arrest him. Before dying, Mendoza confessed to having once belonged to Joaquin's band of marauders, stating that this noted bandit had during his lifetime buried much valuable plunder in Santa Barbara county. The wounded malefactor, already in *articulo mortis*, proceeded to join his chief on the other side before he could definitely describe the locality of the plant.

This untimely taking-off of Mendoza was to the *quid nuncs* and seekers after hidden treasures a sore disappointment. To think that the man should have been so snatched away when just another moment—a few more gasps of breath—would have enabled him to make such coveted revelation, was indeed trying to the patience of this class of expectants. But they were not discouraged; they bided their time, well knowing that some other of the fraternity would, when in limbo or in mortal extremity, supplement this statement of the defunct Mendoza with more full and accurate information as to the locality of the robber's loot—so full and accurate, perhaps, that they could straightway go and capture it.

And so, indeed, it has happened. Sheriff Branham, while escorting, not long since, another Mexican to San Quentin, condemned to there do the State some service, was informed by the culprit that it had been his good fortune to be acquainted with Abelardo Mendoza while the latter was here tarrying in the flesh; that he was in the habit of running with him, and many a deep potato had they taken together. On these occasions, when far gone in his cups, Mendoza had time and again assured him that he knew where Joaquin had concealed a great deal of money and other valuables. For a time at first he refused to reveal to his *compadre* the exact site of the cache, fearing the ghost of Joaquin would do him a harm if he disclosed the secret.

At length, however, his scruples were so far overcome that he not only told his friend where the plunder was deposited, but actually went with him to the spot, where three oak trees were found standing in a line, and everything else as had been represented. Digging under one of these trees, a box was unearthed about three feet beneath the surface, containing a large number of knives, pistols, spurs, etc. Under another tree a second box was dug up, filled with jewelry, gold nuggets and coin, the whole worth a great many thousand dollars. The twain having helped themselves to \$1000, committed the box again to the earth, intending to return at some future time and secure its entire contents. While a bad turn in the luck of Mendoza defeated this purpose on his part, his companion, now an occupant of San Quentin, went back, as he says, during the past spring and helped himself to \$1500 more of the dead bandit's hoard, leaving, as he thinks, at least \$15,000 in gold still in the box.

Such is the story told by this convict to the good Sheriff Branham. That it is veracious throughout, no one acquainted with the character and methods of these Mexican outlaws can for a moment doubt. We all know that Joaquin and his followers were noted alike for their truthfulness and frugality. Thrifty fellows were they all, addicted to getting and saving, especially the former. Accumulation was with them a ruling passion. As a fitting sequel to this pleasant story, let now the sheriff of Santa Barbara county go out into the hills described, find this buried swag, dig it up and advertise for the owners. This done, the honest miner shall come forward, claim the loot, distribute it among the crowd, and all hands take a drink!

MOUNTAIN FIRES are prevailing in a number of localities in Southern California.

## Electricity for Power.

The telegraph informs us of the successful trip of an electric steam launch across the English channel and back, taking three hours and 51 minutes to cross and four hours and 15 minutes to return, on a calm day. The accumulators were charged once in the 50-mile trip. Small launches, propelled by "stored electricity," have been known a few years, and have been tried on European rivers, but this is the first "outside trip" of which we have read. The time is not very fast—about six miles per hour—though the yacht may have been a small one.

On this coast we have thus far had no electric boats, though it would be a good place for them if storage reservoirs are to be used, since there is in summer a strong and constant wind, which could be utilized for generating purposes. The only attempt made here thus far for using electricity for power, aside from small or experimental work, is that now being carried out at Los Angeles on a street railroad, the cars on which will be propelled by electricity. Mr. Keith had one of his dynamos at the Mechanics' Fair last year, harnessed to a pump, and it seemed to work well; but there is an apparent willingness on the part of the public to let some one else make the first experiments of a practical nature with electricity for power.

The result of the Los Angeles street railroad experiment is looked forward to with interest, for these roads have not been so successful elsewhere as was hoped. Moreover, the electric road there will have to compete with the cable roads, and there will be an excellent chance for comparison. Of course, steam is the original source of power for each, and it will be interesting to know whether the engine applied direct to the rope which draws the car can do the work cheaper than the engine which revolves the dynamo which furnishes the electric current for the other road. We confess that it looks as if the cable was the surest and cheapest method.

## Minerals Found in the United States.

J. C. Foye, Professor of Chemistry and Physics, Lawrence University, Appleton, Wisconsin, has written a little hand-book of mineralogy containing the determination, description and classification of minerals found in the United States. It is published in Van Nostrand's Science Series, and has just come to hand. It is a revision of a previous work published under the title of "Mineral Tables," but the present form is much more convenient. It is evidently the intention of the author to furnish a work by the aid of which minerals found in this country may easily be determined, to give concisely their prominent and distinguishing characteristics, and to present the classification commonly used in assaying cabinets.

There is a slight modification of the original form of the tables. The description of the species is given in short paragraphs instead of being presented in tabular form, as it allows a greater latitude in making descriptions, and gives an opportunity to compare closely allied species. The subjects in this part of the work are arranged in alphabetical order. The new system of nomenclature is mainly used. Each species in the chapter on "description of species" is numbered in a parenthesis to correspond to the numbering in the chapters on classification. The classification by basic elements and ores is specially convenient. In the introductory chapter are descriptions of apparatus and reagents, blowpipe reactions, scales of hardness and fusibility, etc. The index is quite complete, and the little work is a very handy one to any one interested in ores and minerals.

IN THE matter of the alleged contempt of the Omega Gold Mining and Ditch Company, one of the defendants in the noted North Bloomfield debris case, Master in Chancery S. C. Houghton has submitted his report to Circuit Judge Sawyer, in which he finds the defendant guilty of contempt of court. The contempt was committed by reason of violating the decretal injunction of the court, enjoining the defendant from carrying on hydraulic mining in Nevada county.

THE San Francisco Mint is the largest in the world, having a coinage capacity twice that of Philadelphia and thrice that of the English Mint.



## Mining Directors and Superintendents.

When people employ mining engineers to carry on their work for them they should first look out to get a good one, and then not try to tell him how to do what he is employed to do. If he is inefficient, let him go and get another. But it is unjust for people in the city to criticize harshly all that is done at the mine, with the idea that they know better than the engineer who is on the ground. It is a common fault with directors of companies to think, because they are directors (by virtue of owning a certain amount of stock), that they know more about the details of the mine and mill than the superintendent himself. Many a promising mining venture has been wrecked by too much "bossing" from the city office. It is especially the case where mines are at a distance from business centers, where conditions are essentially different, that the superintendent knows better what to do than the directors.

Oftentimes, if the superintendent reports everything just as the directors want, he is all right, but should he happen to differ, and offer any advice, he is "hailed over the coals" and often abused unjustly. The *London Mining Journal* has a sensible paragraph on this subject, as follows:

Directors of mines who have no experience of the working and management should not ignore the opinions and judgment of experienced men whose business it is to give honest advice or opinions, even if they are at times unpalatable. Mining management is no plaything for amateurs to try their pretence hands at other people's expense. Our best mining engineers have gained their experience and practical knowledge by hard work themselves and at their own cost, which is a very different thing from theorizing at other people's. Directors of mining companies who are intrusted with the expenditure of shareholders' capital have no right to ignore the opinion of experienced engineers as to management of mines, but are in duty bound to give heed to honest advice, whether palatable or not. Most of the failures of gold-mining companies in England have been traceable to the fact that the directors had no knowledge of the work to be done, or how to do it, and preferred the appointment of inexperienced friends as officers or those who would promise big results; and also from the overweening vanity of men who puffed themselves into great importance through being dressed with a little brief authority. The most important appointment that a board of directors can make is that of their consulting engineer, by whose opinions, if he is a competent man, they should be guided. What is the use of half a dozen inexperienced directors attempting to override the opinions of their engineer, as is so often done? Scores of cases might be referred to where time, capital and labor have been disgracefully wasted by directors and shareholders through their ignoring the honest advice of experienced miners. It must be understood that shareholders of companies, who are often loud in complaint through the press, and are marvelously dumb at a meeting, are much to blame for not insisting on more publicity of the doings of their company. There is no necessity for so much secrecy in or about gold mining, for where there is much secrecy there must be something underhand; the more light there is let into all mining transactions the better for the industry and those connected with it.

**A TINY ENGINE.**—A small but very interesting article in the mechanical exhibit of the fair is the diminutive horizontal engine constructed by Constant Anger, a watchmaker's apprentice, of this city. It is run every evening at the east end of the gallery, by its youthful constructor, developing about 10 indicated fly power. It covers a space about two inches long, and its tiny rods perform their functions with a gravity and correctness worthy of an engine of larger growth.

SOMEHOW or other every new development of ore in the mines of this or any other camp is always reported as the richest ever discovered in the camp.—*Tombstone Democrat*.

## At the Mechanics' Fair.

A stroll through the machinery department of the Mechanics' Fair does not give the visitor such an idea of the mechanical advancement of San Francisco as those interested in it would wish. Not a single one of the large foundries of this city, for instance, is represented in a special display. What there is on exhibition is very good, but there are too few articles. The chief metropolis of the Pacific Coast ought to do much better in this direction than it has.

The Dow Steam Pump Works have a very creditable exhibit of the various patterns of pumps made. Several of these are of special style and all are of original design. Most of them are constructed under the patents of Mr. Dow. These works have gained an enviable reputation for their different pumps, which are now largely used all over the coast.

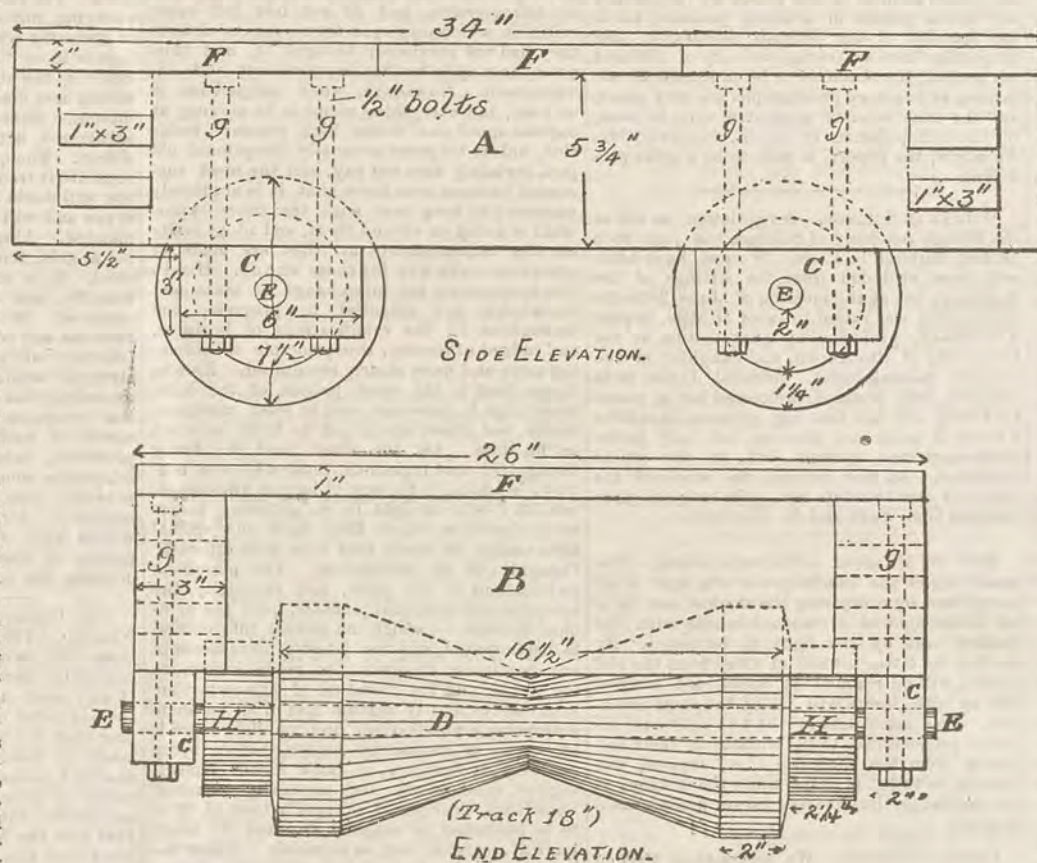
The Hendy Machine Works exhibit several patterns of steam engines, one of which was described and illustrated last week.

Ohmen's horizontal and vertical engines, built in this city, also attract attention. The Ohmen-Simmons automatic cut-off has proved itself superior and is well known here.

Thomson & Evans show their deep-well pumps, duplex steam pump, fly-wheel pump, etc. This firm has been in business here for

two or more strokes of the bit are made very easily. The rotation of the drill is automatic and there is a self-feeding attachment. There is no intermediate obstruction to the descent of the drill bar, so the entire force exerted upon it is utilized at the moment the bit strikes the rock. The power is so applied that there is no rebound. The drill can be worked vertically or horizontally or at any angle. The smaller one can be run by one man and the larger by two. We shall shortly give a complete description of this new hand-drill, which has many excellent features to recommend it to our mining community.

An interesting feature in the department of mining machinery of the Mechanics' Fair is the exhibit by S. B. Paige & Co., of the Golden Gate rock-breaker, and also a granulator constructed on similar principles, which is intended to perform the same work as a stamp battery in reducing ore to the requisite fineness for charging into pans, "concentrating," etc. The machines attract much attention from the ease and rapidity with which large lumps of hard quartz can be pulverized to pass through a No. 40 to 60 screen. The plant designed to work 60 tons of ore in 24 hours consists of one rock-breaker and three granulators, the cost of which is stated to be about one-third that of a stamp battery of similar capacity.



THE "MONTANA" MINING TRUCK.

## Saw Dovetailing.

Among the latest and most meritorious improvements in wood-working appliances exhibited at the Mechanics' Fair, are the dovetailing machines at the stand of Ciprico & Marias. They are built from the designs of L. P. Garsin, of this city, and embody many novel features. One machine is designed expressly for cutting a dovetail groove around the edges of windows and doors for the insertion of weather-strips. The cutter used is a small circular saw, to which is given an angular, oscillating motion, independent of its rotary motion. The teeth of the saw cut the groove, and at the same time oscillate on an axis which coincides with the center of the saw, and a wedge-shaped round bottom groove is the result. For making dovetails, where a straight bottom is required, the work is run through a machine which has two saws mounted at opposite angles in a frame, to which a reciprocating motion is given. The dovetail tenon is produced by revolving knives. After the first cut the angle of the table is reversed and the tenons finished to the proper angle. By this ingenious device angular dovetailing of any variety can be produced.

There is exhibited at the same stand a device which can be applied to large wine casks by which any waste of wine is avoided when necessary to change a plug for a faucet, when it is desired to draw off the contents of the cask. Many other mechanical novelties owned by this firm are exhibited.

## Developing Mines.

Of course there are many instances where prospectors find mines which they have no means whatever to develop, and have to sell for what they can get. But there are many men owning claims who could go to work and develop them into mines by mere hard work, as settlers in new countries take barren land and make of it a profitable farm. In this State, where the necessities of life are cheap, and the country is well settled, men can work for wages part of the time, and with their savings during that period, start and work their mines for a number of months. But a good many seem to prefer playing at mining rather than really mining. Simply owning a claim and holding it does not make a miner.

All over this coast there are hundreds of mines which might make their owners rich if they were worked. But too many want to sell, and it is difficult to sell mere prospect holes in these days. In more prominent camps this is better understood than in newer and smaller ones. An illustration of this is given by the *Leadville Herald-Democrat*, which says:

The manner and vigor with which mining properties are opened in Leadville presents a queer contrast, when compared with operations in the smaller camps. Leadville people develop their claims with a view to working them for practical results and making a profit out of the ore extracted. If the vein is small, or low grade, they will follow it up and at once determine its value or worthlessness. A property only partially opened is not considered a mine, and is either made a mine or abandoned as worthless. There is no plodding, tinkering work, calculated to prolong the agony and possibly secure a chance to dispose of it to some tenderfoot. The history of the Silent Friend mine at Monarch finds no parallel here. The owners of the Silent Friend held this property for years, with a slight showing of ore, demanding an exorbitant price. They were afraid to develop the resources uncovered, and hesitated to sell when a good offer was made them. Finally they preferred to take \$13,000 for a property having \$10,000 in sight, rather than do a little work and prove its value of \$100,000. Some of the Red Cliff, Ten Mile and other mines are worked on the same plan. People delay the development of the apparent resources in their properties, and sit waiting for some one to buy them at prices that the mine should be worth, providing the existing showing continues as it should. They are afraid to prove up, and are often foolish enough to think that some one will assume the risk for them. The only instances of sales under such conditions are when an experienced man, who can see further in the ground than the majority, recognizes features that others have failed to observe, and then he usually buys at a song, when, if previous work had been done, he would have paid a handsome price. The owner of a mining property cannot pursue a more foolish policy than to defer the development of his property, when the expense incident can be recovered from the ore extracted. If the discoverer or owner of a mine shows no confidence in its future, strangers cannot certainly be expected to believe in its alleged uncovered resources.

## A Cheap Truck for Mining Purposes.

Mr. E. C. Van Blarcom, of Oakland, but now at Helena, Montana, sends us a sketch of a cheap truck for mining purposes, which he came across in Montana. He calls it the Montana truck.

The frame of the truck is made from 3x6-inch stuff mortised together, as shown in the drawing, the tenon being on the cross pieces, B, as shown in the cut.

Four hardwood blocks, C, 2x3 inches by 6 inches long, are bolted to the frame with one-half-inch bolts, g, as shown in the drawing.

The top of the truck is covered with inch boards, F.

The wheels or rollers, D, are made from a piece of 7 1/2-inch round stuff dressed down to the dimensions given in the drawings.

The gudgeons, E, can either be made of pieces of hardwood, dressed to about 1 1/2 inches in diameter and let into suitable holes in the roller, or they may be made of one-inch round iron. Bearings are bored through the hardwood blocks, C, to accommodate the gudgeons. For a good, stout car the gudgeon should be a one-inch round bar, passing through the entire length of the roller, and long enough to give a good bearing in each one of the hardwood boxes.

The bearing surface, H, of the roller can be reinforced with a band of one-fourth-inch hoop iron. The ends of the band should be brazed together. This truck will run on any ordinary track.



## SCIENTIFIC PROGRESS.

**POSITIVE AND NEGATIVE ELECTRICITY.**—Dr. Wachter, of Vienna, has recently communicated to the Academy of Science in that city a paper in which he attempts to prove that, contrary to the generally accepted belief, crediting positive and negative electricity with absolutely analogous properties differing only in sign, there are between them many points of diversity. He maintains that the properties of the two electricities are totally different, and these differences manifest themselves in regard to (1) equipotential surfaces, (2) direction of movement, (3) magnetic, (4) thermic, and (5) optic properties; also (6) in regard to the substances electrified. Dr. Wachter treats only of the first and second headings. He asserts that in conductors of great specific resistance the point where the potential has a mean value lies, not midway between the extreme ends of the conductor, but somewhat nearer the negative end. If equal quantities of positive and negative electricity accumulate respectively on two conductors of equal size, the potential, measured by means of an electrometer, has a greater value, irrespective of the sign, on the positive than on the negative conductor. The electric mill revolves in the direction of the flow of positive electricity, which proves that the movement of the molecules of air around a positive and negative point is different. The appearance of the discharge from such points is also different, indicating an inequality in the equipotential surfaces.

**ELECTRIC MOTORS IN MINES.**—Electricity has for some time been employed by the Trafalgar Colliery Company for underground ventilating and pumping with so much success that it was resolved to extend the use of this agent also to its underground railroads. In Germany there are several collieries so worked, but in these cases the current was sent to the locomotive by fixed conductors. In the Trafalgar colliery the electric locomotive carries its own stores of current with it in a series of accumulators, the weight of which represents so much useful adhesive weight on the rails. Where the underground lines have sharp curves, haulage of trains by wire ropes presents great difficulties, and horses are generally employed. This locomotive has been designed by Mr. A. Reckenzaun, and has been in use for several weeks. The construction of the motor and driving gear is similar to that adopted in electric street cars, but the conditions to be satisfied were widely different and more difficult than those obtaining in an ordinary tramway. The space is very limited, and since both sharp curves and heavy gradients occur at frequent intervals, it was somewhat difficult to stow away the necessary power in so limited a space. Within the narrow gauge of two feet seven inches, and an extremely short wheel base, there had to be arranged an electro-motor of 8 horse power, with suitable gearing brakes and attendant details.

**THE SIZE OF A SPIDER'S THREAD.**—Although it is generally known that a spider's thread is exceedingly fine, still very few have any adequate idea of its extreme minuteness. If we take a hundred spider threads and combine them into one and place the combined threads across the field of a microscope, and then place by its side a single human hair of ordinary fineness, the latter will appear of much larger diameter. Indeed, some have asserted that if 100 spider threads, so multiplied, could be closely spun into one, it would not present a greater diameter than a single human hair—the latter would in such a case be equal in size to 10,000 spider threads. If to this we add the well-known fact that the thread of the full-grown spider must be two or three hundred times larger than that of a young spider when it begins to spin its first threads, we have the astonishing fact that the ordinary human hair must be from two to three million times larger than the finest thread of the spider. We should also remember that every spider thread is composed of from five to eight separate filaments, as they come from the body of the insect. What incredible minuteness, and how little do we know of the works of Nature!

**UTILIZING THE HEAT OF THE SUN.**—With a view of utilizing the heat of the sun, which is a source of power and warmth, investigations are still going on in several countries among scientific men, more especially in France and in this country. One of the most interesting and practical methods in this direction is that devised a little while ago by Prof. Morse, of Salem, Mass., the limitations of which, it is hoped, may be overcome by future improvements. The device consists simply of a shallow box, the bottom of which is of corrugated iron, and the top of glass. This is placed outside the building in such a position that the sun shines directly upon it, the heat rays of the sun pass through the glass and are absorbed by the iron, heating it to quite a high temperature, and by a system of ventilation a current of air is passed through the apparatus and into the room to be heated. By this means the air was heated, on pleasant days, to about 90 degrees by passing over the iron.—*Boston Journal of Commerce.*

**A LAYER OF COAL.**—According to the calculations made by a scientific writer, lately, it requires a prodigious amount of vegetable matter to form a layer of coal, the estimate being

that it would really take a million years to form a coal bed 100 feet thick. The United States has an area of between 300,000 and 400,000 square miles of coal fields, 100,000,000 tons of coal being mined from these fields in one year, or enough to run a ring around the earth at the equator  $5\frac{1}{2}$  feet wide and  $5\frac{1}{2}$  feet thick, the quantity being sufficient to supply the whole world for a period of 1500 to 2000 years.

**EARTH TEMPERATURES.**—A remarkable example of the increase of temperature in the earth toward the center has been presented at Pesth, where the deepest artesian well in the world is that now being bored for the purpose of supplying the public baths and other establishments with hot water. A depth of 3120 feet has already been reached, and it furnishes 176,000 gallons daily, at a temperature of 158° F. The municipality have recently voted a large subvention in order that the boring may be continued to a greater depth, not only to obtain a large volume of water, but at a temperature of 176° F. It is suggested that it is thus within the bounds of probability that the time may come when a brewer will obtain his water supply from a well of sufficient depth to yield "liquor" at the mashing temperature.

**BALLISTIC PHOTOGRAPHY.**—It is said that Krupp, of Essen, is making preparations to make extensive use of the photograph in the solution of some important ballistic operations. He is to employ an expert who will devote his attention chiefly to taking photographs of projectiles in transit, the recoil of gun carriages, the penetration of armor plates by projectiles and similar phases in artillery practice, all in the interest of the German Admiralty. As projectiles have an average velocity of 1500 feet per second, the obstacles to be overcome in obtaining satisfactory photographs are very great, and the most delicate apparatus must be used, in the manipulation of which, however, Mr. Anschütz, the expert, is said to be a great proficient.

**WOMAN IN SCIENCE.**—A regulation as old as the French Academy of Sciences has just been broken through in Paris. Women have hitherto been excluded from the sittings of the Academy, but at the meeting of June 28th the interdiction was raised in favor of Mlle. Sophie Kowlewska, professor of mathematics at the University of Stockholm, and daughter of the eminent paleontologist. Admiral Jurien de la Graviere, who presided, welcomed her in graceful terms, and said that her presence should be a cause of pride and pleasure, not only to the mathematicians present but to the whole Academy. As she entered, the whole of the members rose to salute her. She took her place between Gen. Fave and M. Chevreul.

**HOW TO MEASURE A CANDLE-POWER.**—The measuring of the candle-power of a light is accomplished by comparing the shadow cast by a rod in the light of a standard candle with the shadow cast by the light to be tested. By moving the latter toward or away from the rod a point will be reached at which the shadow cast by both lights will be of the same intensity. The intensities of the two lights are directly proportional to the squares of their distances from the shadows, i. e., suppose the light to be tested is three times the distance of the candle, its illuminating power is nine times as great.

**FLUTED CARBONS.**—We understand that in England a new form of carbons has been brought out for arc lighting. These are held to give a higher efficiency than the ordinary cylindrical pencils now used, and to be especially applicable to the electric illumination of lighthouses. The carbons are fluted down the sides, and are made in molds and baked, much in the same way as ordinary cylindrical carbons. The greater efficiency is mainly due to the fact that the new carbons do not "crater" at the points, and hence there is not the same loss of light from that cause as occurs in the round carbons. Many experiments have been made with them with good results.

**HOW TO SEPARATE THE LAYERS OF INSECT'S WINGS.**—A wing that has never been dried is placed in 70 per cent alcohol, then into absolute alcohol, and after a few days' immersion into turpentine. After remaining a day or two in turpentine, the specimen is plunged suddenly into hot water, when the conversion of the turpentine into vapor between the two layers of the wing so far separates those layers that they can be easily parted and mounted in the usual way, as microscopical preparations on a slide.

**HIGHT OF TWILIGHT.**—By observing how far the sun has to sink beneath the horizon before the topmost summit of the air is cut off from its rays, Mons. Bravais, some years ago, determined the greatest upward limit of twilight to be 378,000 feet, or nearly 71 miles above sea-level. By observing the earth's shadow on the moon during eclipses, astronomers had inferred that the atmosphere must be sufficiently dense to produce twilight for at least 240,000 feet away from the earth's surface.

**GLACIERS.** the ice-rivers of lofty mountains, have been found to move downward from one or two inches to over 50 a day, from 10 to 20 inches a day in summer being most common. The rate in winter is about half that of summer.

## MECHANICAL PROGRESS.

## Modern Progress.

With the tendency to rapid progress and improvement so characteristic of modern times, says the *Mechanical World*, when one discovery follows so rapidly upon the heels of another in almost every branch of applied science, and when one invention has barely time to establish its claim to pre-eminence ere it is superseded by something newer and better, there is fortunately a growing disposition on all sides to communicate and disseminate useful information as widely as possible. Exceptions there will, of course, always be found to every rule; and although some firms with specialties of manufacture may be here and there met with, who are very jealous of any outsider knowing how they conduct their business, yet as a rule it will be found that those who are the most unwilling to communicate information to others are those who have least to boast of. While formerly it was the rule to work almost everywhere with closed doors, all strangers being jealously excluded, we now find that those firms who possess well-ordered shops, fitted up with every modern improvement in the way of machinery, tools, etc., are nowadays only too proud to show visitors over their establishments, and the principals take pleasure in pointing out and enlarging upon the merits and excellence of special machinery, and in showing how rapidly and with what excellence their goods can be produced. They have learned that isolation means stagnation or retrogression, and do not fear but court criticism which may open their eyes to defects they had not previously thought of, and thus pave the way to further improvement and advancement. Nowadays, when competition is so keen, and everything seems to be moving at express speed and under high pressure, isolation, unless for some unusually exceptional object, certainly does not pay, and the most successful business men know that it is absolutely necessary to keep pace with the times—know what is going on around them, and adopt really sterling improvements as they are made, or otherwise make way for those who do. Hence, free intercourse, the interchange of ideas and knowledge, are essential to progress, and throughout all the ramifications of business, and indeed of society, this principle is becoming more and more clearly recognized. He who knows least is the most jealous of the little knowledge he possesses, and is least communicative, lest others should get to know as much as he does. On the other hand, the really thoughtful and ingenious, those who are continually adding to the sum of human knowledge, are they who delight in enlightening others on any point on which they have any special information, or which they have with difficulty thought out for themselves. The periodical publications of the press, and especially the scientific and technical journals, form the principal medium by which the newest information is disseminated, and the latest achievements in any particular direction are made known to the world; and the literature of our own time is nowadays mostly written first of all for some enterprising publication, and published week by week, or month by month, before being made up, as formerly, in book form. Knowledge of most kinds, and especially technical knowledge, is acquired so rapidly that if it is to be published as original it must be made known almost as soon as acquired. Hence the proprietors of enterprising journals are always on the lookout for specialists, or for any who have the reputation of being particularly knowing on subjects on which information is required, or who have exceptional opportunities and facilities for acquiring experience.

**AFRICAN BLACKSMITHS.**—In a recently-published account of a journey to Kilimajaro, Africa, H. H. Johnson describes the natives of some parts of Africa as clever smiths, who forge all kinds of tools, arms and decorative articles from pig iron, which is brought from the country of Usanga, near Lake Jipe. The forge consists simply of a pair of goat-skin bellows, converging into a hollow cone of wood, which is supplemented by two segments of stone, penetrated through the center and terminating in a stone nozzle, which is thrust into the furnace of charcoal. "The bellows," he says, "are kept steady by pegs thrust into the ground, and a huge stone is often placed on the pipe to keep it firm. After the iron has been heated white hot in the charcoal, it is taken out by the iron pincers and beaten on a stone anvil." The Chaga smiths, we are told, not only make spear-blades and knives of apparently tempered steel but can fabricate the finest and most delicate chains. The "pig iron" used by these natives is, of course, a very different metal from that which is termed pig iron in this country and Europe.

**SIMPLIFICATION OF MACHINERY.**—Complexity in a machine is always, if possible, to be avoided. The user, who often is not a practical machinist, finds himself in frequent difficulties owing to the mechanism getting out of order, and is caused delay, inconvenience and expense in having the necessary repairs executed. This is a point which has of late years been kept in view by our leading engineers, who work on the basis that the more simple a machine the more satisfactory it is. The *American Machinist* in this connection points out that machines as first constructed are usually more or less complex,

and invention plays a prominent part in simplifying as in originally creating the device. It often happens that when other heads study the machine they are able to improve it by dispensing with a large quantity of the mechanism required by the inventor to perform a given action. A button-hole machine of very complicated design was recently presented to a machine manufacturer, with the request that he should bid for a contract to make the machines in quantity. It was stated to the writer, by the manufacturer in question, that should he contract to make the machines, about one-half the present complicated mechanism of the machine would at once be discarded, yet all operations now performed by the machine would still be executed. In another case, by the same manufacturer, three machines were required to do, in three distinct operations, certain work on articles made of sheet tin. By the simplifying method, two machines were dispensed with, and all three operations performed practically at the same time by one machine. These methods are the true ways of reducing cost of manufacture. It may be also added that true invention as applied to machinery lies not in scheming out a complicated mechanical device for performing given operations, but in reducing the whole matter to its lowest mechanical terms.

**IS IRON TO BE SUPERSEDED?**—Iron is the foundation of the civilization of to-day, the indispensable condition of all commerce and manufacture, without which no industry could exist an hour. Probably none of us have ever imagined that another state of things was possible. Yet there comes a man of science prophesying, not an iron famine, but a new king of industry who expects to depose King Iron. Iron is to be "as completely superseded as the stone of the aborigines." Certainly there is a strong case made out for the new metal—aluminum. First, it is the most abundant of all substances, with the exception of oxygen and silicon. The question has hitherto been how to separate it from the compounds, but no American will doubt that, being in the earth's crust, it can and will be got out when it shall be demanded. Aluminum is light as chalk, malleable as gold, tenacious as iron, and harder than steel. It is soft when ductility, fibrous when tenacity, and crystallizes when hardness, are required. It neither rusts nor tarnishes, is tasteless and odorless, makes numerous and satisfactory alloys, has bulk without weight, strength without size, and conductivity far exceeding that of iron. Its use will open limitless prospects in all directions. All departments of building, furnishing and utensils, plumbing, bridges, railways, steamships and telegraphs would be revolutionized, and transportation gain incalculably in speed, safety and economy. Already the price has been brought within reach of the manufacturing arts, and the process of increasing the production and decreasing the cost is constantly going on.—*Er.*

**GAS CHEATING—AN INVENTION GREATLY NEEDED.**—The great desideratum, says a contemporary, is a good and true gas meter that cannot be manipulated by the gas company. It may seem easy to measure gas; theoretically, the gas meter of the day is an automatic measurer that won't record an error and cannot be made to deceive. But many people believe that as a measurer, good and true, without partiality or favor, the meter of the day is wholly unreliable—that is, on the consumer's side. Just now the New York people are greatly excited over this matter. It is alleged that the cheaper the gas per 1000 feet the higher the consumer's bills. Nor is this mere assertion, because abundant facts are adduced to prove the statement. So some method or plan is getting to be urgently demanded that will do justice to consumer and manufacturer.

Right at this line the developments before the late Senate Committee about the Washington Gas Light Company are somewhat startling. It is asserted that only about \$50,000 was paid in to make the capital of this company some 30 years ago, and yet for years it has been paying enormous dividends on millions of capital! The true inwardness of this financial success is asserted to be a skilled knowledge of the proper methods of mixing coal and water gas and forcing the compound through the meter. Evidence was adduced before the committee to show that the result complained of in New York was reached in other localities—the cheaper the gas the higher the consumer's bills.

**LARGE PLANING MACHINE.**—Messrs. Killock & Galbraith, engineers, Glasgow, Scotland, are at present constructing a planing machine which is said to be the largest of the kind ever made. When finished, this machine will weigh 35 tons, and it is to be capable of planing the edge of a plate of 38 feet in length by five feet wide. It is specially intended to be employed in connection with the preparation of steel plates for the girders of a railway bridge which is about to be erected across a river in New South Wales.

**A NEW TELEGRAPH WIRE.**—As is generally known, compound telegraph wires consist of copper deposited upon iron and steel. A wire, however, is now being brought out in England in which the relation of the two metals is reversed, the steel surrounding the copper. The wire is said to be drawn from compound metal consisting of a hollow ingot of steel filled with copper.



## ENGINEERING NOTES.

## A New Boat-propelling Device.

We are indebted to the *Albany Journal* for the following description of the propulsion of a boat by gas generated from crude petroleum: The principal feature of the engine is that it dispenses with a boiler and burns crude petroleum instead of coal, and that it is run by hydro-carbon gas, generated by the petroleum with condensed air. In the case of the engine particularly described, there was no complicated machinery to get out of order, and the machine ran very easily. It was seen on board a small boat on a trip up the Hudson river, and described as follows: The engine proper is all inclosed in an oblong drum in the center of an engine-room. This drum is a heavy cast-iron shell 40x21 inches, inclosing two cylinders, each 15x15 inches. Each of the cylinders is inclosed by a jacket, and the space between it and the jacket is kept full of cold water. In the middle of the top of the drum is what is known as the fire chamber, with valves opening into the cylinders. In this chamber is a perforated metal disk which is covered with a kind of wicking. This wicking is supplied with oil from a tiny supply pipe that admits a few drops at a time. Another supply pipe of similar dimensions admits the air from a neighboring tank. When the fire is to be started, a small lever at the side of the chamber is pushed to one side, disclosing a vent, to which the light is applied. There is no waiting to get up steam, for as soon as the fire is lighted the engine is ready to start. The cylinders are connected with the propeller shaft by cranks from the bottom. At the side of the engine-room are the oil and air tanks. Of the former, there is one having a capacity of 60 gallons. Of the latter, there are three—two reserves and a working tank. A pressure of 90 pounds is kept on the air tanks. In the engine-room are two long levers. By using one the boat is started ahead. By the other the engine is reversed, and when neither is touched the engine runs free without turning the propeller. The connection of the shaft with the propeller is by a friction clutch, which is thrown on or off by the movement of the levers. With everything in perfect condition, the engine running at full speed makes 112 turns of the propeller per minute. The pistons are driven by the expansion of the hydro-carbon gas precisely the same as by steam, and not by the explosion of the gas. The gas exhausts into a large tank in the stern, which causes a hoarse, coughing sound.

## New Canals in Russia.

Russia seems to be very active in improving the various routes of communication between the different and more distant points in her vast domain. Where railroads are impracticable or too expensive, canals, with improved means of canal transportation, are provided. A new canal, improving the water communication between the Caspian and the Baltic, was opened by the Minister of Ways of Communication, Gen. Possiet, recently. The canal, which has cost \$1,500,000, joins the rivers Wyhegra and Kovja, and forms a fresh link in the chain of waterways connecting the Neva with the Volga. Its length is 15 miles, width 70 feet, and depth seven feet. Some of the cuttings through which it runs had to be excavated to the depth of 30 feet. Most of the work has been done by hand, upward of 20,000 laborers having been employed in the undertaking, together with three dredging machines, nine stationary engines and two locomotives.

Compared with the rest of the vast canal system between the Neva and Volga, the new link was neither an extensive nor a formidable undertaking, but it has relieved the pressure of traffic on the other canals, and shortened the distance from Rybinsk to St. Petersburg.

It is noteworthy, says *Engineering*, that in spite of the development of the Russian railway system the traffic on the canals shows no sign of diminution, a phenomenon quite the reverse of what has occurred in England. This is to be explained, perhaps, by the fact that distances are greater in Russia, while the canals are more like rivers than the narrow waterways common to England.

Barges on Russian rivers and canals range in length from 100 to 300 feet. The cargoes a large proportion of them carry are as large as many an ocean cargo; and instead of being mere lighters, carrying only portions of cargoes, they are to all intents and purposes the counterparts of ocean-going ships.

THE HENNEPIN CANAL SCHEME for connecting the Great Lakes with the Mississippi river has received a lift by the passage of a bill by the United States Senate, appropriating \$300,000 toward the proposed work. The scheme is for the opening of a waterway between Lake Michigan and the Mississippi river by the construction of some 75 miles of ship canal and the deepening of the existing Illinois and Michigan canal and a portion of the Illinois river. As the entire cost is estimated at from \$6,000,000 to \$8,000,000, the appropriation will not insure its very speedy completion.

HIGH-SPEED SHIPS.—Sanguine engineers are predicting that steamships will soon be built which will be able to make from 40 to 50 miles an hour.

## USEFUL INFORMATION.

A LUBRICANT FOR BRASS WORK.—Writing to *Nature* regarding various fats which are used to smooth and bind the surfaces of various kinds of apparatus, such as air-pumps, stop-cocks, etc., Mr. H. G. Madan says: "Melted india rubber answers fairly, but it has too little 'body' and too much glutinosity; moreover, it does, undoubtedly, in course of time, harden into a brittle, resinous substance. Vaseline is quite without action on brass, and never hardens; but it has not sufficient tenacity and adhesiveness. A mixture of two parts by weight of vaseline (the common thick brown kind) and one part of melted india rubber seems to combine the good qualities of both without the drawbacks of either. The india rubber should, of course, be pure (not vulcanized), and should be cut up into shreds and melted at the lowest possible temperature in an iron cup, being constantly pressed down against the hot surface and stirred until a uniform glutinous mass is obtained. Then the proper weight of vaseline should be added, and the whole thoroughly stirred together. This may be left on an air-pump plate for, at any rate, a couple of years without perceptible alteration, either in itself or the brass."

IMITATION VERMILION.—An imitation product, which for all practical purposes may replace the genuine one, may be prepared after the following formula: Dissolve in warm water, previously made weakly alkaline by the addition of a small quantity of soda, from 3 to 10 kilos. (6.6 to 22 pounds) of eosine (the quantity used must be regulated by the price which the product will bring). To this solution (which should properly contain about 5 kilos. of water to 1 kilo. of eosine) should be added, with constant stirring, 100 kilos. of the finest red lead (minimum). To this should be added from 3 to 12 kilos. of acetate of lead or nitrate of lead dissolved in warm water (the quantity of red lead must be gauged by that of the eosine). The mass is now filtered, the moisture expressed by a suitable press, and the press cake cut into small pieces and rapidly dried, preferably in a drying-chamber, specially provided. After thoroughly drying, the product is finely ground and sieved, when it is ready for use.

THE ADHESIVENESS OF IRON OXIDE CEMENT.—One of the most adhesive and durable of cements for uniting iron surfaces is found to be the oxide of iron itself. With this a joint can be made so perfect and sound that the iron will break before the cement will part. As an illustration of this statement the fact is cited that, in removing the cast iron pipe of a bilge pump from a ship that had made four Atlantic voyages, it was found necessary to take the sections apart; the flanges had been pasted with a cement of cast-iron drillings and filings mixed with sulphur and sal-ammoniac moistened with water; then the nuts, three in each flange, were set up on the bolts, and the union was completed. The four voyages occupied nearly a year, and, on the separation of the parts being attempted, even the cold-chisel failed to make a division between the solid castings and the cements that intervened.

HOW TO GRASS A BANK.—There is a German method to grass a bank. For each square rod to be planted take one-half pound of lawn grass seed, and mix it intimately and thoroughly with six cubic feet of good dry garden earth and loam. This should be placed in a tub, and liquid manure diluted with about two-thirds of water added and well stirred in, so as to bring the whole to the consistency of mortar. The slope must be cleaned and made perfectly smooth, and then well watered, after which the paste just mentioned should be applied with a trowel and made as even and thin as possible. Should it crack from exposure to the air it must be again watered and smoothed up day by day until the grass makes its appearance, which will be in from eight to fourteen days, when the whole declivity will soon be covered with a close carpet of green.

BAY WINDOW CARS.—About a quarter of a century ago the railroad which was then known as the New York & New Haven Railroad built three passenger coaches with bay windows. It was thought that these bay windows would prevent people from extending their heads out of the car, and thus prevent injuries to passengers. This object was accomplished, but the glass in these windows broke so often that repairs had to be made almost every day. Consequently the three cars were discarded by the company and sold. One of these cars is now doing duty as a match factory near the railroad junction at Saybrook, Conn. The timbers of the old car are still sound.

GREEN VARNISH FOR METALS.—For a green transparent varnish for metals grind a small quantity of finely powdered chromate of potash (it requires the most elaborate grinding); add a sufficient quantity of copal varnish thinned with turpentine. The tone may be altered by adding more or less of one or the other ingredients.

STRETCHING EMERY CLOTH.—An ingenious device for stretching emery cloth for use in workshops consists of a couple of strips of wood about 14 inches long, hinged longitudinally,

and of round, half round, triangular, or any other shape in cross section. On the inside faces of the wood strips are pointed studs, taking into holes in the opposite side. The strip of emery cloth is laid on to one set of the studs, and the file, as it is called, closed, which fixes the strip on one side. It is then similarly fixed on the other side, and thus constitutes what is called an emery file, and which is a handy and convenient arrangement for workshop use.

HOW TO TIN CLOTH.—A mixture of finely pulverized metallic zinc and albumen, of about the consistency of a thin paste, is spread with a brush upon linen or cotton cloth, and by means of hot steam coagulated. The cloth is now immersed in a bath of stannic chloride, well washed and dried. Running the cloth through a roller press, the tin film is said to take metallic luster. Designs cut in stout paper, letters, numbers, etc., when laid between cloth and roller, are impressed upon it. It can also be cut in strips, corners, etc.

TO CONSTRUCT A RAIN GAUGE.—Take a glass tube of suitable diameter and length, close the lower end with a cork, covered as inserted with melted sealing wax. Then set it in an upright position away from houses, preferably on top of a post. Fit a tin funnel to its top and divide it, making the divisions in the ratio of the squares of the diameters of the tube and funnel mouth. Thus, if the funnel is 3 inches, then magnify the division in the ratio of  $3^2$  to  $\frac{1}{2}^2$  or as 9:25-64=576:25 or 23:1 nearly.

LUSTROUS POLISH FOR CABINET WORK.—A fine, lustrous polish for delicate cabinet work can be made as follows: Half pint linseed oil, half pint of old ale, the white of an egg, one ounce spirits of wine, one ounce spirits of salts. Shake well before using. A little to be applied to the face of a soft linen pad, and lightly rubbed for a minute or two over the article to be restored, which should be first rubbed off with an old silk handkerchief. It will keep any length of time if well corked.

FITTING KEYS.—Fitting a key, says the *American Machinist*, is a good test of a working machinist's ability. Set 50 men to fitting 50 keys, or splines to the same key-way. When they are all done, you will not find three keys which fit alike. A key must fill the hole completely, or it is useless. If it bears a ridge here, a lump there, or is full of small places, the key is of no use. Make a sliding fit on sides of key and driving fit on top and bottom for most purposes.

A NEW PATENT DODGE.—Persons in the Patent Office say there have been several cases in which the owners of an expiring patent have induced some other person to get up an interference and claim priority of invention. Then the first patentee made no defense, patents were issued to the new applicant, who immediately, in accordance with a prearranged plan, assigned his patent to the original patentee, who thus secured a 17-years' extension of his monopoly.

ARTESIAN WELLS were known at Thebes 2000 years before the Christian era.

## GOOD HEALTH.

## One Secret of Right Living.

A large number of professors of athletics or athletic professors met recently in the gymnasium of the Adelphi Academy, Brooklyn, N. Y., to teach the human race how to keep well and live forever. On the subject of physical exercise most people are fools. A man without a muscle is as bad off in this rough-and-tumble world as a man without a brain. Parents take pride in their children when their heads are packed like a pawnbroker's shop with all sorts of odds and ends of information, but they do too little to encourage the symmetrical development of their bodies. They forget that robust health constitutes about three-fourths of the problem of human happiness, and that it is criminal neglect of the boy and girl to keep them at their books until they lose all appetite for out-of-door sports.

Half the men in the world are broken down with dyspepsia and the other half are broken up with rheumatism. The women, who are not supposed to have any muscles, indulge in the luxuries of sick headache and neuralgia. A half hour's vigorous exercise in the morning before the business of the day begins, a brisk walk of a few miles, would sweeten the temper and make life worth living. Such is our physical condition, however, that if you should turn the gentlemen of Wall street into a gymnasium for an hour's torture with the parallel bars and 50-pound dumb bells and the inspiring trapeze, you would have to pick them up from the floor like chestnuts under a tree after a gale of wind. Our clerks, and their employers also, after a three-hours' trot on a hard road, with a leap here and there over a fence or ditch, would have to be brought home in furniture wagons and a large proportion of them deposited at the undertaker's. We have not yet learned the secret of right living. No man lives well who does not spend hours every day out of doors. We are asthmatic, rheumatic, spleeny, and hard to get along with at home because we believe in brains and not in bodies.—*New York Herald*.

A BLAST AGAINST BEER.—For some years a decided inclination has been apparent all over the country to give up the use of whisky and other strong alcohols, using as a substitute beer and other compounds. This is evidently founded on the idea that beer is not harmful, and contains a large amount of nutriment; also that bitters may have some medicinal quality which will neutralize the alcohol which it conceals, etc. These theories are without confirmation in the observation of physicians. The use of beer is found to produce a species of degeneration of all the organs; profound and deceptive fatty deposits, diminished circulation, condition of congestion and perversion of functional activities, local inflammations of both the liver and kidneys, are constantly present. Intellectually, a stupor amounting almost to paralysis arrests the reason, changing all the higher faculties into a mere animalism, sensual, selfish, sluggish, varied only with paroxysms of anger that are senseless and brutal. In appearance the beer-drinker may be the picture of health, but in reality he is most incapable of resisting disease. A slight injury, a severe cold, or a shock to the body or mind, will commonly provoke acute disease, ending fatally. Compared with inebriates who use different kinds of alcohol, he is more incurable and more generally diseased. The constant use of beer every day gives the system no recuperation, but steadily lowers the vital forces. It is our observation that beer-drinking in this country produces the very lowest kind of inebriety, closely allied to criminal insanity. The most dangerous class of ruffians in our cities are beer-drinkers.—*Scientific American*.

DISEASED EGGS.—Dr. D. F. Wright, in the *Bulletin of the Tennessee State Board of Health*, says that soon after it became the practice to transport eggs in large quantities and to long distances by railway trains, it was found on their arrival that adhesion had taken place between the membranes of the yolk and those of the shell, so that the yolk could not be turned out of the shell unbroken. On examination by experienced pathologists, this was found to be the result of true inflammation; the material of the adhesion was found to be precisely the same as that of the plastic exudation in inflammation of the lungs or bowels. It will at first seem absurd to speak of inflammation in such an unformed mass as an egg; but this arises from our forgetting that structureless and unorganized as it seems to be, the egg, even when fresh laid, is a living being, and capable of disease from external causes. The cause of this inflammation is the shaking and friction which it suffers from the motion of the cars. Such inflammation cannot fail to render the egg more or less unhealthy and not as salutary for food as those that are freshly laid and have not been subjected to distant transportation.

WONDERS OF DIET.—The Roman soldiers, who built such wonderful roads and carried such a weight of armor that would crush the average farm hand, lived on coarse brown bread and sour wine. They were temperate in diet, regular and constant in exercise. The Spanish peasant works every day and dances half the night, yet eats only his black bread, onion and watermelon. The Smyrna porter eats only a little fruit and some olives. He eats no beef, pork or mutton, yet he walks off with his load of 800 pounds. The coolie fed on rice is more active and can endure more than the negro fed on fat meat. The heavy work of the world is not done by men who eat the greatest quantity. The fastest and longest-winded horse is not the greatest eater. Moderation in diet seems to be the prerequisite for endurance.

SALT AND WATER FOR THE FEET.—If the feet are tender and painful after long standing or walking, great relief may be obtained by bathing them in warm salt and water. A handful of salt to a gallon of water as warm as can be borne is the proper proportion. The feet should be immersed and the water thrown over them with the hand, and also over the legs as far as the knees. When the water becomes too cool, dry the feet and legs, rubbing with a coarse towel upward. Neuralgia of the feet has been cured by perseverance in this method night and morning. It is also said that persons with weak lungs or bronchia, as well as weak throats, are wonderfully benefited by gargling every morning with strong salt and water.

TURPENTINE AS A REMEDY FOR LOCK-JAW.—Let any one who has an attack of lock-jaw, says an exchange, take a small quantity of turpentine, warm it and pour it on the wound, no matter where the wound is, and relief will follow in less than a minute. Nothing better can be applied to a severe cut or bruise than cold turpentine; it will give certain relief almost instantly. Turpentine is almost a certain remedy for croup. Saturate a piece of flannel with it and put it on the chest, and in a very severe case three or four drops on a lump of sugar may be taken inwardly. Every family should have a bottle on hand.

VENTILATING A ROOM.—According to Gen. Morin, the eminent French expert, the proper temperature in well-ventilated places is as follows: Nurseries, asylums and schools, 69°; workshops, barracks and prisons, 50°; hospitals, 61° to 64°; theaters and lecture-rooms, 66° to 69°. In dwellings in this country it has been the custom to keep the temperature at 65° to 70°.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**SUTTER CREEK.**—*Ledger*, Sept. 11: The Eureka shaft is stripped of everything. The pump was taken out and laid on the surface the latter part of last week; the shaft was then covered over and securely spiked down. A keg of beer and other refreshments were on the ground, and a jollification was had over the event. There are now two or three men at work tearing down the old 40-stamp mill. It will be quite a job, and will take about a month to complete it. It is said that everything is for sale, but whether the ropes and tools which would be indispensable in sinking a new shaft, or carrying on further operations, are included, I am unable to say. From the public rumors which are afloat, it looks as though the mine is to be permanently and totally abandoned. G. W. Horn has returned from the city and is again at work driving the tunnel in the Mahoney hill. The ledge has been struck, and it is likely they will not drift much further. They have an abundance of pay rock in sight, and the mill is likely to start at any time. A slight accident occurred at the South Spring Hill mine last week. The pinion of a spur wheel broke, thereby bringing everything at the hoisting works to a standstill for a few days. Everything is in running order again at this writing. We had pay day at the Lincoln this week, which helped to enliven the town for a few days.

## Butte.

**ANOTHER TUNNEL.**—*Oroville Mercury*, Sept. 11: We are informed that the Spring Valley Mining Company, at Cherokee, are about to commence operations upon another large tunnel. The intentions of the company are to start at some point in the main tunnel and run at right angles under the main mountain, where a large body of rich gravel is known to exist. The work will give employment to a large number of men.

## Calaveras.

**TO BUILD A MILL.**—*Calaveras Chronicle*, Sept. 11: The Banner sawmill, near El Dorado, has received a contract to deliver 150,000 feet of lumber to the mine formerly known as the Rathgeb mine near Fourth Crossing, the proprietors of which intend erecting a 30-stamp mill.

## El Dorado.

**FRENCH CREEK NOTES.**—*Republican*, Sept. 9: It seems that the Oro Fino mine is about to commence work at last. It is said that a part of the machinery is on the way and that men are being engaged to work. The Vandalla mine is at rest for the present.

**GARDEN VALLEY.**—The Lone Jack mine near this place is erecting a ten-stamp mill. Machinery is being delivered, and I am informed that the mill will be in operation within 30 days. The Taylor mine will commence taking out water to-morrow. The Hart mine is running a tunnel to cut the ledge, and work is progressing favorably. The Alpine mine is looking and prospecting favorably. Sulphurets are very high grade. Defiance mine is at work and paying a good margin. Sinking will be resumed on the Esperanza mine next week.

**LATROBE.**—Yesterday I paid the Big Canyon gold mine a visit. It was formerly known as the Oro Fino. The owners have been at work for some time past and have prospected the mine thoroughly. They have found a large body of ore 30 feet wide that will pay, and the best evidence is they have made a contract with the Union Iron Works, of San Francisco, for a 20-stamp mill with all the latest improvements; weight of stamps, 750 pounds. The contract calls for the mill to be completed in 60 days. Kennedy & Bargin, the owners of the mine, are both energetic and have worked hard to develop the property. They have also had quite a struggle in the courts, but still they go ahead.

**PURCHASED.**—*Placerville Observer*, Sept. 11: Ex-Governor Geo. C. Perkins, Hon. J. H. Neff, and other capitalists of this State, have purchased the northern extension of the Springfield mine, in Mud Springs township, and intend thoroughly prospecting it. Work has already been commenced, and those who know the members of the company have no thought but that they mean business. With the work being done at the Grand Victory, McNulty, Springfield and Springfield northern extension, it begins to look as if there was a mining boom near at hand.

**M McNULTY.**—D. W. C. Morgan, of San Francisco, is the new superintendent of the McNulty mine in Mud Springs township. This mine has been bought by a company of Eastern capitalists and it is intended to sink on it to a depth of, at least, 1200 feet. Not being able to get sufficient seasoned timbers in this county, a contract has been let to Towle Bros., of Placer county, who are now shipping timbers to Shingle Springs by way of Sacramento. Mr. Morgan is a mining man of large experience, who expresses the utmost faith that the McNulty will be one of the best mines in California. He thinks so at least to the extent of inducing his company to risk a \$50,000 plant on it.

## Inyo.

**RICH ORE.**—*Independent*, Sept. 11: A few days ago Domenico Galscia brought to Keeler a sample lot of 2200 pounds of ore, worth over \$400 a ton. The ore came from Beveridge district and was sent to Selby & Co., San Francisco.

**WHAT SAVES US.**—All that saves the silver mines of Inyo county from the ruin that has come upon the mines in Nevada and other States and Territories is that our ores carry a great deal of lead. The value of the lead added to the silver enables the miners of Inyo to work their mines, when ores that carry little lead, or none at all, cannot be worked except at a loss. All the mines of Inyo county are being worked as vigorously as ever, though of course at reduced profit. The mines make just as good a market for farm produce as before the recent heavy decline in the value of silver.

## Mono.

**GETTING READY.**—*Bodie Miner*, Sept. 10: The Bodie tunnel mill is getting in good shape to commence crushing ore and producing bullion.

## Nevada.

**NORTH STAR.**—*Grass Valley Union*, Sept. 9: The North Star mine is looking remarkably well in its lowest workings. The old mine gives promise of being better than it ever was in its palmiest days. A 20-stamp mill is one of the projected improvements upon the mine. Very fine milling quartz is now coming out of the Pennsylvania, which shows well in free gold and carries plenty of sulphurets. The owners of the Pennsylvania are in excellent spirits over the flattering prospects. Quartz mining is very active in the Grass Valley district at the present time. The Idaho, Empire, North Star and Crown Point are all yielding regular profits, and the prospecting mines, almost without an exception, are giving good returns from the quartz sent to the mill. The Grass Valley mines stand second to none in the State.

**MILL.**—*North San Juan Times*, Sept. 11: The crushing mill on the Boss mine was started up on Friday and it runs well. It is equal to its recommendation and works like a charm. It is run by a small Pelton wheel and water-power. It will crush and grind about 13 tons of rock per day. Saturday last many of our people visited the mine to witness the operation of the mill, and all came away impressed with the idea that the mill will be a success. Free gold was seen upon the apron in abundance, and it is generally believed that the rock will pay from \$40 to \$50 per ton. That the mine is a good one there can be no doubt, but whether it can be made to pay with such a mill is a question. If the mine shall meet expectations it will not be long before a 40-stamp mill will be in full blast. At present the owners are working slow. Slow and sure is their motto, and they are right. To-day there will probably be a general cleanup and it will decide whether our hopes are to be realized or blasted.

**THE HORSESHOE MINE.**—*Grass Valley Union*, Sept. 11: During the last few days some good developments have been made in the Horseshoe mine, and the owners feel very much encouraged with the present appearances of the mine. Last winter the shaft filled with water, causing the pump to be lost and doing considerable damage. Besides, lately the mine has been freed from water, improvements made in the machinery and everything is looking favorable. The ledge is two feet wide in the bottom of the shaft, and shows well in free gold and heavy sulphurets. Some of the quartz has a pink tinge, and miners say that at the present depth, 165 feet, the rock resembles that taken from the Centennial mine some years ago, and which was rich. There is no doubt but the Horseshoe will prove to be a good paying property.

**CONTEMPLATED MILL.**—*Foothill Tidings*, Sept. 13: Mr. B. Pitchford, of the Risdon Iron Works, is in town looking into the matter of building a mill for the North Star Company. Should the company conclude to build immediately, they will construct a 30-stamp quartz mill. The mill will be run by water power, the water to be taken from the Empire. This will require 11,000 feet of pipe, and the pipe will be 22 inches in diameter. It is expected that the contract for building the mill will be let soon and that it will require 120 days to complete the contract.

## Placer.

**OPHIR ITEMS.**—*Placer Argus*, Sept. 9: Now that the ranchers are ceasing to draw upon the Ditch company for water, the quartz mills are starting up. The New Year company's mill resumed operations Saturday. It is a five-stamp mill, and is engaged in working custom rock. Mr. Dodge is superintendent. He represents San Jose capitalists. Pelster & Lavallee's mills are also crushing custom rock. Some three or four hundred tons of rock await crushing, after which the honest Ophir miners will not be so hard up as they have been. Jim Butts will start up his mine—commonly known as the Hathaway Ledge—soon. He is preparing to run an open tunnel into it. Everything looks favorable at the Doig mine. It is generally estimated that \$75,000 or \$20,000 have been taken out of it during the past six weeks.

## Plumas.

**STRUCK IT RICH.**—*Plumas National*, Sept. 9: Jeff Buffington has been running a tunnel for a long time to strike the upper channel at Cariboo. A short time ago he struck gravel, and last week he cleaned up 74 ounces as the result of six days' run with one pick. Jeff is a hard-working, deserving miner.

## Shasta.

**IMPORTANT MINING TRANSACTIONS.**—*Red Bluff Sentinel*, Sept. 11: For several days past we have known that the Cumberland Gold Mining Company was negotiating a sale of a portion of the Bully Choo group, and to-day we are in receipt of the facts. The company is composed of Senator C. F. Foster, Capt. J. D. Potts, of Red Bluff, J. Q. Finch, of Bully Choo, and ex-supervisor F. D. Robinson, of Shasta county. The three latter gentlemen have sold their interest in the Cumberland, Eureka, True Augur, Mammoth, Susie Foster and Triangle to George N. Cornwall of Napa. Mr. Foster retaining his interest in those mines. The interests in those mines were sold for a good round figure, but only a portion of the purchase-money was paid down. The necessary papers have been signed and filed for recording. Messrs. Robinson, Finch, Potts & Foster still own the Daisy, Home and Cold Spring mines, adjacent to the Cumberland and Mammoth group—spurs, in fact, of the mother lode. It is the intention of Cornwall & Foster to open their mines, and to do so they will spend from \$50,000 to \$70,000. Bully Choo is bound to be one of the best mining districts in the State.

## Sierra.

**CLEANUP.**—*Mountain Messenger*, Sept. 11: The Young America mine cleanup for the month of August was near \$34,000. The Cleveland cleanup was very good, but we did not get the figures.

**ST. LOUIS.**—The miners have done well hereabouts this season. D. Conlan has made a few thousand dollars in his claim.

**PORT WINE.**—The yield of the mines has been good this year. The Bunker Hill tunnel is in 270

feet, and the rock is now rather hard. Eight men are employed by I. Copeland in his mine at Wahoo. Jack Lloyd is running a tunnel just below Port Wine, near the old one, to front ground that may pay well.

**SALINAS & MERCER MINE.**—*Sierra Tribune*, Sept. 11: Messrs. Mooney, Stevenson, Hutchinson & Co. are about to let a contract to run 150 feet of tunnel on their ledge at the Salinas & Mercer mine. They expect to erect a 10-stamp mill as soon as the contract is finished, and to vigorously prosecute operations.

**BUNKER HILL.**—At Bunker Hill mine, Poker Flat, the tunnel is being raised on an incline of about 150 feet. Negotiations are now pending for an immediate sale of this property. The prospective purchaser is a resident of Virginia City, Nevada.

**GIBRALTAR MINE.**—Work has again been resumed at the Gibraltar mine, Poker Flat. The tunnel has been run about 300 feet. The prospects at this mine are apparently very good.

**GOLDEN MONARCH MINE.**—*Sierra Tribune*, Sept. 10: The Golden Monarch mine, of which Mr. J. W. Kane is the principal owner, has been bonded to Wm. Letts Oliver and Frank Harland, of San Francisco, for \$85,000, payable in three months. Mr. Harland recently made an examination of the mine, and was highly pleased with the results thereof. The mine lies between three Young America veins.

**GLIDDEN & STEWART'S CLAIM.**—The claim of Messrs. Glidden & Stewart, at Hog canyon, has a promising outlook. A pound of quartz taken from this ledge was pounded up and produced \$5 worth of gold.

## Trinity.

**NEW RIVER.**—*Cor. Yreka Union*, Sept. 11: The mining outlook of this section is extremely favorable. There are several mines working steadily upon a paying basis. The Grover Cleveland has recently made a good strike and the owners are correspondingly jubilant. The Hard Tack, Tough Nut and the Mountain Boomer have all been working good rock steadily. The Uncle Sam also has a good prospect. The Ridgeway has, under the superintendence of Mr. Dean, become a valuable piece of property. A Kendall mill has recently been put up on this property and is now in operation. A new patent one-stamp mill has also been connected with the water-wheel of the Hard Tack arastra by Messrs. Roe & Olmstead, they claiming a crushing capacity of five to seven tons per diem. The last crushing of this mine yielded \$40, but they now have richer rock. The Mountain Boomer just cleaned up \$1500, giving \$50 per ton, surface rock. The Tough Nut is crushing rock from \$100 to \$120 per ton. Mr. Haley has erected a Kendall mill, one stamp, near White Rock, and will shortly start crushing Modoc quartz. There are about 75 men in the camp, all working, and no idle men; wages \$3 a day without board. From New River I went to Yocumville. The Know Nothing Creek mines in that vicinity are also reported favorably. Loftus & Morris are working eight men in their claim, five miles up the creek from south fork of Salmon. The ledge varies considerably in width. They will start their arastra shortly on another batch of rock. That already crushed has averaged \$80 a ton. Rattlerfinger & Funk have four locations on Know Nothing creek, the principal ledge being two miles above the Loftus & Morris claim, on the same divide. They are building a new arastra and will be crushing in about two weeks. M. J. Isaacs packed last week 13 tons of rock from the ledge to the arastra, which, it is thought, will yield from \$700 to \$125 per ton. There is also a report of a new strike at Black Bear.

## Yuba.

**QUARTZ.**—*North San Juan Times*, Sept. 11: Frank N. Morris and George N. L. Powell have located a very rich quartz mine at the junction of the Middle and North Yuba rivers, in Yuba county. We have seen some of the rock which shows free gold and is rich in sulphurets. The locators are of the opinion that the lode is an extensive one, and that when properly opened the rock will be found to be very rich. The owners are now prospecting their claim for the purpose of testing the rock on a level of 50 feet.

## NEVADA.

## Washoe District.

**BEST AND BELCHER.**—*Enterprise*, Sept. 11: West crosscut No. 1, on the 600 level, was extended 30 feet during the week, making a total length of 253 feet. The face of the drift is thought to be in the west country rock, therefore not much further progress in that direction is liable to be made. Crosscut No. 1 east, on this same level, has been advanced 34 feet, making a total distance of 202 feet. Material, same as heretofore—vein porphyry with streaks of quartz. The heavy stone bulkhead on the 2500 level, to the north of the Osbiston shaft, being completed and the cement sufficiently hardened, the water-gate was finally closed on Wednesday, completely and effectually shutting out the heavy flow of water from the northward. The pumps in the shaft do not now have half as much water to handle as heretofore. This effectual boycott on the incoming water will materially assist in the proposed sinking of the shaft deeper.

**CHOLLAR.**—Owing to further trouble with the pumping arrangements at the Combination shaft, no progress has been made either in extending the lateral drift south on the 3200 level or in the drilling on the 3100 level. The repairs were completed, the water all out again, and work resumed on the 3200 level yesterday morning, drifting southward. The trouble was with the upper section of the Cornish pump-rod, much of which had been in use for the last ten years; therefore it has become liable to fracturing or weakening. Most of it is now renewed and no further trouble apprehended.

**HALE AND NORCROSS.**—Owing to the continued difficulty with the pumping arrangements at the Combination shaft, little or no progress has been made with the exploration developments on the 3200 level. Yesterday, however, everything being all right again and the water all out, work was resumed on the 3200 level, cleaning out and preparing to go ahead toward the Savage line, which is over 200 feet distant.

**SAVAGE.**—The development of the good ore body on the 600 level is going ahead as usual, and about

1000 tons per day of ore is being shipped to mill, in order to free the dump for further extraction from this level. On the 800 level the south lateral drift is being pushed ahead to intersect the ore body of the 600, in case it extends downward sufficiently. The face of the drift is in fine-looking vein material.

**CON. CALIFORNIA AND VIRGINIA.**—About 150 tons of ore per day continues to come from the lowest levels. This is of better grade than heretofore worked, averaging, according to battery assays, over \$20 to the ton. The exploration and development work on the 1400, 1500, 1600 and 1650 levels make the usual good progress, with no new features of interest to relate.

**ALTA.**—The main lateral drift south on the 700 level, following the east side of the old Keystone vein, is now in Alta ground. The northeast drift on this same level in Lady Washington ground is also making good progress, and will soon be into the ore deposit known to exist at that point. No crosscutting as yet at any point on this level.

**CROWN POINT AND BELCHER.**—During the past two or three days a few miners have been put to work easing timbers, repairing, etc., preparatory to resuming the extraction of ore at the earliest opportunity, the increase of water in Carson river inducing the hope that some of the suspended mill stamps will be enabled to run.

**GOULD AND CURRY.**—The upraise above north lateral drift No. 1, on the 450 level, was extended 13 feet during the week, making a total height of 55 feet. A crosscut east has been started from it, which is in 16 feet. Face in vein matter with streaks of quartz.

**OPHIR.**—The southwest drift on the 1465 level has entered Con. Virginia ground, running in favorable vein material. On the 1300 level the south lateral drift is in 381 feet. Material, vein porphyry with some quartz and clay.

**SIERRA NEVADA.**—Crosscut No. 3 west on the 520 level from near the face of the north lateral drift was advanced 37 feet during the week, making a total length of 116 feet. Material, same as last week—vein porphyry with a little quartz.

**POTOSI.**—Drilling operations on the 3100 level had to be suspended during the week by reason of the pumping trouble at the Combination shaft, but now they will be proceeded with as before.

**MONTE CRISTO.**—The face of the main west drift from the new shaft on the 150 level is thought to be near the main ore vein.

**MEXICAN AND UNION.**—The drifts and crosscuts north and west on the 700 level are exploring a promising section of ground.

**YELLOW JACKET.**—About 100 tons continues to be the daily yield, supplying the Brunswick mill.

**KENTUCK.**—Daily yield, 40 tons from the old ore sections above the 800 level.

## Arabia District.

**MONTEZUMA MINE LEASED.**—*Virginia Enterprise*, Sept. 11: The famous old Montezuma mine, in Humboldt county, which for several years has been unproductive and lost sight of, has recently been leased and bonded to James Leet and J. Jones, of Reno, for the period of six months. This mine is situated in Arabia district, and the probabilities are that it will prove a valuable purchase.

## Aurora District.

**SILVER LINING.**—*Walker Lake Bulletin*, Sept. 8: Work has been started on the Silver Lining mine under the superintendency of Capt. John Grey. A tunnel is being run near the Silver Hill mill, by which the ore can reach the mill cheaply. Rapid progress is being made in the tunnel, which will strike the lode at a considerable depth from the surface. Ex-Governor Blasdel remained here some days last week, and put some men to work upon his mine, Ophir Consolidated. The Governor is also interested in a mine at Pine Grove, to which place he went on the 3d inst. The "85" mine employs quite a number of miners; the ore is still being hauled to the Miners Mill. The mill of the Esmeralda Con. is stopped for repairs. Work is still progressing in the mines of the company. The ledge in the Antelope is expected to be cut in a few days.

## Mineral Hill District.

**RESUMED OPERATIONS.**—*Cor. Eureka Sentinel*, Sept. 14: After having been closed down for about a month the mill at this place resumed operations again on Monday, and it is thought no further depreciation will perhaps continue running the balance of the year. During the period in which the mill was closed a series of vats or leaching tubs were put in place, and experimental tests will shortly be made to prove whether a higher percentage of silver can be saved than was formerly done by the pan system.

## Mt. Cory District.

**TO BE WORKED AGAIN.**—*Virginia Chronicle*, Sept. 11: It seems to be a settled fact that work will be resumed at the Mount Cory mine, in Esmeralda county. A few years ago it attracted considerable attention, and was looked upon by experienced miners as a very promising property. Even John W. Mackay said it was a good thing, and backed up his faith by putting considerable money into the work of opening it up. Alex. McKenzie, of the Sierra Nevada, was sent over as superintendent, and died there, which seemed to give a black eye to everything connected with it. An immense mill, adapted to a tedious leaching process, was built, and many big bars of bullion were produced. Things went on swimmingly for a time, and all was serene at Coryville, which assumed the proportions of a sprightly mining camp. Buildings were removed from Bodie to Aurora, and the little place soon became the objective point of the regular crowd of shiftless adventurers who swarm toward "new diggings." But a change came. The ore didn't hold out, bullion shipments stopped and the leading mines of the camp shut down, much to the discomfiture and pecuniary embarrassment of a large number of persons who located there in full faith that a big bonanza was assured. The owners of the Mount Cory, however, never lost faith. For some months past the owners have had a small force of men working the mine, and the outlook induces them to resume operations in a comprehensive manner. This morning R. M. Ballard, superintendent, with Daniel McSherry and Nick Freeman, left for Hawthorne, and will go to work on



the Cory in real earnest. A shaft will be sunk and the ground thoroughly prospected to a depth sufficient to prove the value of the mine. The owners have abundant means to carry on the work, and will not succumb to any frivolous obstacle.

#### Osceola District.

**MILL-RUNNING.**—White Pine News, Sept. 11: An occasional correspondent writes us the following encouraging items from Osceola: Our five-stamp mill is running day and night. Jack Gilmer is bound to make it run if any one can. He says he has got the largest and best mine in the State in the Golden Eagle, and to judge from the amount and quality of quartz in sight, I think he has. The hydraulic company is cleaning up. If they had sufficient water to run for six months a year they would have a handsome dividend-paying property. Capt. D. B. Aikie and Delamater have made a run of 24 tons of quartz from a new discovery, which yielded \$40 in gold per ton.

#### Palmetto District.

**THE PALMETTO MINE.**—Walker Lake Bulletin, Sept. 13: R. B. Catherwood, president of the company's operations near Palmetto, went north last Saturday on his way to San Francisco. He reports excellent prospects in that region, and was in good spirits over the promising condition of the mines. As there is a large proportion of gold in their ores, the price of silver has not caused a cessation of work; on the contrary, the appearance of the property is such as to justify a large increase of force and a general extension of work.

#### Pioche District.

**BAD MINE TO WORK IN.**—Pioche Record, Sept. 7: The last lot of ore shipped by the chloriders working in the Mendha, we learn from Charley Niles, is the best ore that has yet been shipped by them. It goes about 78 ounces in silver and about 50 per cent lead. The men did not do more than one month's steady work in extracting ore, and it is calculated that they will make about \$250 each. All men who have chlorided in this mine have done well and made big wages. There is one great fault with the mine. Men cannot work in it any length of time without becoming leaded and forced to quit work. When the Day Company was working the mine, it was a veritable bonanza to the doctor and drug store, for about one-third of the men were always laying off with a dose of lead in them. Two mines such as the Mendha, in full operation, will convert a physician and proprietor of a drug store into a bloated bondholder in less than six months. It is not any wonder men, notwithstanding that they are broke, and the big inducements in the shape of big pay offered by the mine, reluctantly go to work there to get only a small stake to prospect on.

**LEACHING PLANT.**—Work of building a leaching plant on the east side of the Meadow Valley street divide has been started by the Pioche Con. Company. The intention at present is to build the plant immediately. The screenings, of which it is claimed there are vast quantities in the mines of the company, will average \$20, and will be hauled along the railroad track to the leaching works. The supply of water for leaching purposes is to be obtained from the Raymond & Ely mine, when the pump gets working. The water will be piped along the railroad to the works.

#### Union District.

**ORE.**—Cor. Eureka Sentinel, Sept. 14: It is said some 600 sacks of ore, or about 30 tons, will soon be forwarded from the mines of Union district to the smelters of Utah for reduction. This will be sent to prove the working value of the ore, and ascertain whether the lead ores of that locality will prove remunerative at the prevailing low price of silver.

#### Wild Rose District.

**ORE AND CONCENTRATIONS.**—Silver State, Sept. 11: Yesterday one of the Paradise Valley Company's trains arrived from the mill with 23,100 pounds of concentrations, and one of Charles Kemler's trains arrived from the mine with 18,800 pounds of ore.

**PARADISE VALLEY REPORT.**—For week ending Sept. 7th, milling ore produced 114 tons, 1000 pounds; shipping ore 26 tons, 1820 pounds. Total, 140 tons, 2820 pounds. Average assay value, per ton 92.97 oz. silver; 0.55 oz. gold. Shipped to Boston & Colorado S. Co., Argo, Colorado, 400 sacks concentrations, 36,020 pounds, par value \$282.67; 195 sacks shipping ore, 24,510 pounds, estimated par value, \$2451. Total, \$11,733.67. Mill run 167 hours; worked 124 tons; number of men on pay roll, 134. The mine is producing the usual amount of ore, and of a little higher grade than for some time past. Mill running steadily and water increasing some, which gives encouragement that we may soon have sufficient to run without using the engine.

#### ARIZONA.

**NEW DEVELOPMENTS.**—Mohave Miner, Sept. 7: Few people are aware of the amount of work that has been done on this mine in the past few months, and still fewer are aware of the fact that it has now become one of the leading ore producers of the county. Situated about a mile and a half from Stockton Hill, the C. O. D. is one of the oldest and best known of the mines in that vicinity, as it has been worked for a number of years past. Through the courtesy of Mr. Michael Daley, the efficient foreman of the mine, we were enabled to visit the underground workings last Wednesday. At the 200-foot level drifts are now being run on the vein both east and west. The east drift has been run in some 40 feet and shows 2½ feet of ore that will assay from \$150 to \$175 per ton. In the west drift, which has been run in about 30 feet, the ore body widens out from 2½ feet at the shaft to 6 feet at the face, the ore averaging from \$160 to \$200. These are actual measurements made by Mr. Daley with a two-foot rule in our presence, and may be relied on as being entirely correct. From this level we ascended the shaft to the 150-foot level, on which a drift has been run 145 feet westward, showing from 1 foot to 20 inches of ore which will average about \$70; and eastward about 90 feet with about the same amount of ore, which runs in the neighborhood of \$150. The work in the stopes above the 200-foot level has been discontinued on account of bad air,

consequent upon the damp atmosphere caused by the recent heavy rains. At the present writing, some 14 men are working in the mine in eight-hour shifts, and in spite of the inconvenience and trouble caused by the large quantity of water in the mine the ore shipments average from 40 to 50 tons per month. The ore is packed about a mile and a quarter to the road and from thence hauled to the Kingman Sampling Works.

**HASSAYAMPA.**—Prescott Courier, Sept. 10: Messrs. Wickler, Snapp & White, of Hassayampa district, are developing two good mines, the White Spar and the White Star. The latter is 12 feet wide and assays \$130 per ton in silver and \$50 in gold. They make regular shipments of ore from both mines. Specimens of silver ore from Smithline's mine and from that of Barney Williams in Humboldt district are the richest ever seen by us. Williams is going to ship 20 tons. The Tip Top mill in the same district is ready to run and will, it is predicted, be successful. Groom creek district will soon be the scene of active milling and mining. Its ledges are pretty rich in gold and silver. Another shipment of silver from the Peck mill is expected here in a day or two. As Mr. Bullock, general manager of our railroad, has assured us that reduction works will be erected and run in Prescott shortly after the completion of the road, there is little doubt that the coming winter and spring will witness a step forward all along our great mineral belt—the largest in Arizona.

**NOGALES.**—News, Sept. 9: Times are beginning to improve in this locality. Business is improving every day; more mines are being worked in this section; lots of chloriders are buying outfits and going to the hills in search of the precious metals, and altogether the future looks bright and inviting, and we venture to say that before another year this locality will be in a more prosperous condition than ever before.

#### DAKOTA.

**A STRIKE.**—Dakota Tribune, Sept. 9: A rich strike is reported from the Wall Street mine on Two Butte. Some rich ore is being taken out of the big Homestake cut. Minna has levied an assessment of three mills per share. Four bricks were brought in from the Iron Hill yesterday, weighing, all told, 3504.55 ounces. A fine lot of ore was raised from the Minna yesterday, we were informed through Jeff Hildreth, who visited the mine yesterday. Several tons of first-class Buxton ore passed through the city last evening on its way to the Omaha reduction works. The Isadorah will ship in a week or 10 days. We have been told by what we consider a reliable man that the Minna Company have given up the idea of shipping their ore East for the present, but would sell it to the Daveys, who will smelt it in their furnace. This will, or should, save something to the company, as Col. Davey will no doubt pay the highest price for the ore. The general report on the street this afternoon was that 12 bricks were brought in from the Iron Hill to-day, and that they, together with the five which came in last Sunday, were stacked in the bank windows at Deadwood, and that everybody troubled with sore eyes came and looked at them—it's good for sore eyes, you know. If the Homestake cleanup was added to the pile it would almost cure the blind. There was a general good feeling over the numerous silver bars.

#### COLORADO.

**MINING NOTES.**—Leadville Herald-Democrat, Sept. 9: The Gould shaft on the Mansfield group on Printer Boy hill is down about 165 feet. The lessees of the Vining mine on Rock hill are working regularly, but with indifferent results. A deep shaft on the eastern portion of the Gilt Edge lode should disclose good ore in large quantity. Good ore will sooner or later be uncovered at the head of East Sixth, west of the Luzerne shaft. Since the resumption of work in the Breece iron mine the stock of the company has advanced considerably. No other securities are paying as large rates of interest as the Small Hopes and Adams Mining Co.'s stocks. The lessees of the Castle View mine seem to believe in still lower ore deposits, as they are increasing the depth of their shaft. The Crown Point mine is shipping a lot of carbonate ore to the Arkansas valley smelter, that runs about 80 ounces in silver to the ton. The Brooklyn shaft of the Adams Mining Co. is expected almost daily to encounter the lower ore zone and new mineral bodies. Mr. D. W. Brunton is expected to return in a few days, when work will probably be commenced on the New Minnie mine concentrating mill. The American Mining and Smelting Co. promises to find a great bonanza in the Imes lode on Iron hill, which it is working under a lease. Mr. C. G. Arnold has about completed the opening of the Stevens ditch, and in a few days will resume work on his placers in California gulch. It is to be hoped that the test run now being made on a lot of low-grade ore from the Small Hopes mine at the Chrysolite mill will prove satisfactory. The Big Chief mine on Carbonate hill is one of the few really promising mines in the Leadville district that has been permitted to lie idle for several years past. Developments on the recently-opened rich ore chute in the Lee Basin property show a continuance of good ore. The chute is now opened by two separate drifts. Now that the Amie lode has passed into new hands, it is interesting to see what the property will yield with a new manager and verified returns of ore sales. While the Omaha and Grant Smelting Co. is not purchasing any carbonate ore here, it receives three or four thousand tons of sulphide and iron ore every month. The Arkansas valley smelter will receive its new 250-horse power engine in a few days. When in position the establishment will have motive power sufficient for ten furnaces.

#### IDAHO.

**KETCHUM NOTES.**—Bulletin, Sept. 8: The Bayhorse smelter is now running at its fullest capacity. The Ontario concentrator was closed down Saturday and the men all given their time. Four men are still retained in the mine. Billy Elder and Lou Walker have finished up working over the dump of the Wellington mine, Galena, and cleaned up nearly 500 sacks of good ore. The ore was brought to Ketchum, and the last load came down yesterday. Shipments of ore received at the Ketchum Sampling Works are increasing here of late. Since Sunday, nine tons of Independence, ten King of the

West and six of Live Pine have been received. A new lot is to be received to-day. Sam Bergman came down from the Tyrolse mine, Germania Basin, yesterday. He has a large shipment of ore on the road from the mine to Ketchum. At present 12 men are employed in the mine, and plenty of ore in sight. The new concentrator at the Carrie Leonard mine, Smoky, is completed and now running to its full capacity. There is an immense quantity of good concentrating ore at the mine and it is being run through the mill as rapidly as possible. The concentrator has a capacity for 50 tons every 24 hours.

**FLORIDA MOUNTAIN MINES.**—We hear that fabulously rich ore has been found in the Empire State, and that men are now being put on the mine by Mr. Dewey to extract the same as fast as possible. Some of the ore, it is said, is held together with golden threads. The Seventy-nine has been leased to D. D. McDonald, who has a force of men at work on the lode extracting ore. The lode is large and easily worked, and would keep any mill in the camp running constantly if more men were placed in the mine. The ore is low grade and will mill from \$18 to \$30 per ton.

**FLINT MINES.**—This camp now presents a very lively appearance, at least 100 men being at work in and around the mines and plant. The saw mill is kept busy, the planks being used almost as fast as they come from the saw. We are credibly informed that a very rich chute of ore has been found in the Perseverance, but its extent is not yet known. The ore is high grade and the lode large. We are told that the Leviathan is showing a large ledge of good ore that will mill well. It is similar in character to the ore taken from the mine in years gone by, and from appearances will mill as well.

**ELMIRA.**—Idaho World, Sept. 10: Ed. W. Barry, assayer for the Elmira company, came down from Banner, Wednesday. The mill has shut down for two or three weeks, for repairs. The Banner mine is now producing more ore in a given time than ever before this year, and probably turning it out faster than at any previous time. Ed says just before he left, as much as 30 carloads of fine ore were taken out on one shift, and he heard that this was far surpassed the day before he left, but could not vouch for the correctness of the report. One of the cars holds 1500 pounds, the other 1800. The east end of the lower tunnel is in fine ore. The pay chute dips east, and, therefore, the tunnel from the lower level had to be run further east to reach the pay than in the levels above.

**WAR EAGLE MOUNTAIN MINES.**—Silver City Avalanche, Sept. 7: The Oro Fino still continues to yield good ore and considerable of it, which Mr. Regan, the owner, is piling in separate piles and sacking. We saw some prospected the other day that would mill at least \$500 per ton. The mine is now being placed in excellent condition for working. The Oro, owned by C. S. Peck, is still yielding very rich ore, a considerable quantity of which may be seen on the dump. The lode grows larger and richer as work progresses, and from present appearances will prove a genuine bonanza. The Empire's lessees are pushing the drift north rapidly, and from present appearances will soon be on a body of ore. We hear that the Stormy Hill's lessees have encountered a very rich chute of ore in the drift, surpassing anything of the kind struck on that side of the hill for a number of years. The lode is large and well defined and easily worked. Hicks, Edwards & Co. are sinking the old shaft on the Silver Cord lode and have found rich ore, not only in the bottom of the shaft, but in the lower drifts also, which extend about 100 feet each way from the shaft. The shaft is now over 400 feet deep, and has a hoisting work over it, and engine which has power enough to hoist 1000 feet. Work is still progressing on the Trook & Jennings, and ore filled with gold and silver is being daily extracted therefrom. St. Clair & Douglas have been working on the Ruth since early spring, and from present appearances will be amply rewarded for their labor. They found rich float which they traced to this lode, and are now running a drift on the same to cut the chimney from which the float came.

#### MONTANA.

**DILLON.**—Cor. Inter-Mountain, Sept. 8: Of our mines, there is not much to record in the way of shipments. The owners feel the stress of the depression of silver, and those who are not turning their attention to developing and getting their properties in better shape for the future are running their ore out upon the dump to await shipment at such a time, when the returns will yield them a greater percentage of profit than the market now affords. Of the latter may be mentioned in particular the Dexter, which employs ten men, and the Rena, which employs six. Mining properties, without exception, are reported as looking unusually well, while the wealth recently uncovered in the New Departure is sufficient to startle even imperturbable Judge Lawrence A. Brown, the owner, himself.

**A BIG ENTERPRISE.**—The ten days' test run of the new 20-stamp mill of the Dillon Mining Company was brought to a close Saturday, the 28th ult. Over 80 ounces of gold retort was brought down as a result. Some difficulty was experienced with the feeders, but it is expected to be remedied before the regular run shall be commenced. An estimate of the ore in sight places it as sufficient, without further development of the mine, to keep the stamps running for two years. The low-grade ore, which runs about \$10 per ton, was used during the trial run, while the better class will go about \$15.

**PLACER DISCOVERIES.**—The first of last week, Mr. J. J. Loughridge, of Grasshopper, came to town and reported the discovery of some new placer ground near the mill of the Dillon Mining Company, about ten miles north of Bannack. The find was struck in an old prospect hole, which, by being sunk a few feet, touched bedrock, the first pan yielding about 35 cents. Upon being developed, a pay streak of 25 feet in width was found, which it is estimated will produce from \$6 to \$8 per day to the man. As soon as the find became known, all the ground likely to contain color was staked off by eager hands.

**\$4000 IN GOLD.**—On the 16th of last month, Mr. C. L. Fyhrle, Dr. Lyman and Professor Milford, the latter representing a large English company, took a trip to Gibbonsville to look over the valuable properties in that camp. They returned on the 25th,

being very favorably impressed with the showing. They brought back \$4000 worth of gold bullion, which was shipped to the Helena assay office.

**A MINING SALE.**—The little town of Argenta is highly elated over her prospects for the future, especially so since they are assured of the investment of Butte capital in their midst, as represented by Professor Mueller for a Butte company. It is understood that he has purchased the furnace, site and mill formerly owned by Messrs. Tootle & Leach, that work will be immediately begun, and the fires started in the furnace for the reduction of their ores. The Ball smelter, after running out another carload of bullion, has been closed down for repairs for the past week, but is expected to resume work in a few days. Mr. Bevans reports the sale of his interest in the Lost Cloud group of mines to Joseph Harby, of Bannack, for the sum of \$6000. Boise Sam, the boss of the China gang working the Horse Prairie diggings, came to town to-day to settle his bills. His cleanup for the summer is \$2300.

#### OREGON.

**GRAVEL AND QUARTZ.**—Jacksonville Times, Sept. 11: Capt. Ankeny talks of resuming operations at the Blue Gravel hydraulic mines, on Galice creek, next season. The machinery which is still lacking for the quartz mill on Jackson creek will arrive by the next freight train. It is stated that L. D. Brown & Son's new five-stamp mill will be on the site of the Swinden ledge in a few days. J. N. Casteel has finished his present contract with the Jacksonville Milling and Mining Co., having run about 250 feet of tunnel. The main ledge has not been struck as yet, though several small veins of a promising character have been uncovered. The one which has been searched for is not far off, however. J. S. Howard, of Medford, surveyed the big tunnel this week and found that it was about 18 feet to the left of the shaft which it was intended to run under, and also a number of feet beyond. It is not definitely known what the company intend doing, but will likely commence work again before long.

#### UTAH.

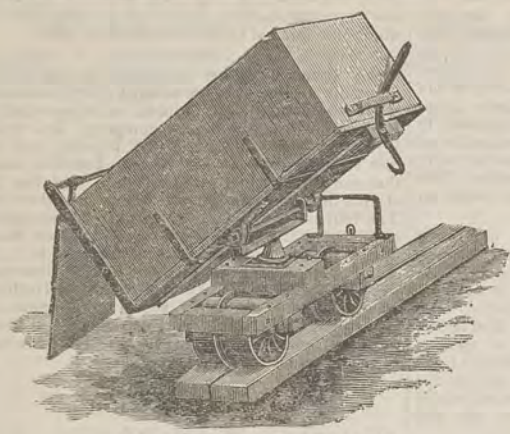
**THE COTTONWOODS.**—Cor. Salt Lake Tribune, Sept. 9: Supt. L. E. Bamberger, of the Silver Mountain mine, Big Cottonwood district, was here yesterday for the purpose of hiring a few miners, and to transact other business. Supt. Bamberger told your correspondent that the Silver Mountain mine is looking well, and is much pleased with the bright prospects for the Big and Little Cottonwood districts. Messrs. Admire and Cohn were here a few days since en route for the Evergreen and New York mining claims in Big Cottonwood. It is the intention of the company to resume work on those claims. I take the pleasure of announcing the arrival here of the great geologist, Professor Vincent, president of the Flag Staff Mining Co., an English corporation. He was warmly received by his host of friends. The professor is in charge of many important mines in Asia, Africa and in our country, the property of English capitalists. He was born in Ohio, but he mostly resides in London, England. Professor Vincent told your correspondent that the English capitalists are anxiously watching the New Emma, and as soon as the miners strike a good body of ore in that mine there will be plenty of English capital invested here.

**PARK NOTES.**—Record, Sept. 11: Thursday, a ten horse-power engine for temporary use at the new hoisting works on the Morgan group arrived, and was put in place yesterday. The Daly mine received from Geo. M. Scott & Co., Salt Lake, on Thursday, 1000 feet of 10-inch galvanized No. 10 ventilating iron pipe. The apparatus is to be used on the 800-foot level, and cost 80 cents per foot. Wednesday was pay day of the Ontario and Daly companies, Thursday the Crescent paid off its employees, and yesterday the Anchor boys were made happy by receiving their earnings for the month. The new sleeping-house at the Daly mine, with accommodations for 150 men, is nearly completed. Last Sunday the Ontario mill was closed down for repairs. The main repairs were to the engine, by boring out the cylinder about three-sixteenths of an inch, and now it will run more smoothly. A large ventilator and heater were put in. Other needed improvements and repairs were made in many parts of the mill, and Friday morning steam was turned on again for another long and successful run.

**ORE AND BULLION SHIPMENTS.**—For the week just ended, the Crescent shipped 235,204 pounds of concentrates, and 80,000 pounds of first-class ore. During the week, the Mackintosh sampler received 341,400 pounds of Ontario ore, 89,160 pounds of Daly, 262,470 pounds of Sampson and 24,220 pounds of Apex ore; total, 717,250 pounds. Owing to the temporary shut-down at the mill, no Ontario bullion was shipped this week. Frank W. Smith, associate mining editor and traveling correspondent of the MINING AND SCIENTIFIC PRESS, San Francisco, spent a few days this week in this, the largest mining camp in Utah.

**QUEEN OF THE HILLS.**—Cor. Salt Lake Tribune, Sept. 11: This mine is now operated under lease by Kirby & Stewart. The mine was discovered in 1873; sold in 1875 for \$135,000 to the Chicago Silver Mining Company, who worked it two years and then reorganized under the title of the Flavilla Mining Company and worked it three or four years, then again reorganized under its present name. The mine has produced from the grass roots down, having turned out at one time in two years an average of 45 tons per day, or over 30,000 tons, averaging from 40 to 45 ounces silver and the same unit of lead. It is fine smelting ore. The mine is now worked by about 50 men, and shipments of ore are being made. It has a good steam hoist. The lowest working at present is down 1200 feet on the incline. The vein is about 18 inches of mixed ore and is improving, all the time getting larger and better. The mine has several breaks in its formation, and when these were encountered, the ore was lost but afterward found. The ore chute comes from the southwest and strikes east about 200 feet wide, and, for about 1000 feet on the run, averaged from four to ten feet. The present working incline is on an angle of 20 deg. for 1000 feet, then changes to about 60 degrees for 400 feet further. Some of the ore is being concentrated at the Honerine mill, and there is a large amount of concentrating ore in sight.





JAMES' PATENT ORE CAR.

# TATUM & BOWEN,

34 &amp; 36 FREMONT ST., Donahue Block, SAN FRANCISCO.

91 &amp; 93 FRONT ST., PORTLAND, OREGON

Ore Car, . . . \$ 40.00  
 Rock Breaker, . . . 100.00  
 Quartz Mill, . . . 350.00

## THE JAMES QUARTZ MILL

Saves a Higher Percentage than any other machine.

Its action is a reciprocating motion of four separate and distinct Dies attached to a heavy casting in such a way that the **WHOLE WEIGHT and FORCE OF BLOW ACTS ALTERNATELY ON EACH DIE.** In this respect it resembles the Stamp Mill, and in point of amalgamation is superior to any machine in use. There is no wear, except on Shoes and Dies, and there is no expense for setting. Weight, 3000 pounds. Capacity, 6 Tons in 24 hours through No. 40 Screen. Requires 4 H. P.



SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

**BEST SOFT LAKE SUPERIOR COPPER USED.**

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.**  
**E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

## THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

### BUILDERS OF

**QUARTZ MILLS**—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
**AIR COMPRESSORS**—Rope Power Transmission.  
**HYDRAULIC PUMPING** and Hoisting Machinery.  
**WROUGHT-IRON WATER PIPE** a Specialty. **NOTE**—Have just completed order for 35 miles of 44-inch pipe of 1-inch iron for Spring Valley Water Works Company, San Francisco.  
**SAW-MILL MACHINERY** of all kinds.  
**STEAM ENGINES**—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
**SOLE MANUFACTURERS** for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.  
**MACBETH PATENT STEEL-RIM PULLEYS**—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

**REFRIGERATING MACHINERY** for Steamships, Breweries, and Cellars.  
**WILSON'S PATENT GAS-PRODUCER.**  
**STEAM BOILERS** of all descriptions.  
**SUGAR MACHINERY**—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.  
**STEAMSHIPS**—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.  
**Builders of 120-stamp Gold Mill** for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.  
 Send for Circular and Price Lists.

## CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

### Sporting, Cannon, Mining, Blasting and HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

**No. 1 (XX) is the Strongest Explosive Known.**  
**No. 2 is superior to any powder of that grade.**

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 250 California Street - - San Francisco, Cal.

## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

**GIANT POWDER or DYNAMITE,**  
 Of Different Strengths as Required.

**NOBEL'S EXPLOSIVE GELATINE**, which contains 94 per cent of Nitro-Glycerine, and **GELATINE-DYNAMITE**, Stronger than Dynamite and even Safer in Handling.

**JUDSON POWDER IMPROVED.**

**FOR RAILROADS AND LAND CLEARING.** Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

**BANDMANN, NIELSEN & CO.,**

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.



THE CONSUMERS' COMPANY.

## VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

**SUPERIOR TO BLACK OR JUDSON POWDER.**

**Vulcan Nos. 1, 2 and 3,**

The Best NITRO-GLYCERINE POWDERS Manufactured.

**SPECIAL INDUCEMENTS IN PRICES.**

**AJAX and VULCAN B B POWDERS** are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**

218 California Street, San Francisco, Cal.



Chicago Prices Beaten!

ESTABLISHED 1860.

**S. F. PIONEER SCREEN WORKS,**

221 & 223 First St., cor. Tehama, S. F.

**J. W. QUICK, Prop'r.**

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).  
 Orders Promptly Executed

INVENTORS, TAKE NOTICE

**L. PETERSON, MODEL MAKER,**

258 Market St., N. E. cor. Front (up stairs), San Francisco.  
 Experimental machinery and all kinds of metal, tin, and Brasswork.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.



## STURTEVANT MILL.

This Mill as a Crusher and Pulverizer is without rival. Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

## MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.

## FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

Huntington Centrifugal QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,

JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.



GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

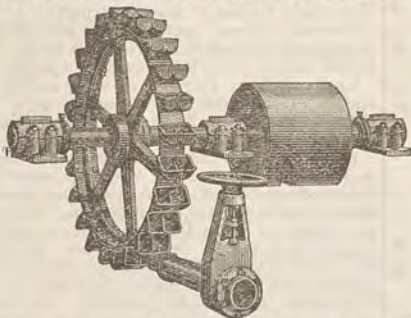
NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

UTAH OFFICE—SALT LAKE CITY, UTAH.

## PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent., distancing all competitors. Send for circulars and guaranteed estimates.

L. A. PELTON,

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.



UNCLE Sam has found it at last! A sure remedy for Torpid Liver, Sick Headache, Habitual Constipation, Chills and Fever, and all affections of the Kidneys and Liver. This is a New Compound, and one trial will convince you that it is the Cheapest and Best Remedy in the Market for Diseases of Kidneys, Liver and Stomach. If you want a pure vegetable compound, that is positively guaranteed to contain no mercury, go to your Druggist, and get a Bottle of the Arkansas Balm for Liver and Kidney Remedy. Price, \$1.00 per Bottle.

For Sale by all Druggists.

## American Exchange Hotel, SANSOME STREET.

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50 PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

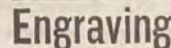
## QUARTZ BREAKERS!

—AND—

Pulverizers Combined.

To Run by Hand or Power. Mining Machinery of Every Description; Drawings, Plans and Specifications.

E. I. NICHOLS, 316 Mission Street, S. F.



Engraving Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.

## H. P. GREGORY & CO.

Nos. 2 and 4 California St., - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

## MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING MACHINERY.

FRANK & CO.'S WOODWORKING MACHINERY.

NEW HAVEN MANUFACTURING CO.'S MACHINISTS' TOOLS.

BEMENT & SON'S MACHINISTS' TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND EXHAUSTS.

SHIMER MATCHER HEADS.

BRAINARD MILLING MACHINES.

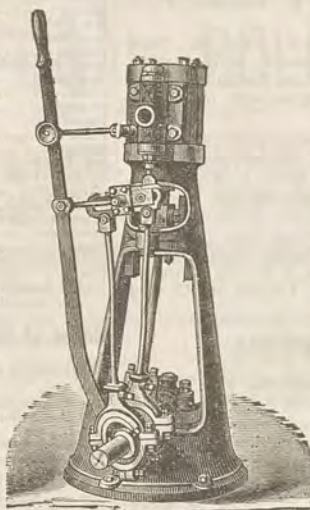
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS.

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISHERS.



YACHT ENGINES.

WILLIAMSON BROS' HOISTING ENGINES.

ATLAS ENGINE WORKS ENGINES AND BOILERS.

PAYNE'S VERTICAL AND HORIZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS.

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECTORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

## MILL SUPPLIES AND LUBRICATING OILS.

## THOMAS PRICE'S ASSAY OFFICE, CHEMICAL LABORATORY,

BULLION ROOMS and ORE FLOORS, 524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

## Metallurgy and Ores.

### SELBY

SMELTING and LEAD CO., 416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges, Under Chamberlin Patent.

## JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUGGISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

## Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt, )

Mining Engineers and Metallurgists.

## METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

## C. H. AARON,

ASSAYER AND METALLURGIST,

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

## WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

514 Kearny Street,

SAN FRANCISCO, - - CALIFORNIA

ASSAYING TAUGHT.

Personal attention insures Correct Returns.



The California Perforating Screen Company.

All kinds of Quartz Screens, slot or round holes; zinc, copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.



## Work of the Ingersoll Drill.

[By a Correspondent of the New York World.]

I paid a visit to the new aqueduct tunnel the other day, and, by special permission, was allowed to inspect the work at different points. I was not there, thank you, from any political motives. I doubtless have my faults, but meddling with politics is not one of them. My interest in this mighty work of modern engineering was simply that of any ordinarily intelligent citizen. What struck me with especial force was the rapidity and comparative ease with which rock-tunneling is done at the present day. Here, for example, is an enormous subterranean passage, which will be when completed 33 1/2 miles in length and will have a maximum water-flowing capacity of 320,000,000 gallons a day, and this great tunnel, which is reached through shafts varying from 50 to 380 feet in length, is being excavated for nearly its entire depth through solid rock. How could such a work have been even dreamed of in the days of the old-fashioned hand-drill? As well might a swarm of beetles or an army of ground moles attempt to nibble their way through the Egyptian pyramids as for any number of men, armed simply with hand-drills and hammers, to undertake the construction of a tunnel like this. What was required was the use of the most perfect and efficient power rock-drills, air-compressors, boilers, hoisting engines and pumps. At the inception of the work the contractors and engineers made a most thorough and exhaustive examination of the various appliances in the market, which resulted in equipping the greater portion of the tunnel with the celebrated Ingersoll Eclipse rock-drills and straight-line air-compressors, boilers, etc., manufactured by the Ingersoll Rock-drill Company, 10 Park place, New York city. At the present time there are more than 240 of these drills in use in this tunnel, run by compressed air, supplied from these compressors, located near the top of shafts.

Have you ever seen these drills work? They have always seemed to me like human machines. I have seen them high up on the peaks of the Rocky mountains, where the miners pin their faith to them as all-powerful aids in robbing the granite cliffs of their silver treasures, and I have seen them plunging their great steel points into rocks below the surface of turbulent streams. They always interest me. In the work at this great aqueduct tunnel the Ingersoll drills have been peculiarly effective, and, as usual, have outstripped all competitors. The following comparative table of average monthly progress for the four months ending Feb. 27, 1886, will prove to the satisfaction of all persons who know anything of rock-work the eminent superiority of the Ingersoll drill:

Best 10 headings using Ingersoll drills exclusively.	Best 10 headings using Rand drills exclusively.
1. 231 ft. 21 in.	158.5 ft.
2. 214 ft. 13 in.	150.5 ft.
3. 207 ft. 7 in.	147.5 ft.
4. 200 ft. 14 in.	146.5 ft.
5. 198 ft. 15 in.	136 ft.
6. 194 ft. 15 in.	129.2 ft.
7. 187 ft. 19 in.	104.8 ft.
8. 186 ft. 10 in.	104 ft.
9. 175 ft. 24 in.	101 ft.
10. 174 ft. 18 in.	98.3 ft.

Monthly average..... 196.7 ft. 127.6 ft.

The best single heading with Ingersoll drills exclusively (9 ft. 8 in.) averages..... 231 feet. The best single heading with Rand drills exclusively (21 ft. 8 in.) averages..... 158.5 feet.

Average monthly progress for four months on the entire line (in 45 headings worked continuously) 142.6 feet. To put the matter in a way which will be more readily appreciated by the public, I may state that with five of these Ingersoll machines a distance of 83 feet has been driven in one week and 255 feet in 22 days through the hardest kind of rock, the size of the excavation being 15 feet wide and 15 feet high. When the work was started, Ingersoll drills were adopted in 21 headings. They are now used in 42 headings out of 47 in actual progress to the Harlem river.

I know from personal observation that the Ingersoll machines are extensively used throughout the mines, quarries, and in all rock-work of magnitude on this continent, and have been extensively introduced in Europe, Australia and India. The rapidity of their work is surprising. One of these machines, requiring two men to operate it, equals the work done by 15 men drilling by hand. These machines are run in underground work, by compressed air, while on the surface the motor power for the same machines is steam. The company mentioned manufactures various sizes and styles of machines, adapted to all kinds of rock excavation, whether it be for drilling holes for blasting or cutting out stone to dimensions for building purposes, and an examination of these appliances will well repay all people engaged in rock-work. PARKE & LACY, No. 12 California St. and No. 21 Fremont St., represent the INGERSOLL ROCK DRILL CO. on the Pacific Coast and in the Australian colonies, and will mail to any given postoffice address the progress sheets and maps of the great New York aqueduct tunnel.

## Mining Share Market.

There is little of importance to be said concerning the mining share market, which continues to be uninteresting. Owing to the recent prevailing cooler weather and consequent decrease of evaporation, allowing the mountain springs to rise, the volume of water in the Carson river is said to have quite materially increased, so that some of the mill stamps, recently suspended from lack of water motive power, are again to be put to work. A few miners have, within the last few days, been put to work in the Crown Point and Belcher, repairing and fixing the timbering in good shape and opening out generally, preparatory to resumption of ore extraction to as good an extent as the milling facilities will allow.

Good work continues to be done in the Con. California and Virginia mine, with resultant good ore production, under the efficient management. The recently constructed bulkhead on the 2500 level of Best and Belcher has shut out all the water flowing from the northward, consequently the pumps in the Osbiston shaft have only half as much work to do as heretofore.

At a meeting of the Charleston Relief Committee, Tuesday, it was stated that it will take at least \$1,000,000 to put the necessary repairs to the houses of persons who are utterly unable to make their dwellings safe and habitable.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Bodie Con. M. Co.	California	51	50	June 21	Aug 23	Oct 15	G. W. Sessions	309 Montgomery St.
Bullion M. Co.	Nevada	31	30	Aug 31	Oct 5	Oct 28	R. J. Grayson	327 Pine St.
Bedrock M. Co.	Arizona	2	10	Sept 13	Oct 18	Nov 8	J. L. Hunt	308 Montgomery St.
Champion M. Co.	California	22	40	Aug 31	Oct 5	Oct 21	T. Wetzel	522 Montgomery St.
Con. Imperial M. Co.	Nevada	23	10	Aug 5	Sept 8	Sept 28	G. L. McCoy	329 Pine St.
Chollar M. Co.	Nevada	21	10	Aug 24	Sept 29	Oct 20	C. E. Elliot	309 Montgomery St.
Eureka Con. M. Co.	Nevada	10	1.00	July 28	Sept 6	Sept 25	E. H. Willson	328 Montgomery St.
Golden Jacket M. Co.	Nevada	2	10	Sept 1	Oct 14	Nov 4	R. G. McClellan	331 Montgomery St.
Indian Spring Drift M. Co.	California	6	15	July 25	Aug 30	Sept 30	L. H. Short	213 Sansome St.
Liberty Hill Con. M. Co.	California	1	15	Sept 1	Oct 7	Oct 28	F. E. Lutz	330 Pine St.
Live Oak Drift M. Co.	California	2	05	Aug 9	Sept 15	Oct 4	T. Wetzel	522 Montgomery St.
Loreto M. & M. Co.	Mexico	9	40	Aug 5	Sept 6	Sept 29	C. T. Bridge	224 California St.
Mount Cory M. Co.	Nevada	1	1.00	Aug 25	Oct 2	Oct 23	G. Frier	309 Montgomery St.
Mayflower Gravel M. Co.	California	32	25	Sept 6	Oct 15	Nov 12	J. Morizio	328 Montgomery St.
Nevada M. & M. Co.	Nevada	1	1.00	Aug 25	Oct 2	Oct 23	G. L. Brander	309 Montgomery St.
North Banner Con. M. Co.	California	14	14	Aug 7	Sept 9	Sept 27	T. J. Mitchell	Grass Valley
Occidental M. Co.	Nevada	6	30	Aug 9	Sept 13	Oct 4	A. K. Durbin	308 Montgomery St.
Pilgrim M. Co.	Idaho	6	01	Aug 7	Sept 17	Oct 16	A. Halsey	328 Montgomery St.
Potosi M. Co.	Nevada	10	30	Aug 31	Oct 5	Oct 28	C. E. Elliot	309 Montgomery St.
Silver Lining M. Co.	Nevada	2	10	Sept 14	Oct 18	Nov 5	A. H. Clough	431 California St.
Sierra Nevada S. M. Co.	Nevada	85	25	Sept 11	Oct 13	Nov 1	E. L. Parker	309 Montgomery St.
Utah M. Co.	Nevada	53	50	Aug 24	Sept 28	Oct 18	A. H. Fish	309 Montgomery St.

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Belle Isle M. Co.	Nevada	J. W. Pew	310 Pine St.	Annual	Sept 23
Golden Fleece Gravel M. Co.	California	W. J. Gleason	310 Phelan Block	Annual	Sept 28
Paradise Valley M. Co.	Nevada	W. L. Oliver	328 Montgomery St.	Annual	Sept 29
Jupiter M. Co.	Idaho	Edward Land	309 Montgomery St.	Annual	Sept 25

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Paradise Valley M. Co.	Nevada	J. W. Letts Oliver	328 Montgomery St.	25	Aug 25
Silver King M. Co.	Arizona	J. Nash	328 Montgomery St.	25	Aug 16
Young America M. Co.	California			40	May 20

## New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

MASTER PAINTERS' ASSOCIATION OF PACIFIC COAST, Sept. 10. Object, to promote a friendly feeling among members of the craft; to exchange ideas and experience; to discuss methods of doing work of different kinds; to discuss the merits and demerits of articles used in the trade; to adopt rules and regulations governing apprentices; to provide means for the prevention of abuses and impositions on the trade. The principal place of business is in San Francisco. No capital stock. Directors—all residing in San Francisco—B. L. Brandt, E. M. Gallagher, M. J. Donovan, H. B. Wagner, J. S. Mellor, J. A. Wiswell, P. N. Kress, T. Downing and J. F. Sullivan.

CONFIDENCE GAS AND OIL CO., Sept. 10. Object, to bore and prospect for oil, gas and petroleum, to lay pipes and operate pipe-lines for the transportation of the same and to construct buildings and tanks necessary for such purpose. Capital stock \$250,000 in 10,000 shares. Directors, Justin Gates, J. D. Bodwell, H. Dabbel, W. H. Davis and H. B. Mayhew.

INYO MARBLE CO., Sept. 11. Object, to quarry marble in Inyo Co. Cal., and prepare it for market. Capital stock \$1,000,000 in 100,000 shares. Directors, L. Luce, J. M. Keeler, H. B. Keesing, F. Hiller, Jr., J. P. Fraser and G. W. Luce.

NORTON TANNING CO., Sept. 11. Location, California. Capital stock, \$100,000. Directors, A. W. Norton, S. E. Holden, E. Manassee, R. T. and C. T. Field.

NORTH OCCIDENTAL G. & S. MIN. CO., Sept. 11. Location, Nevada. Directors, Mark Strouse, John Rapp, Albert Buhlert, P. S. Kimball and Fred Nichol. Capital stock, \$2,000,000 in 100,000 shares.

DRAKE AUTOMATIC RAILWAY SAFETY SWITCH CO., Sept. 15. Capital stock, 100,000,000 in 100,000 shares. Directors, Wm. Birch, J. W. Stewart, Henry A. Johnson, C. S. Drake and E. H. Shoemaker.

WASHINGTON M. CO., Sept. 12. Location, Washington, Nevada Co. Capital stock, \$250,000, in 100,000 shares. Directors, J. H. von Schroeder, J. A. Bauer, J. H. Culver, A. Tregido and G. Godfrey.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Con. California and Virginia, Sept. 11, \$52,971; Navajo, 11, \$8648; Standard, 7, \$9855; Marget Ann, 7, \$8432; Moulton, 7, \$11,760; Lexington, 9, \$20,768; Hanauer, 5, \$5970; Queen of the Hills, 5, \$2680; Crescent, 5, \$6300; Germania, 5, \$5059; Alice, 7, \$11,242; Germania, 7, \$3711; Hanauer, 8, \$2520; Queen of the Hills, 8, \$4400; Hanauer, 8, \$4770; Stormont, 8, \$2580; Queen of the Hills, 7, \$2800; Germania, 8, \$3684; 9, \$3772; Hanauer, 10, \$2500; Crescent, 10, \$3400; Queen of the Hills, 10, \$1390; Germania, 11, \$5431; Hanauer, 11, \$5555; Queen of the Hills, 11, \$3345; Alice, 11, \$21,260; Hanauer, 12, \$6025; Germania, 12, \$1660; Paradise Valley, 7, \$11,733. The banks of Salt Lake City report the receipt for the week ending September 8th, inclusive, of \$126,750.15 in bullion and \$71,223.43 in ore; a total of \$197,973.58. The base metal and ore output for the week ending September 11th was: Thirty cars bullion, 724,766 pounds, three cars copper ore, 75,310 pounds; total, 33 cars, 800,076 pounds.

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

THE MINING AND SCIENTIFIC PRESS of the 28th ult. devotes about three columns to the mining interests of Owyhee, and gives a very faithful representation in most respects of our mines and camps. Its correspondent, Mr. Frank W. Smith, took the whole country in at a glance, and while he has done us justice, has not overestimated the merits of our country. —Silver City (Idaho) Avalanche.

## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey &amp; Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING SEPTEMBER 7, 1886.

- 348,822.—MACHINE FOR COVERING WIRES, ETC.—J. C. Belk, Tombstone, A. T.  
348,716.—RECLINING CHAIR—Boggs & McLuhan, Albina, Oregon.  
348,667.—DINING TABLE—C. A. Grillwitzer, S. F.  
348,629.—UPRIGHT PIANOFORTE—F. Imhorst, S. F.  
348,678.—MAIL POUCH—L. B. Lathrop, Hollister, Cal.  
348,752.—SPICE-BOX—L. Lemos, S. F.  
348,693.—DISK HARROW—L. A. Richards, Grayson, Cal.  
348,791.—SAFETY HOOK—E. H. Smith, Rutherford, Cal.  
348,793.—CHURN—W. S. Smith, Salem, Oregon.  
348,700.—PETROLEUM BURNER—A. J. Stevens, Sacramento.  
348,598.—BORDER FOR FLOWER BEDS—G. W. Strickland, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## New York Metal Market.

Telegraphic advices dated Sept. 16th give the following New York prices:

- BORAX—6 1/2% @ 7 1/2%  
BAR SILVER—95 per oz.  
COPPER-LAKE—\$10.37 1/2 @ 10.50.  
IRON—No. 1, \$17 @ 18.00.  
LEAD—\$4.85 @ 4.95.  
QUICKSILVER—43 @ 43 1/2%  
The following is the latest by mail from the "New York Metal Exchange Market Report":  
COPPER—Firm, spot closing 10.25c @ 10.40c. Transferable Notices (Lake) issued at 10.35; Transferable Notices (Chili Bars) issued at 1.39 1/2.  
LEAD—Dull at \$4.75 @ 4.90c spot; \$4.80 @ 4.82 1/2 futures. Transferable Notices issued at 4.75.  
TIN—Firm at \$21.80 @ 21.90. Transferable Notices issued at \$21.85.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$21.80 @ 22.25; Billiton Tin, \$21.90 @ 22.25; Banca Tin, \$22.05 @ 22.40; Baltimore Copper, \$9.25 @ 9.40; Orford Copper, \$9.25 @ 9.45; P. S. C. Copper, \$9.35 @ 9.65; Foreign Lead, \$4.80 @ 4.87 1/2; Foreign Spelter, \$4.70 @ 4.75.

MAKER'S PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge, \$15.00 @ 16.00. Hudson River, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge \$15.00 @ 16.00. Southern, Grade No. 1, \$17.00 @ 18.50; No. 2, \$16.50 @ 17.50; Grey Forge \$15 @ 16.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
G. W. INGALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
R. G. HUSTON—Montana.  
Geo. McDowell—Santa Clara Co.  
FRANK W. SMITH—Utah and Colorado.  
M. S. PRIME—Marin Co.  
W. J. TULLIS—Humboldt Co.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

BACK FILES of the MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$5. Inserted in Dewey's patent binder, 50 cents additional per volume.

## Mining and Scientific Press.

THE BEST PRACTICAL MINING JOURNAL IN THE WORLD.

Established in 1860, this paper has been eminently successful as a popular and useful mining and mechanical journal. Relative to precious metals especially, it is the leading mining paper of the world.

It is largely patronized by the leading Miners, Mine Owners, Superintendents, Engineers, Metallurgists, Chemists, Manufacturers, Mechanics, Scientific, Professional and Industrial "Men of Progress" on the Pacific Coast and many leading Mining Men throughout the mining fields of the world.

It is by far the best advertising medium in the Pacific States and Territories for Mining, Mechanical, Engineering, Building and Manufacturing Tools and Implements Goods, Supplies, etc.

Being thoroughly able and reliable in its editorial and business management, and long established in the most progressive industrial portion of the Union, at present, its power as an advertising medium is unsurpassed.

Subscription, \$3 a year. Advertising rates, moderate. Send for samples and further information.

DEWEY & CO., Publishers,  
252 Market Street, San Francisco.

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Aug. 26.	WEEK ENDING Sept. 2.	WEEK ENDING Sept. 9.	WEEK ENDING Sept. 16.
Alta.....	.90	.60	.55	.60
Alta.....	.70	1.00	.85	1.05
Argenta.....	.25	.25	.15	.25
Belcher.....	1.00	1.30	1.15	1.30
Belding.....	.20	.10	.15	.10
Best & Belcher.....	1.20	1.40	1.15	1.35
Bullion.....	.20	.10	.15	.10
Bonanza King.....	.20	.25	.30	.35
Bodie.....	.25	2.65	2.80	2.40
Bodie Con.....	.10	.20	.15	.20
Bodie Tunnel.....	.50	.60	.50	.60
Bulwer.....	.95	1.95	1.45	1.85
California.....	.20	2.65	2.25	2.10
Challenge.....	.20	.20	.20	.20
Chollar.....	.30	.90	.60	.70
Confidence.....	.20	.20	.20	.20
Con. Imperial.....	.05	.10	.05	.10
Con. Virginia.....	.20	2.65	2.25	2.10
Con. Pacific.....	.20	.20	.20	.20
Crown Point.....	.95	1.00	.90	1.00
Day.....	.25	2.55	3.50	3.20
Eureka Con.....	.25	2.55	3.50	3.20
Eureka Tunnel.....	.15	.20	.15	.20
Exchequer.....	.15	.20	.15	.20
Grand Prize.....	.95	1.10	.75	.80
Gould & Curry.....	.95	1.10	.75	.80
Goodshaw.....	1.55	1.70	1.10	1.45
Hale & Norcross.....	1.50	1.75	1.00	1.80
Holmes.....	.15	.20	.15	.20
Independence.....	.40	.45	.50	.40
Justice.....	.40	.45	.50	.40
Martin White.....	.25	2.95	2.50	2.90
Mono.....	.60	.80	.60	.80
Mexican.....	.125	.125	.125	.125
Mt. Diablo.....	.55	.60	.55	.60
Northern Belle.....	.60	.65	.60	.65
Navajo.....	1.20	1.40	.57	1.75
North Belle Isle.....	.60	1.50	.80	1.25
Occidental.....	1.25	1.80	1.15	1.50
Ophir.....	.25	.30	.30	.35
Overman.....	.50	.55	.40	.50
Potosi.....	.20	.25	.20	.25
Pyral Con.....	.20	.25	.20	.25
Savage.....	.50	.55	.50	.55
Seg. Belcher.....	.50	.55	.50	.55
Sierra Nevada.....	.50	.55	.50	.55
Silver Hill.....	.50	.55	.50	.55
Silver King.....	.50	.55	.50	.55
Scorpion.....	.10	.15	.10	.15
Syndicate.....	.10	.15	.10	.15
Tioga.....	.10	.15	.10	.15
Union Con.....	.80	1.00	.70	.85
Utah.....	.90	1.00	.80	.90
Yellow Jacket.....	.90	1.00	.80	.90

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., Sept. 16.		500	100	50	20	10
950	Alta.....	1.40	1.40	1.40	1.40	1.40
200	B. & Belcher.....	1.05	1.10	1.05	1.10	1.05
50	Bodie Con.....	2.45	2.45	2.45	2.45	2.45
350	Bulwer.....	1.65	1.70	1.65	1.70	1.65
300	Benton Con.....	.35	.35	.35	.35	.35
2150	Belle Isle.....	.55	.55	.55	.55	.55
100	Belcher.....	1.35	1.35	1.35	1.35	1.35
100	Chollar.....	.50	.50	.50	.50	.50
600	Con Va & Cal.....	2.80	2.80	2.80	2.80	2.80
50	Caladonia.....	1.05	1.10	1.05	1.10	1.05
500	Calaveras.....	1.40	1.40	1.40	1.40	1.40
50	Eureka Con.....	3.50	3.50	3.50	3.50	3.50
400	Gould & Carry.....	.65	.65	.65	.65	.65
200	Independence.....	.20	.20	.20	.20	.20
	500 Lady Wash.....	.35	.35	.35	.35	.35
	100 Mexican.....	.60	.60	.60	.60	.60
	100 Mono.....	2.45	2.45	2.45	2.45	2.45
	100 Red Bl.....	1.00	1.00	1.00	1.00	1.00
	700 Navajo.....	1.00	1.00	1.00	1.00	1.00
	100 Occidental.....	1.20	1.20	1.20	1.20	1.20
	750 Ophir.....	1.30	1.30	1.30	1.30	1.30
	700 Overman.....	.45	.45	.45	.45	.45
	1100 Potosi.....	25	25	25	25	25
	100 Savage.....	2.30	2.30	2.30	2.30	2.30
	150 Sierra Nevada.....	.40	.40	.40	.40	.40
	100 Shoshone Hill.....	1.50	1.50	1.50	1.50	1.50
	30 Utah.....	.70	.70	.70	.70	.70
	100 Union Con.....	.40	.40	.40	.40	.40
	100 Yellow Jacket.....	.90	.90	.90	.90	.90



## Books on Assaying.

By C. H. AARON.

## PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the practical miner can mistake his meaning.

The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

## Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorchification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 12mo. pages, with illustrations, well bound in cloth; 1884. Price, \$1, postpaid. Sold by DEWEY & Co., Publishers, No. 252 Market street, San Francisco.

## PARTS II AND III.

Lead, Copper, Tin, Mercury, etc.  
Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

## Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Manipulation, etc.; Lead Ores; Copper Ores; Volumetric Assays; Parkes' Process; Amalgamation; New Process; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of Zinc Ores, New Method; New Assay of Nickel and Cobalt; Assay of Chromium; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Salt; Appendix to Part I; Notes on Crucible Assays; Weighing by Oscillations; Appendix to Part III; The Assay of Lead; The Assay of Copper.

There are 160 12mo. pages with illustrations in the volume which is bound strongly in cloth. Price postpaid, \$1.75. Sold by DEWEY & Co., Publishers, No. 252 Market St., S. F.

## Books on Working Ores.

By GUIDO KUSTEL, M. E.

ROASTING OF GOLD AND SILVER ORES (Second Edition) and the Extraction of their Respective Metals without Quicksilver. By GUIDO KUSTEL, M. E. 1880.

This rare book on the treatment of gold and silver ore without quicksilver is liberally illustrated and crammed full of facts. It gives short and concise descriptions of various processes and apparatus employed in this country and in Europe, and the why and wherefore. It contains 156 pages, embracing illustrations of furnaces, supplements and working apparatus. It is a work of great merit, by an author whose reputation is unsurpassed in his specialty. PRICE, \$3, coin, postage free. Sold by DEWEY & Co., Publishers, 252 Market St., San Francisco, Cal.

By C. H. AARON.

AARON'S LEACHING GOLD AND SILVER ORES, the most complete hand-book on the subject extant; 164 pages octavo. Illustrated by 12 lithographic engravings and four wood cuts. Fully indexed. Plainly written for practical men. In cloth, \$3. Sold by DEWEY & Co., S. F.

Dewey & Co.'s Scientific Press  
Patent Agency.



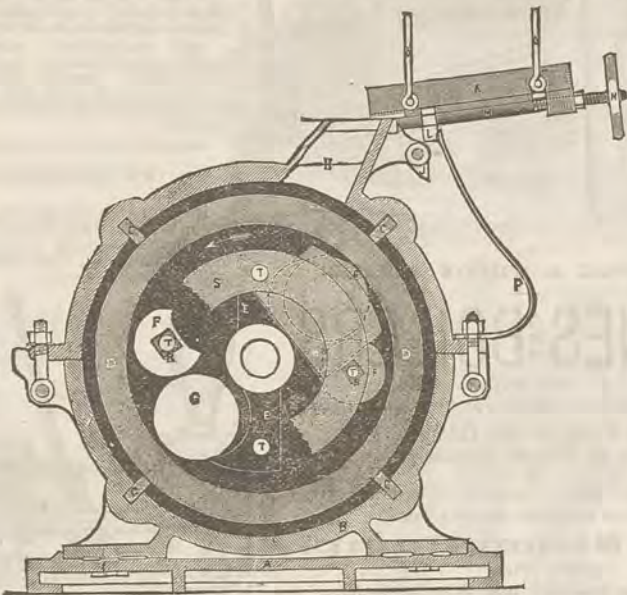
OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

DEWEY & CO., Patent Agents.  
No. 252 Market St. Elevator 12 Front St.  
S. F. Telephone No. 658.

A. T. DEWEY. W. B. EWER. GEO. H. STRONG.



## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied. At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet. All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco. Certificates as to performance of the Mills, and any information required, furnished on application.

THE FRISBEE-LUCOP MILL CO.,  
Office, 104 & 106 Washington St., NEW YORK.  
OR PACIFIC IRON WORKS, SAN FRANCISCO.

JENKINS PATENT VALVES.  
Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over all other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN &amp; CO., San Francisco, Cal.

## Newspaper Agents Wanted.

Extra inducements will be offered for a few active canvassers who will give their whole attention (for a while at least) to soliciting subscriptions and advertisements for this journal and other first-class popular newspapers. Apply soon, or address this office, giving address, age, experience and reference.

DEWEY & Co., Publishers,  
No. 252 Market St., S. F.

Practical Treatise on Hydraulic Mining.  
By AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-curdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by Dewey & Co., Publishers, 252 Market St., San Francisco.

HEALD'S BUSINESS COLLEGE,  
24 Post St. S. F.  
Send for Circular.

## LUBRICATION.

Our readers can procure of CHARLES J. WOODBURY Manufacturer of Oils, 123 California St., San Francisco, a fine Lard Engine Oil, unsurpassed by any other Oil for general use, and which will flow through any feeder at all temperatures. Also, Cylinder Oils, Refined Cylinder Tallow, Lubric Compound, Farm, Machine, and strictly pure Lard Oil. The Woodbury Oils are in use on the Central, Southern, and Northern Pacific Railways, and nearly every Railroad and Steamship line on the coast.

## ORE FEEDERS.

We direct attention to an advertisement, which appears in our journal, of the "Original Roller" Ore Feeder, manufactured by the "Joshua Hendy Machine Works," of Nos. 39 to 51 Fremont St., this city.

As the manufacturers of a similar form of Feeder, known as the "Templeton Roller," claim that it is superior to any other style, and cite those in operation at the "Bunker Hill" mill in Ama or county, we expressly contradict the statement, and in substantiation submit a copy of a letter shown to us by a representative of the "Joshua Hendy Machine Works," which speaks for itself.

BUNKER HILL GOLD MINING CO.,  
AMADOR CITY, CAL., July 12, 1886.

To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: We have used the "Challenge" and "Roller" or "Templeton" Ore Feeders in our mill for the past three years, and I am free to say that I consider the "Challenge" far superior to the "Roller" Feeder, in that most important of all things in a quartz mill, namely, the regular feeding of ores to the batteries. If the "Roller" Feeder is regulated to feed finely pulverized ore, the coarser ore will choke the outlet of the Feeder, and no ore can reach the batteries. If, on the other hand, it is regulated to feed coarse ore, then the fine ore when it comes will sluice right through and fill the batteries. The "Roller" Feeder requires constant attention. Yours truly,

(signed) N. W. CROCKER, Supt.

## REGISTRATION

—FOR THE—

## General Election.

All electors desiring to vote at the General Election, to be held November 2, 1886, must be registered regardless of any previous registration.

Registration for the General Election to be held November 2, 1886, will commence at the office of the Registrar of Voters, in the basement of New City Hall, on WEDNESDAY, August 4th, and will continue until MONDAY, October 11th, inclusive. Office hours, 9 o'clock A. M. to 5 P. M.

By order of the Board of Election Commissioners.

P. F. WALSH, Registrar.

August 1, 1886.

## WANTED!

Man of Capital and Mining Experience to buy a number of claims, all in the hands of prospectors. Three locations on same vein, 10-25 feet; formation, slate hanging, granite footwall; assays from \$10 to \$80 per ton in gold and silver, with a little copper in it. Can be opened and worked with tunnels to a depth from 400 to 2000 feet. Plenty of water and densely timbered. Title perfect. About 20 miles from N. P. R. R., Montana. No Reduction Works in the vicinity. Will bear close investigation. Great chance for practical mining men of some means. Price, \$30,000. For further particulars, address

J. W. LIND,

Marysville, Lewis &amp; Clarke Co., Montana.

## ASSESSMENT NOTICE.

Truckee Ice Company. — Location of principal place of business, San Francisco, California. Location of works, Martus Creek, near Truckee, Nevada county, California.

NOTICE is hereby given, that at a meeting of the Directors, held on the 1st day of September, 1886, an assessment (No. 1) of Ten Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 202 Sansome Street, room 4, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 4th day of October, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 25th day of October, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

GEO. W. SCOTT, Secretary.

OFFICE—No. 202 Sansome St., room 4, San Francisco, California.

## DIVIDEND NOTICE.

OFFICE OF THE

Paradise Valley Mining Company  
San Francisco, California.

At a meeting of the Board of Directors of the above-named Company, held August 24, 1886, Dividend No. 8, of Twenty-five (25) Cents per share, was declared payable on Wednesday, the 25th of August, 1886, at the office of the Company.

W. LETTS OLIVER, Secretary.

OFFICE—No. 328 Montgomery St., San Francisco, Cal.

## THE RUSSELL PROCESS COMP'Y.

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

## San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice

TUBBS &amp; CO.

611 and 613 Front St., San Francisco.



## Iron and Machine Works.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,  
EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

BUILDER OF

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines  
Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. **ORDERS SOLICITED.**

### UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

### STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,  
SACRAMENTO, CAL.

NO MORE SLIPPING OF BELTS!

NO LOSS OF POWER!

CHAS. McCORMICK'S

Improved Composition for

PAPER PULLEY  
COVERING.

Cheap & Durable

A Saving of 50 per cent in Power.

SATISFACTION GUARANTEED.

CHAS. McCORMICK

Can be found at Savage's Foundry, 135  
Fremont St., San Francisco, Cal.

**Refers to best firms in the city.**

### N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY  
Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

NATIONAL ASSURANCE CO.,  
OF IRELAND.

ATLAS ASSURANCE COMPY.,  
OF LONDON.

BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.

H. M. NEWHALL & CO.,

GENERAL AGENTS,

309 & 311 Sansome St., San Francisco, Cal.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

## FULTON IRON WORKS,

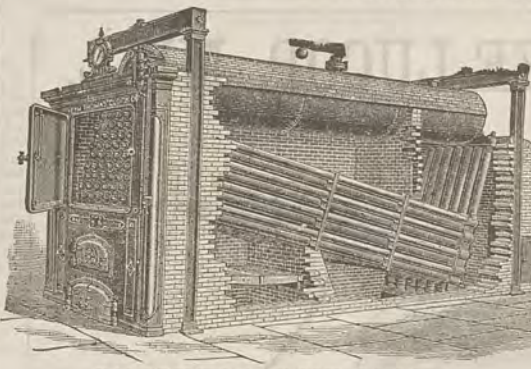
HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries

OF EVERY DESCRIPTION.

Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

Deane Steam Pump.

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS OF Every Description.

—ALSO—

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

## FRASER & CHALMERS.

CHICAGO, ILL.

U. S. A.

General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.

PERFORATED METALS FOR

REVOLVING and SHAKING-SCREENS,

JIGS & STAMP-BATTERIES.

Denver Office:  
No. 248  
18th Street,  
Denver,  
Colo.

Mexico Office:  
No. 11  
Calle de San Juan,  
Chihuahua,  
Mex.

UTAH OFFICE—SALT LAKE CITY, UTAH.

NOTICE TO  
MINING MEN,  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.

Engineers' Tables of Progress

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, etc., address:

INGERSOLL ROCK DRILL CO.,

REPRESENTED BY

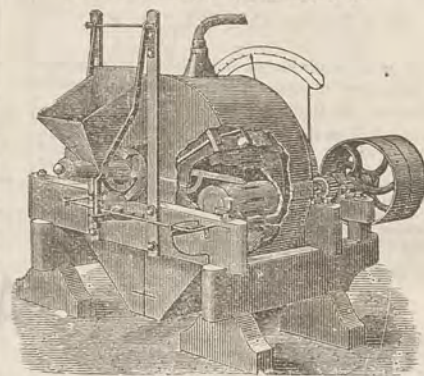
BERRY & PLACE MACHINE CO.

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

## Tustin's Pulverizer WORKS ORE WET OR DRY

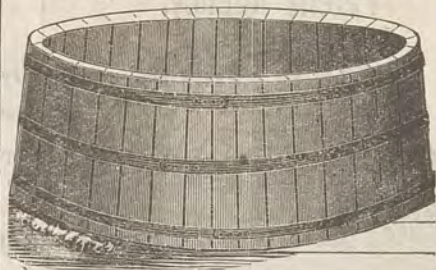
FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLEY, SPIERS & HAYES,

Mining Vats and Tanks.



LEACHING VATS with FALSE BOTTOMS.

PRECIPITATING VATS,

SOLUTION and WATER TANKS

For Mining Purposes.

WELLS, RUSSELL & CO.,

Mechanics' Mills, San Francisco.

RICHARD C. REMMEY, Agent,  
Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of

all kinds of

Chemical Stoneware

—FOR—

Manufacturing

Chemists.

Also Chemical Brick  
for Glover Tower.

A Good Opportunity for a Ma-  
chinist.

A variety of good Tools, Patterns, etc., with business  
for sale cheap by a party retiring from business. A  
splendid opportunity for an enterprising mechanic.

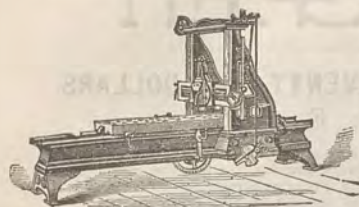
Address A. B. C., care of this paper.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



Putnam Planer.

# PARKE & LACY.

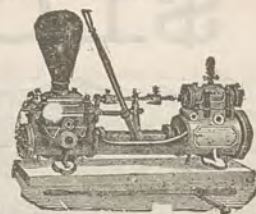
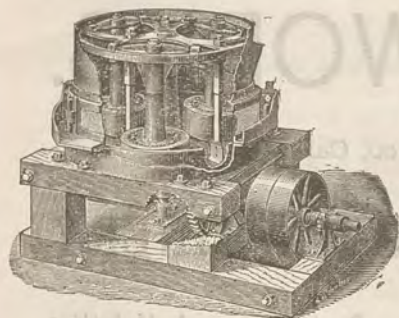
IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.

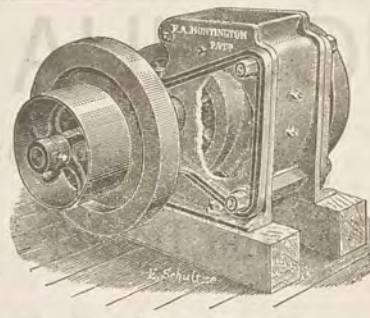
Knowles Steam Pump  
The Standard.

Centrifugal Roller Quartz Mill.

**F. A. HUNTINGTON,**  
 MANUFACTURER OF  
**Centrifugal Roller Quartz Mills,**  
**CONCENTRATORS AND ORE CRUSHERS,**  
 Mining Machinery of Every Description,  
**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.  
J. O'B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market &amp; Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT &amp; CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

## THE SCIENTIFIC PORTABLE FORGE

AND  
BLACKSMITH HAND BLOWERS.

GUARANTEED

The Lightest Running! The Strongest Blast!  
The Most Durable!

ADAPTED TO ALL KINDS OF WORK,

Send for Catalogue! AND MADE IN STYLES AND SIZES TO SUIT.

THE FOOS MANUFACTURING CO., - - Springfield, Ohio

## CINCINNATI CORRUGATING COMPANY.

JOHN F. HAZEN, Prest.

JAMES HICKS, Treas.

J. G. BATTELLE, Sec'y.

## Over 1500 Tons Iron in Stock!

FOUR WIDTHS OF CORRUGATIONS MADE!

STANDING SEAM PLAIN ROOFING!

All Paint Re-ground in Pure Linseed Oil!

## CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

STEIGER &amp; KERR, Occidental Foundry,

No. 187 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

L. C. MARSHUTZ.

G. T. CANTRELL.

## NATIONAL IRON WORKS,

N. W. Cor. Main and Howard Sts.,  
San Francisco,

...MANUFACTURERS OF...

Stationary and Compound  
Engines,FLOUR, SUGAR, SAW and QUARTZ  
MILL MACHINERY.

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

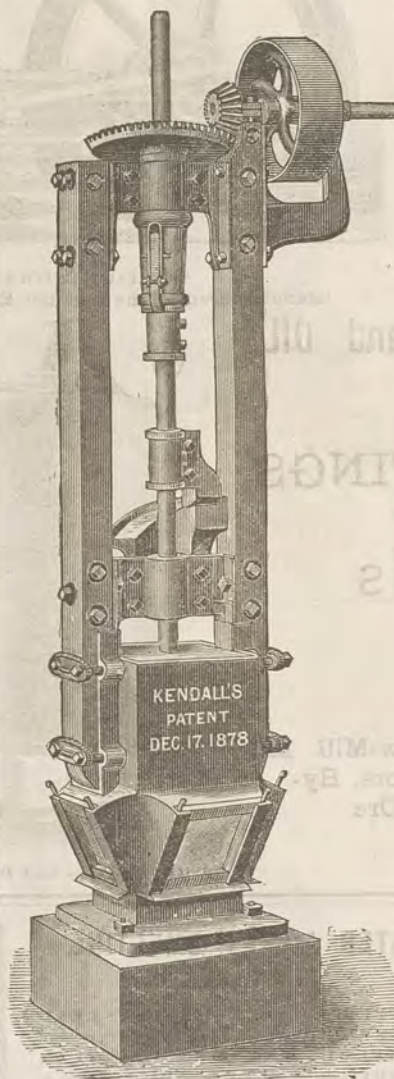
...SOLE MANUFACTURERS OF...

## KENDALL'S PATENT QUARTZ MILLS.

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past seven years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that is claimed for it and give entire satisfaction.

MARSHUTZ &amp; CANTRELL.

Send for Circulars and Price List.

KENDALL'S  
PATENT  
DEC. 17, 1878

## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.  
CLOT & MEESE,

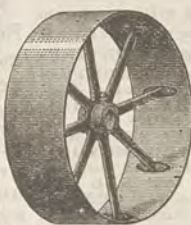
Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.



PAT. OCT. 25, 1881.

Nos. 129 &amp; 131 Fremont Street,

San Francisco, Cal.

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.

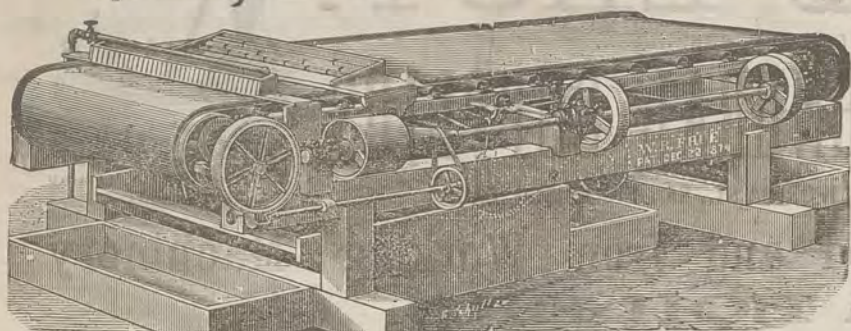
DEWEY & CO., { No. 252 MARKET ST. } PATENT AGENTS,  
Elevator 12 Front St.



\$1,000

Cooper Union Institute  
January 1 '85  
10744

CHALLENGE!



**THE FRUE ORE CONCENTRATOR,  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS.**  
(\$575 00), F. O. B.

**OVER 1,000 ARE NOW IN USE.** Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement. The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them. Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept 18, 1883. Patents applied for. N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street.

SAN FRANCISCO, CAL.

# JOSHUA HENDY MACHINE WORKS.

(INCORPORATED SEPTEMBER 29, 1882.)

Nos. 39 to 51 Fremont Street,

San Francisco, Cal.

MANUFACTURERS OF

**NEW and Dealers in SECOND-HAND BOILERS, ENGINES and MACHINERY  
OF EVERY VARIETY.**

Steam Pumps of all Makes,

CENTRIFUGAL PUMPS,

MINING PUMPS.

BLOWERS AND EXHAUST FANS.

LEATHER and RUBBER

**BELTING.**

LUBRICATING COMPOUNDS and OILS

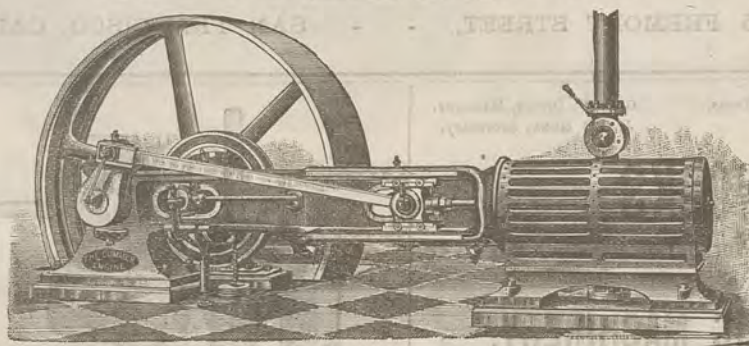
OF THE BEST MAKES.

PIPE and PIPE FITTINGS.

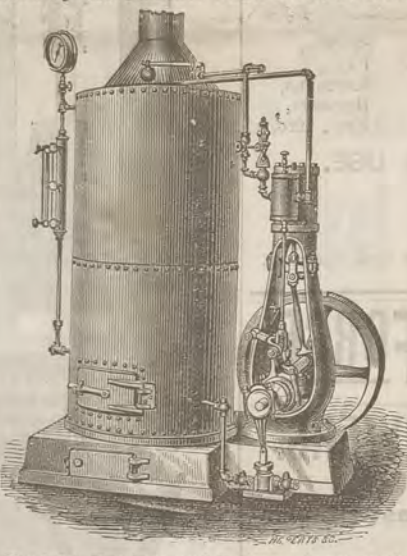
Brass Goods

AND  
FITTINGS.

Hydraulic Mining, Quartz, and Saw-Mill Machinery, Hydraulic Gravel Elevators, Hydraulic Giants, "Triumph" Ore Concentrators, Automatic Ore Feeders.



SPECIAL AUTOMATIC ENGINES.  
(Manufactured by the Cummer Engine Co., of Cleveland, Ohio.)



Upright Engines and Boilers Connected.

Stationary, Portable, and Hoisting  
**ENGINES and BOILERS.**

Shafting,

Pulleys,

Boxes,

Hangers.

**WOODWORKING  
MACHINERY,**

—COMPRISING—

BAND SAWS, STICKERS,  
PLANERS, SHAPERS,  
SHINGLE MILLS, Etc.

IMPROVED

**Single and Double Circular Saw-Mills.**

AGENTS FOR THE SALE OF

"Cummer" Engines, from Cleveland, Ohio,  
Porter Manufacturing Co.'s Engines and Boilers.  
"Baker" Rotary Pressure Blowers.  
"Wilbraham" Rotary Piston Pumps  
"Boggs & Clarke" Centrifugal Pumps.  
The Volker & Felthousen Mfg Co.'s  
Buffalo Duplex Steam Pumps.  
P. Blaisdell & Co.'s Machinists' Tools.

**PACIFIC  
IRON WORKS**

1850. 1885.  
**RANKIN, BRAYTON & CO.,**  
...BUILDERS OF...  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

## WATER JACKET SMELTING FURNACES

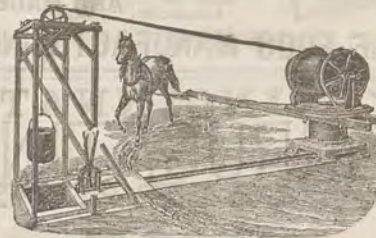
For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.

**WATER JACKET  
SMELTING  
FURNACES**

**THE DUNCAN  
CONCENTRATOR**

Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



**BAKER'S MINING HORSE POWER.**

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700 pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE OF CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.

**HOISTING  
WORKS.**



# MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, SEPTEMBER 25, 1886.

VOLUME LIII.  
Number 13.

## The Burnham Engines.

In a further examination of the different exhibits of the mechanical devices which are to be seen at the present exposition of the Mechanics' Institute, we note the simple and serviceable automatic, self-oiling steam engine built at Christiana, Pa., and for the sale of which, on this coast, the Joshua Hendy Machine Works, of Nos. 39 to 51 Fremont street, this city, are the agents.

We have been furnished by a representative of those works with a statement covering something of the history of the conception of this invention, and an examination of the cuts given herewith will afford an excellent idea of their form of construction and simplicity of operation.

These self-oiling automatic engines are the invention of an engineer who has devoted many years to devising plans for a fast-running, self-oiling, automatic engine, of simple and compact construction, to use steam economically, which could be run in the same room with other machinery without causing damage by steam.

The first engine of this form was run two months and thoroughly tested by all conceivable means as to its power, durability and steady running, and when taken apart for examination, all of its parts were found as perfect as when first put in operation. The second engine made was changed in appearance and placed in the Novelties Exhibition at Philadelphia, Pa., driving an Edison Dynamo, and run every day the exhibition was open (six weeks), from 10 A. M. to 10 P. M., and at the close of the exhibition was awarded the highest premium given to any exhibitor (silver medal and diploma).

These engines are self-oiling, not by cups with small adjustable tubes, which often clog and do not feed freely, but by wool or cotton, placed in large stationary cups, and saturated with oil, which oil is slowly conveyed to the running parts of the engine through loose wicks in tubes. The casing prevents the oil from getting outside, and deposits it, after being used, in the bottom of the casing, so that it can be used again, or removed, as may be desired. The ventilation at each end of the casing admits cold air to working parts of the engine, and the heat of the cylinder causes the air to ascend and pass out at the upper end of the ventilators.

The number of pieces constituting these engines is few compared with other automatic engines, and are so constructed that the fitting of each piece is done accurately by machinery to standard gauges. The crank-shaft and all other wrought material used, except connecting rod, are made of steel.

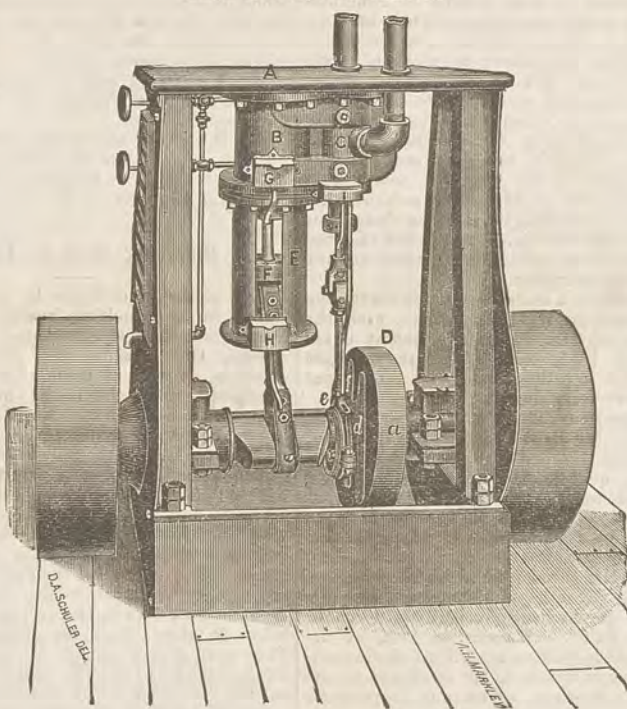
New tools are used with special appliances for fitting these engines to the best advantage, and the utmost care is taken to have every machine thoroughly made in all its parts. Each engine is tested before shipment.

The same firm also build double cylinder engines, having two cylinders and their connections in one casing, and which have double the power of the single cylinder. The two connecting-rods being connected to one shaft, having cranks at right angles, avoid dead-centers, and give the full pressure of the steam at all times to rotate the shaft, securing a much more steady motion than any engine with dead-centers. Double-cylinder engines taking steam only at one end of the cylinder have dead-

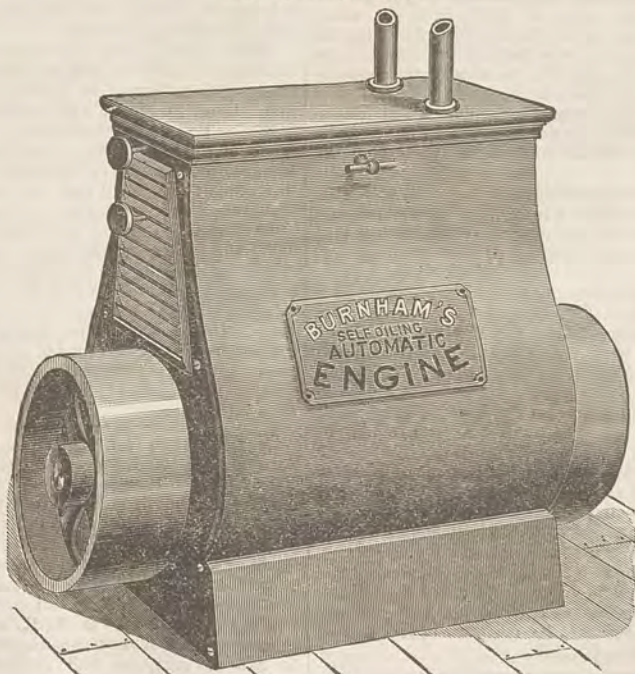
centers, the same as single-cylinder engines taking steam at each end of the cylinder. All dead-center engines must have heavy fly-wheel or other connections to retain motion over the dead-centers; and if not of very high speed the

any derangement of the one in use, can be made in a few minutes to the other cylinder without changing the machinery driven; or, if the full power of the two cylinders is used and a derangement occurs to one cylinder, it can be

Single Cylinder, Front Removed.



Single Cylinder, Complete.



BURNHAM SELF-OILING AUTOMATIC ENGINE.

motion is unsteady. Where a very steady motion is required the double engine is preferable to a dead-center engine. It is so constructed that in a few minutes either connecting-rod and eccentric-strap can be detached, and one cylinder used, giving the power of a single-cylinder engine of same diameter and stroke. There are many places where constant power is required, and by having this engine of double the power necessary, with one connecting-rod and eccentric-strap detached, a change, in case of

detached and one-half the machinery may be run while repairs are being made.

The engine now being exhibited, as above related, by the Joshua Hendy Machine Works, is rated at five-horse power, and its automatic simplicity of movement and elegance of design and construction are worthy of being seen, examined and studied.

GOLD has been found at Amesport Landing, Halfmoon bay, San Mateo county.

## California Marble.

We use in this State about half a million dollars worth of marble a year, most of it coming from Italy and Vermont, the latter being only about \$10 a ton cheaper than the former. The only place in this State where any steps have been taken to utilize the marble deposits on any scale is in Inyo county. A mill is now being erected there, some four carloads of machinery having gone down to Inyo last week. The mill will be erected at the quarry; steam-power will be used. There is already plenty of demand for the marble, and all possible effort will be made to hasten the completion of the mill, so as to get the marble in market as early a day as possible. When rail communication shall be established with the South, a great deal of the marble will go in that direction, some of it, doubtless, as far as New Orleans. There are now sufficient indications that this is destined to grow into a business of great importance. A company now owns these quarries, and they are going to work to thoroughly develop them. Blocks of any desirable size can be procured, free from stains. It can be supplied to manufacturers here at a cost not to exceed the freight on foreign marble. The dealers here do not take kindly to the Inyo marble, owing, mainly, in all probability to the present business interests in other marbles.

There are several marble deposits in California, but none have been worked to any extent. In Amador county, nine miles north of Ione, a good white marble is found suitable for building stone. Near Pence's ranch, Butte county, there is quite a large deposit. In Calaveras county there is found a pearl-gray marble with dark markings. At the Alabaster Lime Works, near Newcastle, Placer county, the marble varies from a pure white to an agreeable gray color, and takes a high polish. A beautiful mottled gray marble has been brought to the State Museum from near Eureka, Humboldt county. A yellow marble is found in Kern county, near Tehachapai. Both light and dark-colored marble have been found in Los Angeles county. Fine white marble is also found near Carmel bay, Monterey county. Several deposits were found near Auburn, Placer county. Extensive beds are known in Tuolumne county. No doubt, as marble comes more into use here, outside of its utilization for furniture trimmings, some of these quarries will be opened and worked. Meantime the result of the quarrying work in Inyo county will be looked to with interest.

THE case of the Excelsior Mining Co. vs. J. P. Pierce is on trial in this city. It is set forth in the complaint that the defendant was a director of the company, and as such voted for 19 dividends, which were declared between July, 1877, and August, 1878. The aggregate of these dividends was \$268,692, and it is alleged they were taken from the capital stock of the company and not from the surplus profits. The company therefore sues to recover this sum, with interest, which now makes it foot up \$450,000.

THE first ore bought for the new smelting works at Reno, Nev., came from the north end of Pyramid Lake, Cottonwood district.

SILVER PEAK, once a much-boomed mining district in Esmeralda county, is booming again. A new find of gold ore is the cause.



## CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

## Centrifugal Pumps and Draining Machinery.

[Written for the Press by J. RICHARDS.]

NUMBER I.

## Centrifugal Pumps.

It is a common opinion in this country that centrifugal pumps were invented and first applied in Europe, and the art, to so call it, is one in which American engineers and mechanics have had but little part.

This opinion being inferentially, at least, promulgated by a recent article in the MINING PRESS, has prompted the writer to at this time carry out a long intended purpose of giving a true account of this important manufacture, and establish, as far as ascertainable facts will serve, the part that has been contributed from the United States.

It will, no doubt, be a matter of surprise to most of your readers to know that centrifugal pumps are strictly and entirely an American invention, and that 20 years before such pumps were made or known in Europe, they had in his country attained a form and efficiency but little inferior to the best practice of the present day, and in some respects superior to some pumps now made and sold.

This matter will, in a future chapter, be fully explained, and drawings given of American centrifugal pumps made between 1818 and 1830—long before any such manufacture was thought of in England, and much less in the Netherlands, where constructive art of the kind had been almost eliminated at the time.

The Gwynne pumps referred to in the article before named are of American origin. They were at first an attempted and doubtful improvement on American methods well known and extensively applied at the time; not only this—the first experiments of Mr. J. S. Gwynne, the senior brother, among those of the name now comprising the firm of Gwynne & Co., and J. and H. Gwynne, of London, Eng., were made in Pittsburgh, Pa., in 1844. The first pump made by Mr. Gwynne was for the Passaic copper mine, the location of which I am unable to ascertain. Mr. Gwynne's first patent was taken out in the United States from New York, where he then resided, and where he continued to reside for some years after the great contest and controversy at the London Exhibition of 1851, when such pumps were for the first time publicly exhibited in Europe.

The pumps shown there by Mr. Gwynne were called "Gwynne's American Pumps," and it was, no doubt, in some measure, due to this fact that the controversy arose between him, Easton and Amos, and the makers of the Bessemer Pump, as will be hereafter more fully explained.

I think the term "Gwynne's American Pump" was hardly correct, because Mr. Gwynne's alleged improvements, as before intimated, were of questionable value, as he will no doubt now admit; at least they form no part of his present practice; and as a matter that need not be one of opinion wholly, I will venture to claim that had the centrifugal pumps, as made in America previous to Mr. Gwynne's improvements, been put in competition at the exhibition of 1851, they would have given much better results than either of the three that were exhibited.

The drawings to be given hereafter will prove this, because, in the light of modern experience, the duty of a pump of this kind can be very fairly ascertained from its construction.

The experience of Mr. Gwynne in the United States, during a term of ten years or more, was in a sense the foundation of the manufacture that bears his and his brother's names. This manufacture, which is one of the greatest facts in the recent history of centrifugal pumps, was but a continuance of the art transplanted from America, and for a long time without substantial improvement except in workmanship and strength. It will not be too much to claim that after various experiments and modifications the practice settled down to very nearly what it was in his country in 1830. It went through a cycle of change and experiment which, as will be shown in another chapter, was alike unusual and discreditable to engineering skill, even of 40 years ago, and has not yet settled down into a regular engineering manufacture.

The comparatively limited use for pumps of the kind in the United States when no lands were drained, and when water-raising was seldom performed under circumstances requiring centrifugal pumps, permitted this manufacture to lag behind. It also fell into the hands of firms without engineering skill or without the skill required to develop it, as the firms of Gwynne & Co. and John & Henry Gwynne have done in England since 1855.

The works of Gwynne & Co. were at first on the water side, just west of the Temple, in London. The ground was acquired by the Commissioners for the Victoria Embankment, and the works were moved back to a position almost opposite the Temple station of the Metropolitan and District Railway.

The works of John & Henry Gwynne are at Hammersmith, eight or ten miles westward on

the Thames, and among the engineering manufactures of England it is to be questioned whether, on the grounds of careful workmanship, the selection of material or general good quality, there is any branch more carefully conducted.

The pumps, as before claimed, have gone through a maze of modification both in England and on the Continent. There has been as much retrogression as advance, and, except in the case of Messrs. Gwynne and some other firms that follow them, there is nothing beyond the American practice of 50 years ago.

Mr. Gwynne, in his patent of 1851 in the United States, begins his claims by saying, "I do not claim to be the inventor of centrifugal pumps," and after other negation to qualify his discoveries, confines his positive claims to certain mechanical details, which, as before remarked, have long ago disappeared in his own practice, and so far as I know never had place in any machines except those made soon after 1850. The pump for the Passaic copper mine was, we may infer, similar in construction to the one exhibited in London in 1851.

It was a disk pump 12 feet in diameter, with arrangement to protect the back of the disk from pressure, there being a single suction at one side. It was carefully engraved at the time, and can be examined in the patent and other references now available. It was called "Gwynne's Direct-acting, Balanced-pressure Centrifugal Pump," and called also, as before mentioned, "Gwynne's American Pump."

Messrs. Gwynne, Appold and Bessemer were exhibitors of rival pumps at the exhibition of 1851, and out of a controversy that arose then we are indebted for some history of American pumps that would otherwise no doubt be lost. Our meager records of that time, and a period of no record of inventions to speak of, from 1818 to 1847, has left us without history of early practice in this country; but, in order to combat some of the claims made by Mr. Bessemer (now Sir Henry), Mr. Gwynne and his friends were obliged to bring forward accounts and descriptions of the American pumps that formed the basis of Mr. Gwynne's practice. This, however unwillingly it were done, was unavoidable, because Mr. Bessemer had attached to his pump at the exhibition a placard bearing the following inscription:

"This model of a centrifugal pump for forcing fluids is made in rigid accordance with the specification of Mr. Bessemer's patent dated December 5, 1845, being the first recorded invention for impelling fluids by centrifugal force by a revolving disk."

This pretentious claim will appear a little ridiculous in the light of facts to be hereafter given, unless the word "recorded" is employed as a qualification; at any rate it gave offense to Messrs. Gwynne and Appold, and, as before remarked, caused a controversy between the commissioners and jurors of the exhibition as well as the exhibitors.

No doubt Mr. Bessemer had made an original invention so far as he was concerned, and discovered the employment of centrifugal force for "impelling fluids." He was, in fact, at the time engaged in making centrifugal drying machines for sugar, and in so far as all except the pumps he, at the time, had more to do, perhaps, with centrifugal force as an element in machine action than any engineer then living. His pumps as then made and subsequently improved and patented again in 1849, bear, in many respects, close analogy to centrifugal drying machines. One idea was born of the other, or, as might be said, one idea is almost the same as the other, and it would be quite unfair at this time to detract from the importance of Bessemer's invention, however much we may differ from the particular methods of application and use.

The adaptations shown in his elaborate patent of 1849 exhibit a fertility of experience and acquaintance with constructive mechanics that seems far to excel his knowledge of Hydrodynamics.

The controversy mentioned culminated in a challenge from Mr. Gwynne to operate the pumps in competition for a year, the losing competitor to pay £1000 into the treasury of the London Mechanics' Institution. This challenge was not accepted.

The peculiarities and characteristics of these different pumps will, as before mentioned, be explained in a future place. With this much in an introductory way, I will now proceed to note some of the facts in this history of centrifugal pumps, which can, no doubt, be confirmed by people now living—facts that should appear in the public records of our country.

The claim to original discovery on national grounds is in many cases silly and provincial, but in the present one is so marked and has been so ignored that its review will be a matter of common fairness.

## Notes on Lubrication.

## Report of an Actual Conversation.

Mr. A.: "Mr. B., we are alarmed at the second occurrence of fire in the vicinity of your oil warehouse, and have called to cancel our insurance with you."

Mr. B.: "All right; we will attend to the transfer of policy to another company to-day. But are you quite certain there is cause for alarm?"

Mr. A.: "Why, certainly; you have oil, and oil is the most inflammable of substances."

Mr. B.: "Yes, but there is oil and oil, you

know. Some oil is made to burn and some is made not to burn. You could insert a lighted torch into any barrel of oil in my warehouse and the torch would be extinguished as suddenly as if plunged into water."

Mr. A.: "Is that so? Why, your oils are petroleum, are they not? And how many fires we hear of every year caused by petroleum!"

Mr. C., entering: "Good morning, Mr. B. I want to know if it is safe for me to carry in stock at my iron works and silver mine any considerable quantity of petroleum lubricating oil. It's a great deal cheaper for me, but I don't want to run any risk."

Mr. B.: "Suppose you try to set a barrel of lubricating oil on fire, and see how difficult a job you have undertaken. Did you read the notice of the affair in Brooklyn, N. Y., a fire at a lubricating oil works, where, after the staves were burned through, the oil quenched the fire? I will insure you against any loss from this cause."

Mr. A.: "But how about so many oil fires—fires uncontrollable and destructive?"

Mr. B.: "They occur almost invariably at refineries. Crude oil is heated in stills over a furnace. Within three hours the air in the immediate vicinity is so laden with explosive vapors that a match or a cigar is not allowed on the ground. This process goes on until the naphtha, gasoline, benzine and all the heavier distillates intended for kerosene have been evaporated. The substance that remains in the still is exposed afterward to a process of destructive distillation, by which it is heated to 600 and 700 degrees Fahrenheit. Only after this does it come into the condition in which it is used for the production of lubricating oils. By this time you can readily see it is free from the obnoxious and inflammable elements that occasion trouble."

Mr. A.: "Can you tell us about the processes of making the refined oils for illuminating purposes?"

Mr. B.: "Oh, that is not a subject to make light of—some other time when there is more leisure."

CHARLES J. WOODBURY.

123 California St., S. F.

## Smelting Ores in Denver.

The tendency of trade to centralization is shown in the smelting business in this city. Denver smelters are now treating ore from Alaska, Old Mexico and Chili, in South America, as well as from all the States and Territories along the Rocky mountains. The trade with Chili in this line has but lately begun, but it is destined to be one of some importance. The method by which it was obtained is not without interest, and was as follows: Several months ago the Chilean Government appointed a commission of experts to visit the United States to examine the latest improved methods of smelting and ore treatment. They visited all the smelting centers of the country while performing their duties, and spent several days in Denver, where pains were taken to show them the methods used here. They were expert enough to understand that all the conditions in Chili were so much different from what they are here that there were economical reasons why American methods cannot be used there. The prices paid here for ore are so high that they find more profit in shipping and selling it here than they can obtain by treating it in Chili.

When Messrs. Eddy, James and Grant established their works in this city there was but one smelting plant here, and it was not always an easy thing to obtain the amount of ore it required. The establishment of the Grant works made this an important smelting point, and was followed by heavy shipments of ore, and the difficulty that had met the Argo works in obtaining a sufficient supply was no longer felt.

The establishment of the Holden smelter will have the effect of still further increasing the supply by drawing ore from sources which have not heretofore sent any to this market. The magnitude of the business here is little understood. One concern alone during the month of August treated 22,000 tons of ore and rock, and its receipts during the same month were 12,000 tons of ore, or 1000 car-loads.—*Denver Tribune-Republican*.

COAL-BURNERS ON THE HILL.—Two coal-burning engines have been put on the Sacramento division for the purpose of experimenting on the proposition as to whether they can be run through the long snow-sheds with safety to the traveling public. This course has been rendered necessary on account of the scarcity of wood this season. The immense freight and passenger traffic which resulted from cut rates last spring and the G. A. R. excursion this summer caused an extra consumption of fuel, and the railroad company finds itself short of wood at a time when they need a large quantity. There is said to be less than 20,000 cords on hand this side of the Summit. Be as economical as possible, this would not last through the winter. The annual consumption of wood by the C. P. R. R. is about 100,000 cords. A coal-burner now draws the local passenger train, and it is said that the run is being successfully made.—*Truckee Republican*.

It is stated that the engineer of Rapid City, Dakota Territory, in surveying for the water works, located the reservoir several feet above the fountain-head of the water supply, and now the water will not run into the tank, and, therefore, the city's \$50,000 water system is of no use.

## Oregon Gold Fields.

## The Baker County Mines.

A correspondent of the Portland News gives the following comprehensive sketch of the gold mines of Baker county, Oregon:

Baker county is bounded on the north by Union county, east by Idaho Territory, south by the State of Nevada, west by Grant county, Oregon, and embraces a country from 70 to 100 miles in width by 200 miles in length north and south; or, computed in acres, about 11,000,000, the greater portion of which has been surveyed and platted by the Government. The present population is variously estimated at from 15,000 to 18,000, and is rapidly increasing.

## Rivers and Creeks.

Streams of pure mountain water are numerous, and some of them are of such magnitude as to attain the dignity of rivers with volumes of water flowing through them equal to the Alleghany and other navigable rivers of the East, principal among which is the Snake, which rises in the Rocky mountains, in Wyoming, flows west and empties into the Columbia, of which it is the most important tributary. The next important rivers are the Malheur, Owyhee, Burnt and Powder.

The most important feature of Baker county is its gold mines, which embrace both placer and quartz, extending over a country fully 100 miles in length by 60 miles in width. The yield of the placers of Eastern Oregon in the early days of 1860-3 was fabulous, and fairly rivaled California in the exciting times of '49 and '50. Auburn, which was not like Goldsmith's lovely plain, but a lively, stirring gulch mining city of from 6000 to 7000 inhabitants, was the center of attractions and the center of placer mining in 1862-3, and produced its millions of nuggets and dust. The torn gulches, the ragged hillsides, the piles of displaced boulders and the diverted water-courses, mark the spot from which this great wealth was taken, and are monuments to the energy and enterprise of the men who pioneered and penetrated the wilds for gold and gain. Once so attractive, a more unattractive place than Auburn cannot be found in Oregon, with its tumble-down clap-board houses and log cabins. It is to-day what might be termed a deserted mining camp, the only occupants of the place being a few Chinamen who are engaged in mining, but with what success no one can tell, as their work is a sealed book to Melican man and outside barbarians. Giant and rooker, however, are kept busy by them, and there is no doubt but they have taken out large quantities of gold and will continue to do so for years to come.

## Quartz Mining.

While Baker county is rich in placers, it is still richer in quartz, and while much time and attention has been given to the working of several quartz ledges, the surface has only been scratched, and the free gold skimmed off, as it were, leaving the rebellious and richer ores on the lower levels to be extracted and worked by improved modern appliances and handled by skilled metallurgists. Hundreds of thousands have been extracted, but millions yet remain, and modern machinery is now being placed on the mines to do the work.

There are nine organized mining districts in Baker county, as follows: Pine Creek, Eagle, Sparta, Virtue, Gold Ridge, Burnt River, Connor Creek, Granite and Pochontas, with Baker City as the great distributing center. Last year there was a general stampede to the rich and newly-discovered leads of

## Pine Creek.

And the Whitman, Red Boy, Robert Emmet and Lucky Boy were frequently mentioned by the News. The town of Cornucopia has since sprung up as a lively mining camp, with many pretentious houses and numerous branches of business. Development has been prosecuted in the mines, ore shipments made to Omaha, and a vast store of sulphurets uncovered. Last Saturday a 10-stamp gold mill was shipped into the district from Baker City, and it is only a question of 60 days before the stamps will make merry music for the honest miners. Three arastras have been running for some time past on free gold croppings, and about 60 miners have been engaged in extracting ore and in development work on the several mines and prospects. A good wagon road, partially completed at the expense of the State, opens the way to the mines of Pine Creek. The future of the district is promising.

## Eagle Creek

Is an important district, containing the same class of ore, and has several mines in process of development. One arastra has been running with fair results.

## Sparta

Has a number of placers, and its quartz mines have been sufficiently developed to justify the erection of a quartz mill on the Dolly Varden, which is patented. There is plenty of water and timber for all practical purposes.

## Gold Ridge

Has a 10-stamp mill, and is shipping about \$8000 per week in the way of gold bricks to Baker City.

## Connor Creek

Is the home of the Connor Creek mine, which is known as the most productive gold mine in



Oregon, which has a record dating back several years second to none in the Northwest. The ore is free-milling, and the mine is permanent. The owners are Reed, Paull and Ainsworth, parties well known in Portland.

#### Pocahontas

Is eight miles from Baker City, and is a district containing the well-known Nelson placer mine, for which \$400,000 was offered and refused by Mr. Nelson, the owner, a son of Dr. Nelson, of Portland. The developments of the mine continue uninterrupted and the output is perfectly satisfactory to the fortunate owner.

#### Burnt River.

This district has become famous for its placers the world over, and has produced and is now producing a large amount of gold dust. Preparations are also being made to open up new ground and work it on a very extensive scale. In this district is located

#### The Cleveland Mine.

Which one of the few well-defined free-milling producing properties in the eastern part of Oregon. The owners propose incorporating it, and will set aside sufficient stock to put in a small mill and develop the mine systematically.

#### The Virtue

Is one of the best known mines in Baker county and has produced from the grass roots down. It was formerly the property of Mr. James Virtue, of Baker City, a man who is doing more to advertise the resources of Eastern Oregon than any person in it. The mine is now owned by San Francisco men who are putting in extensive machinery. It is distant from the city about eight miles.

#### Baker District

Is coming to the front as one of the most promising in the country. New life has been infused into it and active work is now going on, both placer and quartz. The district is situated about 40 miles west of Baker City, and five miles from the stage station kept by Mr. Parker. It embraces an extensive country with hills ribbed with rich gold quartz leads and gulches which have produced nuggets worth \$50 to \$3000. Here are the celebrated Parker & Winters diggings, which turned out hundreds of thousands and made the fortune of many a hardy miner. Mr. Travillan, ex-sheriff of Baker county and a gentleman well known in Eastern Oregon, is engaged, with several other good miners, in opening up the winter ditches and making preparations for extensive operations next spring.

#### The Nesbitt and Bonanza

Quartz mines, at the head of Ireland Gulch, and about a mile from the Winters' placers, have recently been purchased by Messrs. James Steel, of Portland, and Thomas Gilchrist, of Baker, and others. The Nesbitt has hitherto been worked with fair success with inferior machinery. The mine is opened by a tunnel and shafts, exposing ore the entire length. Enough is in sight to justify the building of a ten-stamp mill, which is now being built at the Willamette Iron Works, Portland, and will be put on the grounds under the supervision of Prof. Clayton. The outlook for this property is exceedingly promising, and as it is in the hands of first-class men, will be managed in a manner which will bring wealth to themselves and credit to the Parker district.

This district can be readily reached by way of the Baker and Canyon City stage line, owned by Messrs. Parker & McEwen. The line is in excellent condition, and as the roads are good (barring the dust), Sam Ross, the wide-awake driver, will put passengers through on time.

Every comfort is assured the traveler. Half-way house, Britton, kept by Mrs. Britton, and at the Parker house, kept by Mrs. Parker.

The road passes through one of the most beautiful and interesting portions of Oregon, and a trip over it is exceedingly delightful.

#### Prospecting.

Prospectors are daily passing through the Blue mountains, and many of them have succeeded in making lucky finds. The other day Mr. Britton, of Britton's station, struck it rich in the Rainbow, and has plenty of free-gold ore to show his friends. His neighbor, too, was equally fortunate in striking a mine which he called the Hurricane. Both are on the famous Mammoth lode, and are very promising prospects.

#### Baker City.

All roads lead to Rome, so do they all lead to Baker, and the result is a busy, bustling city, which is now commanding more attention than any place in Oregon outside of Portland. It already contains a population of 2500, with a prospect of doubling it in another year, and quadrupling it in four years. The center of a gold country without an equal in extent on the continent to-day, there is nothing to prevent it from becoming second only to Portland. The News, which circulates more extensively in Eastern Oregon than any other Portland daily paper, makes the prediction that Baker City will have 10,000 people four years hence. What Butte is to Montana, so will Baker be to Oregon; what Leadville is to Colorado, so will Baker be to the land of the Webfoot.

A YOUNG German chemist has kept blood uncoagulated for many days by coating the interior of its receptacle with oil.

### Gold Lake Mines.

#### A Promising Mining District.

Last Monday, says the *Sierra Tribune*, John Scott and Dr. Hutchins took a trip out to the new mines of Gold Lake district. The first mine they saw was that of Mr. Snow, located on the south side of the first hill south of the lake. The men are building a nice cabin, and say they may winter at the claim. They have a tunnel in about 40 feet, well timbered; also an incline down 25 feet. They have from one to two feet of good-looking quartz.

Going up the steep hill and around on the side that overlooks the lake, they came to the camp of the Forest King. Here Mr. Bowers, one of the owners, entertained the visitors royally with good, old-fashioned bacon and beans, bread, coffee, etc. Ample justice being done the dinner, they went to the mine. The lode is located on the north side of the great peak that stands sentinel over the southern end of the lovely lake, and runs directly through the mountain. This enables the owners to open the mine by a drift on the vein. The vein has been traced clear down to the bottom of the hill. A drift has been run 80 feet on the vein and shows from six inches to three feet of ore. This ore is just "away up;" it will pay at least \$100 a ton. A substantial log house is being built, and the owners expect to work all winter. The verdict was, "better than the Young America."

From the Forest King they went down the mountain and to the east about one mile to the Forest Queen. This is the old Rhodes mine that was worked over 20 years ago and abandoned. Here two men were at work cleaning out the old drift and retimbering. In the progress of the work a large amount of fine ore has been taken out. The visitors were shown lots of specimens showing free gold. Samples brought away, and since prospected, prove all the ore to be of very high grade. The men had just reached the head of the old incline, which, they think, is in good shape. There are four or five hundred tons of \$40 or \$50 ore about this mine. If indications are worth anything, this, too, will be a valuable property.

Let us notice one thing: None of these developments are the work of capital. A few men of very moderate means, some having only their ability to work hard and live hard, are doing this work. Talk about what capital has done for this State! Men of capital have not made this State the grand empire it is, but it is the men of hard hands, the men of faith and pluck and brawn. When the nut is cracked capital is always ready to steal the meat.

### Safety Catches on Incline Trucks.

A correspondent of the *Foothill Tidings* (Nevada county) says: There is a great want existing to-day among us as miners—not an individual, but a universal want; one which, as soon as sufficiently brought to the notice of the theoretical and practical mine owners and mine managers of Grass Valley, we believe will be removed. We want a catch placed on the trucks carrying men on our incline shafts; for, we are sorry to say, not one is used at the present time in any of the mines. Though mining here has been comparatively safe in the past, yet somewhere in the dim future this safety catch may be needed—the rope (notwithstanding all man's care) may break; and what a satisfaction it would be to the company to feel themselves prepared for such an emergency! And what a double satisfaction and zeal it would give the men to observe the interest taken in their lives! Why, it would be as great a boon as was ever conferred on the people of Grass Valley if this "catch" were adopted, and the names of the men conferring the same would be handed down from generation to generation as model men, whose example would be worthy of imitation by children's children. I would say this "catch" can be placed on the trucks very easily and cheaply, and will be one that would answer the demands made upon it in any emergency. If such an emergency should occur (which I hope never will) who will come forth and state the amount of good which would be accomplished? The worth of the lives saved, the amount of suffering prevented, desolation, misery and poverty averted? Would not the men, through whom all this calamity was prevented, stand up to the world as philanthropists of the first degree? as model men—men recognizing the claims of humanity and brotherly love upon them? Aye! their remembrance would be everlasting as the hills, and their names revered as things precious in history.

We as miners anxiously await the day when the mine managers of Grass Valley shall stand apart from their fellows and set an example before the gazing world by adopting this safety-catch.

At the recent annual meeting of the Homestake Mining Company, the receipts for the last fiscal year were reported at \$1,665,193; dividends, \$612,500; balance carried forward, \$314,718. Most of the ore was taken from the 300-foot level. The 400 and 500-foot levels were being opened with fair prospects. It was estimated that there was over 700,000 tons of ore in sight. All the machinery about the mine and mills was in good repair and working smoothly.

### A School on Wheels.

#### Instructing Trainmen About Air Brakes.

The Union Pacific Company, says the *Omaha Republican*, has just completed a very handsome car, in which is displayed most attractively an entire Westinghouse air-brake outfit, where trainmen, especially engineers, may be schooled and trained in the proper use of that valuable patent. The Burlington and St. Paul companies each have a car somewhat similar but not nearly so complete as this one, and no doubt all the big roads will ere long be supplied with something of the kind. It is bound to become a very valuable institution and result in a much more skillful and safer handling of trains than has ever been known to the railroad service. Quite recently the Union Pacific Company adopted Westinghouse air brakes, and has equipped all their freight cars with them; but by reason of a lack of knowledge on the part of trainmen in knowing how to operate the scheme correctly, annoyance and bad mistakes have been experienced. To remedy this and bring railroading up to scientific principles, the school car has become a necessity; therefore, with the enterprise that has marked its management of late years, the Union Pacific leads all competitors by being the first to fit out and arrange the most complete model ever invented. They took the old directors' car, No. 21, repaired it thoroughly for the purpose intended, and will be ready to send it over the road next week. T. A. Hedendahl, an experienced and expert engineer, will be in charge of the car as superintendent and direct the instructions. The arrangement from which the trainmen will take their lessons in the use of the air brake is very fine and comparatively simple. At the front end of the car stands a frame on which rests 30 air chambers and 1000 feet of pipe, just what would be required for an ordinary train of cars, and in addition there are also the wheels and gearing of a freight car, with the air-brake attachment mounted on another frame about the center of the car. In the opposite end is stationed a very attractive engine of about six-horse power capacity, while between this and the frames spoken of above is planted a steam chest on which are the gauges, valves and apparatus by which the engineer works the brakes. With the steam engine and pumps; main reservoir in which compressed air is stored; engineer's brake valve which regulates the flow of air from the reservoir into the brake pipe for releasing the brakes; main brake pipe, and auxiliary reservoir brake cylinder; triple valve which connects the brake pipe with the auxiliary reservoir and the latter to the brake cylinder; the car model completely equipped and the full complement for a complete train, you would imagine that the car is well filled, but such is not the case. The remaining space, which is nicely carpeted, gives ample room for 20 men at a time to watch the operations of the machinery and listen to Mr. Hedendahl's explanations and instructions. He stands at the main reservoir, and by working the engineer's brake-valve causes the air-chamber cylinders to move out and in, the same as when in use on cars that are on a track in a train and in motion. His instructions are minute as to detail, covering every point, supposing many things that might occur in case of accident, and at times Mr. Hedendahl grows quite eloquent. Take a case in point merely for illustration: A train of 30 freight cars heavily loaded, going down grade, breaks about the middle; of course the air-pipe is also broken, but brakes are drawn. The engineer increases speed to get away from the detached part of the train. By turning a lever the rear-end trainman keeps the brakes down, so that a collision like many that have occurred in accidents of this kind is easily avoided. Without that knowledge of the brake to be obtained in the school-car, trainmen are very often at a great loss to know what the matter is or how to remedy it should the brakes get out of order. The invention is certainly a great one, and will be very valuable to the Union Pacific road. Mr. Hedendahl goes first to Grand Island, where he will stop a few days, and then make every division station on the entire system.

WANT GOLD MINES.—Ex-Senator Wallace, of Pennsylvania, who owns mining property in Ouray county and is making a trip to this county to examine it, as well as to look after some gold properties in San Miguel county for an English syndicate, says that as a result of the prevailing low prices of silver all foreign investors are looking for gold mines, and will touch nothing else. He is of the opinion that any one owning a ledge of free-milling gold ore, whether low or high grade, can readily find a purchaser under existing circumstances, whereas only a short time ago people would not even go to look at a gold-bearing property unless phenomenally rich. He thinks there is occasion to be encouraged over the outlook for the mining industry, and believes it to be in better condition than for years past.—*Denver Republican*.

AT THE Mechnich Lead Works, in Germany, the tallest chimney in the world has recently been completed. It is 440 feet high, 6 feet more than the famous chimney of the St. Rollox Chemical Works, Glasgow, Scotland, which, until the German one was built, was without a rival. The flue of the Mechnich chimney is 11½ feet in diameter at the bottom and 10 feet at the top.

### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

APPARATUS FOR BURNING PETROLEUM.—A. J. Stevens, Sacramento. No. 348,700. Dated Sept. 7, 1886. This invention relates to certain improvements for the burning of petroleum or hydro-carbon oils, and it is especially adapted to such combustion or connection with steam-boiler furnaces. The method is that which has been in use for some time on the ferry-steamers of the C. P. R. R., on this bay, and which we have before described.

DISK-HARROW.—Lovell A. Richards, Grayson, Stanislaus Co. No. 348,693. Dated Sept. 7, 1886. This is one of that class of harrows which are provided with oppositely-inclined disk-gangs, the inner ends of which have abutting bumpers; and the invention consists in the pivot connection of the tongue with the beams of the gangs, whereby on (gang is held to the tongue and the other is allowed to have a lateral movement. It consists, further, in the side braces, by which the disk-gangs are held and their inclination varied, and in said braces in connection with the tongue and the beams of the disk-gangs. The object is, while providing for the various adjustments of the disk-gangs to hold them at the same time in the same vertical plane at their meeting ends, so that said ends cannot get out of line by moving up or down.

DINING TABLE.—Chas. A. Grillwitzer, assignor to Automatic Dining Table Co., S. F. No. 348,667. Dated Sept. 7, 1886. This invention relates to that class of dining tables which may be called "self-helping," and it consists in a combination of devices. It is intended to provide a dining table at which the guests may be speedily and effectively served without the employment of waiters. A guest having been seated, punches out on the bill of fare the articles he wants. Then laying the bill of fare on the tray in front of him, he touches a button, which transmits a signal to the kitchen, giving also the location of the guest. By turning a drum in the kitchen, the carriage (a part of the table) is drawn back to the kitchen, where it is supplied with the order, and then returned to the guest in the proper place at the table.

MAIL POUCH.—L. B. Lathrop, Hollister. No. 348,678. Dated Sept. 7, 1886. The invention relates to certain improvements in mail pouches in which the patentee provides a more efficient and rapid system of unlocking and opening, and closing and fastening, the mouth of the pouch; a means for holding the direction-card holder, a means for suspending the pouch so as to be filled, and a means for making the pouch dust and water-proof. The invention consists of a flap extending beyond one side of the mouth of the pouch, so that it may be folded over upon the opposite side, and rigidly fixed staples projecting from this side and entering corresponding sockets in inclosing caps, which are secured to the flap, a sliding strap having pins secured to it, and a holding and locking device upon one end of the sliding strap by which all the pins are retained in their places when the pouch is closed; and the address or direction card also locked into place.

THE SUTRO TUNNEL.—The suit of McCalamont Brothers, London, to obtain the foreclosure of a mortgage held by them against the Sutro tunnel, for the sum of nearly \$1,000,000 loaned, with interest added, will be adjudicated at the next session of the United States Court at Carson. After the foreclosure of the mortgage the property will be sold by the United States Marshal. The *Virginia Chronicle* says that after the sale an effort will be made by the management of the Comstock ore-producing mines to have the royalty on low-grade ores reduced, or arrange a schedule of rates on different grades of ore, the royalty to be also graduated according to the cost of extracting it at great depths below the tunnel level. The sale of the tunnel property, after the foreclosure of the mortgages against it, will net U. S. Marshal Kelly a handsome sum, provided it brings \$1,500,000—the total amount of the mortgages with interest accrued. The Marshal is entitled to eight per cent of the sum for which the property is sold.

LEADVILLE is to-day the greatest retail market for steam pumps in the United States. More large Cameron, Knowles and other standard pumps are sold there every month than many persons have any conception of, and the same may also be said of steam hoisters.

OWING to the low price of silver, a number of mines in this county have been storing the ore which they are obliged to take out in developing, and it is noticeable that shipments have fallen off considerably in consequence of this fact.—*Georgetown Courier*.

BOYS AND GIRLS may be had, particularly boys, for service at wages, for indenture, or for legal adoption, by applying with recommendations to E. T. Duoley, Supt. Boys and Girls' Aid Society, Baker street, corner of Grove street, San Francisco.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 13 Front St.

W. B. EWER..... SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrearsages must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square).....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Sept. 25, 1886.

## TABLE OF CONTENTS.

**EDITORIALS.**—The Burnham Engines; California Marble, 192. Passing Events; Mineralogical Notes; Copper; Reduction and Sampling Works in Oregon; Hydraulic Gravel Elevators, 195. Mechanics' Fair Notes, 196.**ILLUSTRATIONS.**—Burnham Self-Oiling Automatic Engines, 192. Hydraulic Gravel Elevator on Ben Willson's "Big Muddy," Pioneerville, Boise Co., Idaho, 193.**CORRESPONDENCE.**—Centrifugal Pumps and Draining Machinery; Notes on Lubrication, 198.**MECHANICAL PROGRESS.**—The Scoring of Grindstones; Iron Street Paving; Rolling Molten Steel; The Corliss Engine; Europeans Visiting our Manufactories; A Pointer for Molders; Transmitting Power, 202.**SCIENTIFIC PROGRESS.**—Recent Progress in Chemistry; New Sources in Alcohol; The Noise of the Finger; Genesis of a Salt Mine; An Optical Illusion; Thunder Storms; Facts About the Common Housefly; The August Eclipse; More Evidence of Internal Heat; Another New Element, 202.**USEFUL INFORMATION.**—How Milk is Spoiled; A Hat which Takes Photographs; The King of Spiders; Luminous Stone; Acids in Lubricating Oils; To Prevent the Cracking of Wooden Faucets; Salt in Sea Water, 213.**GOOD HEALTH.**—Poison in Milk and Cheese; The Action of the Heart; A Physician's Prediction; Effect of Mental Overwork on the Teeth; Treatment of a Dog Bite; Blindness Due to Decayed Teeth, 203.**MISCELLANEOUS.**—Smelting Ores in Denver; Oregon Gold Fields, 193. Gold Lake Mines; Safety Catches on Incline Trucks; A School on Wheels; Notices of Recent Patents, 199. Advice to Young Miners, 203.**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 204-05.**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 208.

## Business Announcements.

Hydraulic Giants—Joshua Hendy Machine Works.  
Paint—Paraffine Paint Company.

See Advertising Columns

## Passing Events.

The establishment of custom reduction and sampling works at Portland, Oregon, is an indication of an improvement in the quartz industry of that State. The great trouble with mining there has been the lack of just such facilities as these works will offer when opened next month.

The Mechanics' Fair closed in this city this week, and many of our manufacturers now receive their rewards in medals and diplomas.

Quicksilver again advances in price this week. This metal has been so low for such a term of years that numbers of mines have been closed and only the largest ones could keep at work. If it advances much above present rates, however, probably some of the smaller mines will start up. This metal is not mined in the United States outside of California.

Silver still holds to its recent advance, much to the delight of silver miners, who, however, would like to see it go up a few notches higher.

An explosion occurred in one of the detached sheds at the Giant Powder Company's works at Fleming's Point, on the bay shore, on Thursday morning, and two Chinamen were killed.

The superintendent of the assay office at Helena reports that Montana last year produced \$23,000,000 in precious metals, the amount of gold being \$5,000,000.

## Mineralogical Notes.

Argyrodite is a new silver ore, first found in September of last year in the Himmelfurst mine, near Freiberg. It has a metallic luster and steel-gray color. The hardness is 2.5, and specific gravity 6.085. It is opaque and brittle, occurring in crystals and compact masses. The minerals associated with argyrodite are: spathic iron ore, zinc blende, copper pyrites, iron pyrites, marcasite, argentite, pyrrargyrite, polybasite and stephanite. A number of analyses gave 75 per cent silver and 18 per cent of sulphur, and a loss of 7 per cent. This loss was found by C. Winkler, on February 1st, 1886, to be due to the presence of a new element, which he calls Germanium.

Toward the end of 1882, rich auriferous deposits were discovered in Queensland, 25 miles from Rockhampton, near the Dee river. The matrix is a ferruginous quartz, in which the gold is disseminated in a very finely divided state. The rock appears to have been deposited from a hot spring which held the quartz, iron and gold in solution, and from which the gold was precipitated. In the cavities opened out in the mine there hang stalactites of oxide of iron and quartz, containing finely disseminated gold. The gold is remarkable for its purity. It assays 99.7 per cent in gold, the rest being copper with a trace of iron.

A new metallic element, called anstrum, has been isolated from the arendal orthite. No description of the metal or its reactions has yet been given.

An aluminium alloy, obtained by melting 10 parts of tin with 100 parts of aluminium, is found to be more easily worked and is less affected by reagents, etc., than pure aluminium. Moreover, it can be soldered easily and without any special preparation. Its specific gravity is 2.85.

An analysis of four samples of coal collected by C. D. Walcott, in Deer Creek valley, 13 miles south of the San Carlos Indian Agency, Arizona, gave the following results:

	1	2	3	4
Water.....	1.59	0.48	3.27	0.56
Volatile hydrocarbons.....	15.79	19.81	12.51	17.50
Fixed carbon.....	49.72	61.01	5.72	62.85
Ash.....	32.90	78.50	78.50	21.09
	100.00	100.00	100.00	100.00

An excellent article on the preparation of titanium and aluminium, with a note on the separation of titanium and iron, has been published by F. A. Gooch in Bulletin No. 27 of the U. S. Geological Survey.

## Copper.

Copper miners are becoming more hopeful of the industry so long depressed. When even large mines, like some of those in Montana and Arizona, have to shut down, of course the smaller mines can have little chance of profit. None of those mines lately closed have started up, but the restriction of product has slightly improved the market. In the case of the Anaconda mine, which has been producing about 2000 tons per month for some time past, the English copper buyers believe that the recent closing down is done with a view to reduction of wages and railroad freight, and at the same time enhance the value of their large unsold stock of copper.

As England rules the copper market, some few facts relating to copper there will be of interest to miners here. The demand for English copper, both manufactured and unmanufactured, continues very limited, and several smelters and manufacturers are now working only about three days in the week. The stocks on hand at the end of last month show a large increase—2563 tons. They include 1150 tons of Anaconda matte unsold. The visible supply has increased 3333 tons. The arrivals in Liverpool last month were 2383 tons from Chili, and 4125 tons from other countries. The arrivals from the United States equal, in bars, ingot, matte, etc., about 1804 tons fine copper; and the arrivals in France from this country were 475 tons fine. The Chili charters for the month were 3600 tons.

The Chili exports of copper for the year up to the 1st inst., according to James Lewis &amp; Sons' report on ores and metals, are equal to 27,912 tons fine; this is about 2000 tons less than for the same period last year. Including stocks of copper on hand and that afloat, the total visible supply abroad is now 66,201 tons fine.

As showing the increase of American ex-

ports it may be stated that the imports of American copper into Liverpool and South Wales for the first eight months of 1882 were 460 tons; first eight months of 1883, 5314; in 1884 the amount was 9724 tons; in 1885 it was 16,440 tons. In the last eight months, however, it has been only 11,040 tons. We now export more than all other countries, Chili excepted. At last advices by mail, when Chili bars were selling for £39, 5s cash, the price for three months prompt was £39 17s 6d.

## Reduction and Sampling Works in Oregon.

While Oregon has many mining districts in a partial state of development, the quartz miners have had little encouragement to work their claims properly, since they have not had facilities for sampling or beneficiating their ores. A few large mines like the Virtue have made good records, but there are hundreds of gold quartz mines in different parts of the State which are only partly opened from lack of reduction facilities. Men have not been able to market their ores, so that the quartz industry has been badly retarded. Within the past year or two the mines of Oregon have attracted more attention, and now, we are pleased to note, facilities are being afforded to work the ores. Those in that State who have ores for sale and no opportunity to reduce them will now have the advantage of custom works in a central locality, and at the point where transportation companies concentrate.

A complete plant for sampling and reducing ores has been purchased in this city for the Portland Reduction Works. It includes a 40-ton wrought-iron water-jacket smelting furnace for galena ores, a No. 5 Baker pressure blower, with a Westinghouse engine to run it, a 50 horse power horizontal tubular boiler with the necessary feed-pumps, etc.; tank and pump for water supply, a Westinghouse engine for use in the reduction works, a Kendall stamp mill, a Dodge rock-breaker, a set of Cornish rolls, a Chile sampling mill, etc.

These, with the other machinery, were furnished by Parke &amp; Lacy, dealers in mining machinery in this city and Portland, Oregon, and will outfit a very complete sampling and reduction works. The smelter is a duplicate of those used at the Selby Smelting Works at Vallejo Junction, the largest works of the kind on this coast. They have run this kind of smelter at their new works for over a year without any stoppage. The rock-breaker, stamp mill and chute mill are used in all well-equipped sampling works in this country, and are duplicates of such orders as Parke &amp; Lacy have furnished the Richmond Mining Co. and Eureka Consolidated Co., of Eureka, Nev., the Sunny Corner mines of Silverton, Australia, Broken Hill mine of Australia.

These reduction works will be ready to treat ores for any mine-owners on a liberal basis, and are expected to start up on October 15th. This will open up a means for prospectors and miners to dispose of their products or convert them into bullion, getting their coin returns immediately. This makes the discoverer of a mine virtually independent of the capitalists, as is not the case when he works his own ores and has to put up a reduction plant. These works will tend to open up a large section of mining country that is now undeveloped on account of there being no place where the miners could get their ores worked.

**A PATENT INFRINGEMENT.**—In the case of W. H. Foye vs. Harrison P. Nichols, an action in which damages were asked for an infringement of a patent for an improvement in rotary plows, the defendant, against whom the action was decided, objected in the United States Circuit Court to Master in Chancery Houghton's assessment of the damages. Judge Sawyer overruled the objection, or rather exceptions, and entered a final decree in favor of the plaintiff.**DESPITE** the temporary closing of the Anaconda, the mills and smelters of Butte are treating 2000 tons of ore every 24 hours, or about as much as all the other mines in Montana are producing outside of the Butte district.

J. A. BAUER, treasurer of the Mechanics' Institute, has paid off \$15,000 of the mortgage on the Mechanics' Pavilion, leaving \$90,000 still due.

## Hydraulic Gravel Elevators.

Pioneerville, Idaho.

[From our Traveling Representative, FRANK W. SMITH.]

This camp was appropriately named and is on Grimes' creek, some 18 miles up the basin from Idaho City, the county seat. The place should be called "Willsonville" now, as Hon. Benj. Willson, an old-time Californian, owns nearly all the end of the basin in which Pioneerville is located. The upper end of the basin boasts of nearly every kind of mining—placer, seam and quartz. Over 100 miles of ditches drain Grimes' creek and its tributaries, all of which is owned or controlled and used in extensive development by "Ben" Willson, as he is familiarly known hereabouts. A proper description of Mr. W.'s mines and mining interests would fill a book, hence want of space forbids much more than a brief mention here.

Of Mr. Willson himself much could be said, and his record as a mining man is one worthy of emulation by not only the present but the coming mining man as well. It is said that genius and wealth seldom go together. As a rule, a man of genius is a crank, and he is invariably as poor as "Job's turkey." Mr. Willson is an exception to the rule. He is an inventor, a thorough, practical, hard-working millionaire miner. The representative of the MINING AND SCIENTIFIC PRESS visited the "Big Muddy" gravel mine, where two mammoth hydraulic gravel elevators were thundering away, lifting great beds of rocks and debris from the bedrock and depositing it with a large head of water into flumed sluice-boxes nearly 30 feet high.

## The Hydraulic Gravel Elevator.

The object is to raise solid substances from a pit or excavation, or gravel and debris from a flat to a higher level by means of a stream of water projected under pressure through a pipe or tube. The feasibility of the invention has been demonstrated beyond all doubt. The machine has been so arranged that it can be adjusted to the various positions necessary as sinking or excavation of ground continues, and sizes to suit the requirements of a miner or a district can be had. The elevators at work here are much larger than could be used by the average miner, hence the reader must not be misled with the idea that all these machines are too large to be used by a man of moderate means. A glance at the engraving, given herewith, will give the mining man an idea of what this much-talked-of machine looks like at work, and the following memorandum of the mechanism will enable the mechanic to grasp the theory "the beast works on." A number of vertical pipes, 18 inches long, lined with steel or white iron, are fastened together, enough of them to reach to the height desired. The lower section is made conical or bell-shaped, so as to form an enlarged air chamber, into which a 5½-inch nozzle projects from below. The power pipe, a 20-inch one with a 300-foot pressure, is attached to the nozzle at the lower end of this bell-shaped section. A branch pipe leading from the side of this bell chamber downward and into the pit or excavation, curving so as to lay flat on the ground a few feet after reaching it, is called the suction pipe. It also is lined with steel or iron, to prevent wearing. The water pipe which leads the water to the nozzle curves upward at its lower end and is connected by a ball-and-socket joint with a short vertical section. The nozzle is made independent, so as to slide up and down in the short vertical section, which increases or decreases the suction as the nozzle is approached or withdrawn from the contraction or upper end of the bell-shaped chamber. A set of screw rods that can be worked from the outside enables this nozzle to be moved at pleasure and without shutting off the water. The stream of water entering the nozzle through the lower end of the bell-shaped chamber, and passing through the contracted opening of the upper end of this section, creates a partial vacuum in the bell-shaped chamber below, with which chamber the branch or suction pipe is connected. A head of water and two little giants bring the gravel and debris to the head of the suction pipe, passing through a few sluice-boxes and a 2½-inch grizzly into the opening in front of the hungry suction pipe, into which the great bed of moving debris and dirty water disappears like water pouring over falls. The material is forced through the ver-



tical sections at a lightning pace, and against a steel-lined inverted sluice-box, and drops into the sluiceway prepared to carry it away, and is rushed down the boxes at a pace it never could have attained without elevation. A suction pipe on either side of the bell-shaped chamber is often attached, thus enabling the two to be used alternately—both cannot be used together. This is of especial advantage in working two sides of a creek without having to move the pipes around. Of course the amount of material handled by these machines depends on the capacity of the elevator, the power and the character of the ground worked. The elevators used here have worked more ground during the past two years than a hundred men would have done the old way in a lifetime. Only three men to the machine are used here. Acres upon acres can be worked without moving the elevator and the altitude of the lifting qualities of the elevator can be raised by reducing size of the suction pipe, and increasing size of water-power pipe and the pressure. These machines are made by the Joshua Hendy Machine Works, San Francisco.

#### Pioneerville "Forkings."

Willson pays out about \$6000 per month to run his claims.

A 200-acre ranch is cultivated by Mr. Willson in addition to working his many mines.

November 15th generally finds the water failing so fast that all placer claims are closed down.

"Placer King Ben," as he is sometimes called, is noted for his liberality, and is always a friend to the poor.

In speaking of one of his model saw-mills, Ben said: "I have just put in a new chisel-saw (one of Spaulding's). I saw his ad in the PRESS, and it is the best I ever saw. I wouldn't give it for all the rest combined."

The Mammoth mine, 12 miles above Pioneerville, shows a four-foot vein of free-milling \$20 gold ore. Development to the extent of a 300-foot shaft and the vein tapped by a 700-foot tunnel. The mill is a water-power, wet process.

If all of Ben Willson's placer and quartz mines were carefully and truthfully represented, the account would read so much like a romance that there would be more doubters than believers.

THE creditors of the "Forty-nine Mining Company" have petitioned the Superior Court to declare the company insolvent. These creditors and their claims are: Golden State and Miners' Iron Works, \$2136; Justinian Caire, \$194.70; Eugene Woodin, \$189; Vulcan Powder Company, \$37.50; Dunham, Carrigan & Co., \$15.73; total, \$2,572.93. The property of the company was attached in Tuolumne county, at the suit of S. S. Bradford, on the 7th inst.

No hydraulic mining carried on in Nevada county. All reports otherwise are malicious and made for an opportunity to harass the people living in the mining regions.—*Foothill Tidings*.

THE English mill property near Reno was on Saturday formally transferred to the new smelting company, the full amount of \$90,000 being paid.

SINCE the Navajo mill started up on the 20th of last May, it has produced 90 bars of bullion, valued at \$180,000.

GRANITE DISTRICT, White Pine county, Nev., is attracting much attention in the eastern portion of the State.

CALICO DISTRICT has produced since January 1, 1884, the sum of \$2,387,484 in bullion.

#### Mechanics' Fair Notes.

##### Electric Lighting.

Among the many beautiful exhibits at the Mechanics' Fair none has attracted more attention than that of the California Electric Light Company. Their principal exhibit is located on the Larkin street side of the gallery and consists of two beautifully furnished rooms lighted with over 60 incandescent lights. The lights are distributed in a very attractive manner. In the centers of the rooms are elaborate electroliers; on the walls are side lights. Lights are also seen burning under water, among fruits and flowers and hanging from the ivy decorations like "apples of gold." The lamp employed is known as the Swan lamp—the invention of Mr. Swan, of England, who claims to be the first inventor of the incandescent lamp as now generally in use. The carbon filament of this lamp is made from a cotton thread, which is first converted into parchment by the use of sulphuric acid. This parchment is then converted into carbon, which is afterward placed in a small glass globe, from which the air is exhausted. The lamp is now ready for use, and is said to give a continuous light of 16 candle-power for

we hope the day is near at hand when this progressive company will be able to supply this light to all.

Mr. S. W. Shaw has on exhibition his combined "Disk Concentrator and Amalgamator" in operation. In construction and working it is radically different from the concentrators in common use. The chief feature is a circular copper dish in the shape of a very shallow cone with the apex turned downward, to which an eccentric motion of about one-half inch throw is communicated by a vertical spindle passing through the center, which is geared even to a light horizontal shaft running from 200 to 250 revolutions per minute. The disk does not revolve, being subject only to the eccentric motion, the result being the "panning motion," considered so necessary in all concentrating appliances. When in operation the movement of the concentrates is toward the center, where they are discharged. The tailings escape over the periphery of the disk into a circular trough. In order to assist or retard the motion of the pulp toward the periphery, a number of revolving radial arms are provided, to which are secured, at short intervals, small notched stirrers of sheet copper, which dip about a quarter of an inch into the pulp on the

E. G. Denniston exhibits one of the largest size silver plated copper plates used to catch the gold in the free-milling process. These plates are now used in all gold-mining countries, having first found favor in this State, where they are made. All well-equipped mills now use them.

The only specimen of a stamp quartz mill on exhibition is Day's prospecting mill, with vacuum attachment, at the stand of B. A. Harrison. It is small and worked by hand. At the same stand is a hand-power rock drill, with a vacuum arrangement similar to that applied to the battery.

C. H. Evans exhibits several of his positive-action steam pumps; also, Donaldson's oscillating engine with reversing gear, which occupies a very small space for the power developed. At this stand is also exhibited in operation the engine, propeller-wheel, etc., for a small steamer.

Several samples of quick-opening and full-flow faucets are at the stand of Wm. J. Hough, who also exhibits a very neat turbine for running sewing machines, intended for attachments to faucets or water-pipes.

The Paraffine Paint Co. has an interesting exhibit of samples of that product, together with specimens of building material, clothing, etc., showing the water-proof qualities of the paint.

S. A. Owen exhibits several handsome models of large steamers and launches.

I. L. Merrill exhibits an interesting variety of asbestos lagging for steam-pipes and boilers.

A direct-acting pump of new design, built by Joseph Pracy, has a stand near the main engine.

The exhibit of the Dixon Crucible Co., near the fountain, is very complete and well arranged.

The exhibit of Tibbal's sewer-pipe and tide-gate is of interest to house-owners who want to keep out sewer gas.

The *Pacific Press* makes a handsome display of superior typographical work at their stand, in charge of T. A. Kilgore.

A creditable display of tools and bar steel may be seen at the stand of G. & E. Pennington & Sons, near the main engine.

The electric automatic fanning mill, an ingenious machine operated by a small electric motor, has a stand in the north aisle.

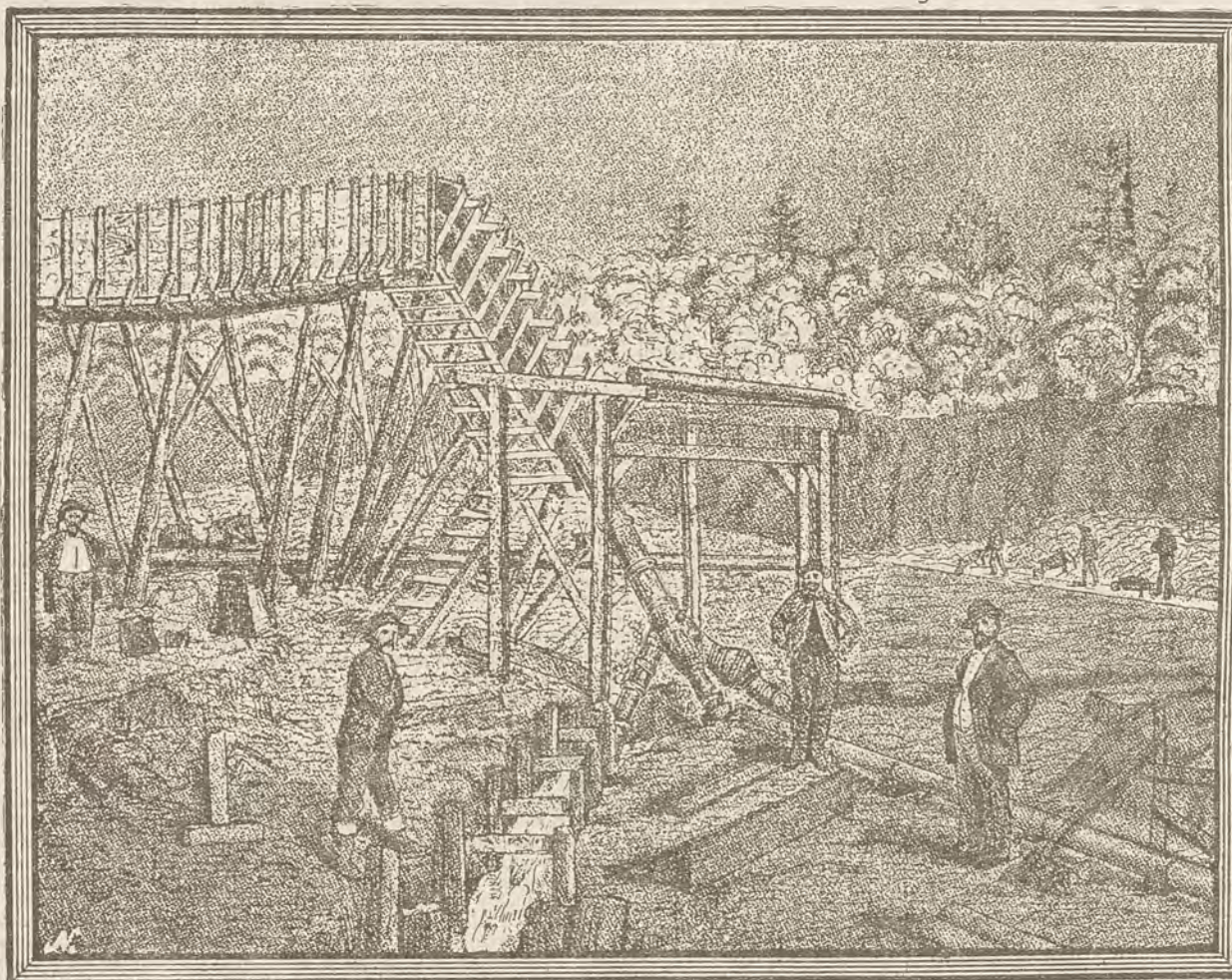
Wainwright's sprinkler, by which a solid stream can be changed to a spray without turning off the water, is exhibited near the garden.

The exhibit of the California Wire Works, near the fountain, is one of the most complete and creditable displays of domestic manufacture in the fair.

The Siemens and Lundgren regenerative gas lamp is exhibited in the north aisle. It is so constructed that its downward flood of light is not obstructed by any supply pipes.

Warren Dunham exhibits a double-center cable grip of his construction. This grip is double and has many other novel features which attract attention from railroad men.

MAKE YOURSELF USEFUL.—A man who regards work as a hardship, an oppression, who looks upon the time given to his employer as a species of limited slavery, can never do anything well. He must take an interest in his work if he would excel. The true rule for a young man is to make himself as useful as possible to his employer. He should never feel satisfied with himself as long as anything in his power to promote his employer's interest is left undone. In this way his labor is rendered profitable. Promotion comes unsought and before it is expected. This is the secret of success.



HYDRAULIC GRAVEL ELEVATOR ON BEN WILLSON'S "BIG MUDDY" PIONEERVILLE, BOISE CO., IDAHO.

over 1000 hours. The electrical energy which supplies these exhibition lights is generated in the machinery department of the pavilion by one Charles F. Bruoe's shunt-wound, automatic dynamos. There is no outside regulation in connection with this dynamo, and the lights may be turned on or off without endangering the machine and with an economy of power proportionate to the number of lamps in use. Near this dynamo is another exhibition of incandescent lights being run from the same machine. An electric motor driving a fan is also being run from the same wires that supply the lamps. In the fly-wheel of the steam engine that drives the dynamo are three lamps attached to the spokes of the wheel. As this fly-wheel revolves very rapidly, the effect produced is a ring of fire.

Upon a board near by are 16 lamps which receive their exciting energy from the company's station on Jessie street. The wires which deliver the electricity to the large arc lamps lighting the machinery department and garden being "toped" for that purpose.

Taking the entire exhibit, it is the most complete of the kind that has ever been made on this coast, and reflects great credit upon the management. The praise that has been bestowed upon it by every one is deserved, and

disk. It is claimed that one machine will handle the pulp from five stamps, which is fed into the central hopper with one to two inches of water. The disk can be silverized and utilized to catch the free gold in the pulp.

The exhibit of concrete-and-iron work of Mr. P. H. Jackson is one which has attracted great attention. Mr. Jackson has made a number of inventions in this direction, and put them into practical every-day work. In next week's PRESS we shall give a fuller description of his systems of construction with concrete.

Several portable forges of improved design are exhibited by the maker, Geo. Cumming. One forge, for use in contracted places difficult of access, can be taken apart or put together in less than one minute. All these machines are supplied with Cumming's patent geared blower, which can create a blast of sufficient force to lift the cast-iron tuyere cap from its seat.

Near the north end of the machinery department is exhibited Navone's machine for hub and general boring, mortising and general drilling, Olsen's filter and heater for steam boilers, McGowan Bros.' emery grinder for reaper teeth and F. Korbel's exhibit of redwood tanks.

The Paragon window, both sides of which can be reached from the interior of the house, is exhibited in the gallery.



## MECHANICAL PROGRESS.

## The Scoring of Grindstones.

We recently referred in these columns to what was claimed as a new idea in dressing grindstones, a device by which the stone, in addition to its rotation, was given a lateral motion as well, to the end that the face of the stone might wear more evenly and avoid the trouble technically known as "scoring." A cotemporary, in referring to this improvement, says it is no new thing. We quote as follows:

In file-making establishments the lateral movement of the grindstone is a necessity, else the file blanks would speedily cut the stone into annular channels. In some machine shops, also, provision is made for the same movement. But if this sideways movement is absolutely reciprocal, the stone will be scored as surely as though there was no movement sideways, only the scores will be curved instead of straight. For instance, suppose the shaft of the grindstone has end play enough on its journals to allow of a lateral motion of one inch, and a cam is fixed on the shaft with that amount of throw, a stationary guide on which the cam works to be secured to the frame, it is evident that, when the stone has made one revolution, its periphery will be, in relation to a fixed line on the frame, in exactly the same place as when it started; and, in consequence, if a scoring point was held against the face of the stone, it would make a cut one inch sideways out of a direct line, but meeting, to make a continuous ring, precisely as though the stone had no sideways motion.

In order to prevent this continuous and uniform action, the lateral movement, in relation to the revolution of the stone, must be continually changing. For this purpose the driving belt should be on a pulley on a short countershaft, on which is also a gear wheel that meshes with another on the shaft of the grindstone. This countershaft is to be attached by boxes to the grindstone frame. The gear on the grindstone shaft should be wide enough on the face to allow the lateral movement of the stone without unmeshing the teeth of the gears. The cam is fixed to the grindstone shaft, and may have its throw either as a raised strip or as a score, to be guided by a holder fixed to the frame; but if the gears have even numbers of teeth—numbers divisible by each other—the uniform scoring cannot be avoided. So one gear should have an odd tooth—"a hunting tooth," as it is sometimes called—which will insure perpetual change. Thus, if the two gears had respectively 40 teeth and 80 teeth, there would be uniformity of throw; but with 39 teeth and 80 teeth, or with 41 teeth and 80 teeth, uniformity would be impossible. Half an inch is enough of lateral movement to the stone, and the relative sizes of gears are immaterial, so long as their disproportion in number of teeth is observed.

**IRON STREET PAVING.**—A new form of iron pavement has been laid on Madison street, just east of Dearborn, which is attracting a great deal of interest, not only from the average passer-by, but from practical men and those interested in the construction of a good and substantial roadway. The material used is of iron, rolled into the shape of small T rails, one and one-half inches high, laid with the flat side, or what is known as the bottom of the rail, up. This surface is an inch and a half wide, and has indentations across it at intervals of six inches, for the purpose of insuring a more perfect foothold. The rails are fastened together by being securely bolted with wrought-iron bars, and are laid an inch and a half apart. They rest on two-inch planking, and are secured thereto by staples which pass over the bolts. The pavement is laid in sections 12 feet in length by two feet in width, with stone blocking along the curb and next to the railroad track. The space between the rails is filled up to the street level with tar and gravel, thus making it perfectly water-proof. The merits of this pavement are said to be that it will keep in a smooth condition for a period probably longer than any stone or wood blocking, and is considerably less noisy than the stone. Charles Peck is the inventor, and the Chicago Iron Paving Company is engaged on the work.—*Chicago Industrial World.*

**ROLLING MOLTEN STEEL.**—With a view to making armor plates, Bessemer once tried the novel experiment of pouring molten steel between rolls revolving slowly and cooled by water passing through their centers. The rolls were expected to receive the fluid or semi-fluid steel and to discharge it solid. A plate of considerable dimensions was rolled. Fairbairn afterward in treating of the experiment said: "If this method could be carried out successfully we might look for larger and more homogeneous plates than is possible with the present system of puddle balls. We might, in fact, calculate on a continuous web of iron from the rolls on the same principle as that of the paper machine, provided the converting or leading furnaces are sufficiently large and numerous to keep up the supply."

**THE CORLISS ENGINE.**—Since the expiration of the original patents on the Corliss engine, many firms have manufactured them and put them upon the market, and usually each one claims some particular point of superiority over all others, and as a natural consequence these

engines are being used more extensively than ever before, and every engineer should be thoroughly posted on this valve gear, which possesses a great many fine points, and while it seems complicated to the casual observer, still to the initiated it is the simplest of all automatic valve gears, and it is one that admits more of a chosen adjustment of the several valves to their respective duties than any other extant, and yet we find men who have run them for years who are entirely ignorant of what it is possible to do with them, or even how the steam and exhaust valves are constructed and the manner in which they perform their work.

## Europeans Visiting our Manufactories.

Quite recently, two well-known German iron manufacturers visited Pittsburg with the view of making a comparison between our mode and facilities for manufacturing iron and steel and those of Germany. While there they remarked to a newspaper reporter as follows:

"We have traveled extensively in the West and have just arrived from Cincinnati. I am keeping a diary of our travels, so that we may benefit by our mission. Our chief object is to examine the methods of manufacturing steel in this country, together with the condition of the workmen. I confess that we have been surprised. America is far ahead of us in making steel. Their methods are quicker, more powerful, and their extensive use of machinery makes their cost of production much less than ours. For instance, here a billet of steel is put into the machinery and it comes out a finished steel rail. In Germany in making the steel rail it passes through the hands of many workmen.

"The social condition of the workmen in America is far superior to that of any workmen I have seen in any country. A few days ago I had my dinner with a German steel worker. He had just come from work, and really, the meal was such that workmen in Germany never see, even in their holiday time. I also saw in this man's house easy chairs, a lounge and a spring-bed. These luxuries are confined absolutely to the rich in Germany. Our workmen—that is, common laborers, earn about 90 cents per day, and skilled workmen about \$1.25. Provisions there are just about as dear as they are here. Altogether, Americans have much to be proud of. We are anxious to have a good look at Pittsburg, because wherever we have been manufacturers have said to us: 'Be sure and visit Pittsburg and see its natural gas.' The latter is really the great thing talked of all over the country."

## An Austrian Engineer's Opinion.

We clip the following from a late issue of the *Pittsburg Commercial Gazette*: Mr. Arthur Pehger, of Vienna, Austria, is in the city examining the manufacturing establishments. He is a civil engineer of some repute in his own country, and some months ago left to visit the industries of the New World. He arrived here some days ago, and found such interesting subjects of study that he has already overstaid his limit, and yet cannot make up his mind to leave. He was seen last night at the Seventh Avenue hotel, and said to a representative of this paper:

"I have been astonished with the advancement of this country in engineering. In some matters we are ahead, but in others America leads. I think on the whole, though, the United States has the advantage. But the most interesting place of all is Pittsburg, with its natural gas. I was astonished, and have looked into the mills and glasshouses with the deepest interest. It seems to be better fuel all around than any fuel yet discovered. But the most interesting of all the sights are the immense engines at the water-works. I don't think they are excelled in the world.

"Mr. Lowry has proved that his theory of upright engines is a correct one, and I spent several most pleasant hours up there. I was surprised, though, that he made only one pair of his engines compound. That is now the true theory. All the English locomotives are compound, having three cylinders, and Mr. Lowry should have carried out his first plan. I shall leave here to-morrow, but I shall not soon forget those immense engines."

**A POINTER FOR MOLDERS.**—A correspondent of the *American Machinist* writes: "I was making at one time some castings with a very steep joint. I used to get lake sand, wet it and sleek it up. One day a tramp came along and stood looking at me. Said he, 'Why don't you get some rags for that job and use them in the place of that sand?' I got some rags, wet them and put them on, and they beat all the parting sand and paper I ever tried."

**TRANSMITTING POWER.**—Experience has proved that the least practicable distance to which power may be transmitted economically by means of a wire rope is only about 50 feet. It has been demonstrated that compressed air can be conveyed a distance of one or more miles with greater facility and economy than is now done so extensively with steam. It has been used in tunneling and mining at great distances.

**A REASON WHY STEEL WILL NOT WELD AS READILY AS WROUGHT IRON** is that it is not partially composed of cinder, as seems to be the case with wrought iron, which assists in forming a fusible alloy with the scale of oxidation formed on the surface of the iron in the furnace.

## SCIENTIFIC PROGRESS.

## Recent Progress in Chemistry.

In a paper recently read before the New York Academy of Sciences by Prof. H. O. Bolton, of Trinity College, Hartford, Conn., the professor discussed the problems of chemical dynamics and pointed out the rich store of promise in this neglected field. Physic, he remarked, deals with three quantities—space, mass and time. Chemistry has long been content with studying the changes of matter in terms of space and mass only. The discovery of a time-rate for the attractions due to affinity is destined to throw new light on chemical science, and to render it capable of mathematical treatment.

A prodigious amount of work has been done in thermo-chemistry, and within a few years a multitude of isolated observations have been collected, classified and made available. The importance of this undertaking will be more appreciated in the future than it has been in the immediate past.

In all cases of chemical change, energy in the form of heat is either developed or absorbed, and the amount is as definite in a given reaction as are the weights of the substances involved; hence measurement of the quantity of heat set free or absorbed in chemical reactions often enables the chemist to determine the true nature of the change. For example, the exact condition of certain bodies in solution can only be conjectured from certain physical characters, few and ill-defined; but by thermic methods of investigation the bodies formed can be accurately ascertained. This is accomplished by reference to the laws of maximum work. "In any reaction, those bodies, the formation of which gives rise to the greatest development of heat, are formed in preference to others." Thus the thermometer alone, in skillful hands, determines the *a priori* necessity or impossibility of a reaction.

**NEW SOURCES OF ALCOHOL.**—A correspondent of *Comptes Rendus* obtains alcohol from turpentine. He says French turpentine oil reacts with acetic acid, forming several acetates with the formula  $C^{10}H^{10}C^2H^4O^2$ , which are of various properties. From these acetates are obtained various single valued alcohols,  $C^{10}H^{18}O$ , by heating with an equal weight of potash and five or six times the weight of alcohol in a closed vessel for 10 hours up to the boiling point. By the addition of water, the combination thus formed can be separated, and can be purified by distillation in a vacuum. A botanist of Germany has discovered what he considers will prove a new and economical source of alcohol or brandy. It appears that the pulp which covers the poppy seed contains saccharine matter, which, after due fermentation and distillation, produces a kind of brandy of an agreeable flavor. As this pulp has hitherto been thrown away, the discovery, it is said, affords poppy planters an opportunity of realizing more profit from their crops, without a very great expenditure of capital.

**AN INGENIOUS LITTLE INSTRUMENT** called the "hyalolypotype," or (more sensibly) hot pen, has been invented, by means of which drawings can be made on glass or glassy substances with a waxy composition, which is solid and somewhat hard at ordinary temperatures. The pen can be heated by gas or electricity, and when heated the waxy material flows easily from it, setting so quickly on the glass that cross patching can be done more rapidly than with ordinary pen and ink, without risk of blocking up the angles. Corrections can be made with a pen-knife. After the drawing has been made, the plate is etched by fluorid acid, and when complete it can be either electrotyped, stereotyped, used directly, or applied to any purpose for which engraved surfaces are required.

**THE NOISE OF THE FINGER.**—Dr. Hammond says that when you place the end of your finger in your ear, the roaring noise you hear is the sound of the circulation in your finger, which is the fact, as any one can demonstrate for himself by first putting his finger in his ears, and then stopping them up with other substances. Try it, and think what a wonderful machine your body is, that even the points of your fingers are such busy workshops that they roar like a small Niagara. The roaring is probably more than the noise of the circulation of the blood. It is the voice of all the vital processes together—the tearing-down and building-up processes that are always going forward in every living body from conception down to death.

**GENESIS OF A SALT MINE.**—On the eastern coast of the Caspian Sea a curious phenomenon is in progress. The Kara Bobhas is an estuary nearly separated from the main body of the sea by a bank through which there is an inlet. The evaporation from this gulf is so great that a current continually sets in from the Caspian; and as there is no return current the water of the gulf becomes more and more saliferous, and a deposit of salt is in course of formation. In time this gulf will be cut off from the Caspian, and will then be dried up and become an extensive salt bed.

**AN OPTICAL ILLUSION.**—M. De Parville has called the attention of the French Academy of Sciences to a curious illusion of the vision which may account for the apparent oscillation

or swinging of stars, sometimes observed. When the eye looks for some time at a small, feebly-lighted body, itself being in complete darkness, the body appears to oscillate or describe certain curves. It is a phenomenon of the subjective order, and appears to be of the same nature as the movement of a star observed when a person leans the head against a wall and fixes his eye upon the star. The star appears to be agitated in its place and to oscillate rapidly. In order that the motion may be noticed, there should be no moon, and the sky should be clear.

## Thunder-Storms.

The cause of the phenomena of thunder-storms, in the present state of our knowledge of atmospheric electricity, is quite obscure; but the fact that their frequency and violence is evidently increasing in all civilized countries at least is inducing a more careful study of them. It is to be hoped that more light will be thrown upon this interesting matter by a comparative study of the frequency, severity and other phenomena during a lengthened period of time and on extensive geographical area.

The Germans appear to be taking the lead in this study, and from certain meteorological statistics recently published in Germany we learn that thunder-storms in that country have, during the last 30 years, been steadily increasing, both in frequency and severity. The number of deaths per annum from lightning has also increased in a far greater ratio than that of the increase of population.

The German savants incline to the opinion that the increase is to be attributed to the enormously increased production of smoke and steam which has taken place during the last three decades. But, although we may admit this to be to some extent a probable cause, yet, when we consider the very local character of thunder-storms, we should naturally expect to find that it would follow that the neighborhoods of large cities, and especially of manufacturing districts, would suffer the most severely. But the statistics referred to show distinctly that the very reverse is the case. The number of storms attended by fatal results from lightning is far larger in the agricultural districts than in the towns. Upon the other hand, we ought to take into consideration the protective action of lightning conductors, with which the prominent buildings in the towns of Germany are well provided.

**FACTS ABOUT THE COMMON HOUSE-FLY.**—The house-fly begins to make its appearance in July, becomes abundant toward the end of August, and lives from that time till killed by cold weather. The eggs are deposited in the ordure of stables, whose warmth hatches them. The larva hatches from the shell in the form of a small, white worm; from this it passes into the pupa state. The pupa is larger than the larva, and is of a dark-brown color. In this state the insect remains from 8 to 14 days, then comes forth the perfect fly. All flies and mosquitoes grow in the larva and pupa state, and after they acquire wings they do not grow any more. The smaller flies we often see with the house-fly are not the young of the same species, but another and a smaller kind. As all flies apparently perish on the advent of cold weather, it is difficult to tell whence come the fresh swarms with each recurring summer season, but it is supposed that a few do live through the winter in sequestered warm spots, and no doubt some lie dormant in the pupa state through the cold months. Thus enough are carried over to begin the work of propagation in the early spring. This work proceeds so rapidly that in a month or two a little one literally becomes 1000, and July finds us with our usual crop of millions of our familiar pests on hand.

**THE AUGUST ECLIPSE.**—The total eclipse of the sun which occurred August 29th—invisible in this country—belongs to the series occurring in 1850, 1868, 1886, 1904, etc., which series is remarkable for the extreme length of the period of totality. This time the greatest duration was at a point in the Atlantic, a little more than 400 miles southwest of Sierra Leone, where the sun was wholly covered by the moon for about 6½ minutes. On land the greatest duration, nearly five minutes, was at Ben-Guela, on the South African coast. A more readily accessible point for studying the eclipse, however, was found at Grenada, in the West Indies, where the total phase lasted a little less than four minutes; and this place was selected as the site of observation for a party of British astronomers, who no doubt spent the few moments so precious to science in efforts to add to our knowledge of the solar corona and other eclipse phenomena. We have not, as yet, seen any reports from observers.

**MORE EVIDENCE OF INTERNAL HEAT.**—From his studies of the Krakatoa catastrophe, Verbeek is led to maintain that the central part of our globe remains still in a molten state, and he disputes the theory which has been advanced that the heat of the volcanic furnaces is entirely due to local chemical action.

**ANOTHER NEW ELEMENT.**—A new chemical metallic element has been obtained from orthite of Arandal, by Professor Linneman, of Prague, who has given it the name of "aus-trium."



## Advice to Young Miners.

A nice young man, who writes that he is from the East and intends to engage in prospecting, wants us to give him some advice, says the *Denver Tribune-Republican*. That young man will be a brilliant success; he appreciates the eternal fitness of things; he knows where to apply for advice, and that in this great and glorious republic it is sold at from \$1 to \$10 a year, according as the chunks may be delivered in daily or weekly doses.

He has begun his training for a prospector's life in an admirable manner, which will do something toward fitting him for the fate in store. Notwithstanding all analogy would lead him to expect to obtain here all he asks for, he will be disappointed. The mining editor went out of the advice business several years ago. He confines himself now to a statement of facts, leaving people to be guided by them in whatever direction their stock of sense or idiocy may lead.

But we have been reading over several chapters of a book of advice, and if the nice young man will accept its contents, concentrated with a loss of nothing but worthless gangue, he is welcome to it.

In the first place, don't sit down on the edge of every hole you find and wait for some tender-foot capitalist to come along and buy it, especially if it be a silver prospect. Silver mining is in the condition of a graveyard, as described by Jim Fisk; those who are in can't get out, and those who are out don't want to get in. Nobody but a chump ever sits down to wait for some one to buy his hole in the ground. A nice young man of sense will go to work and change it from a hole in the ground to a decent prospect or a mine, if it contains the qualities which will make it such.

Don't be a chump. Nobody but a chump expects to make a paying mine out of a hole which shows no ore of paying value, if that hole be on a fissure vein. Nobody but a chump will neglect to prospect his vein along the surface to find a chimney or deposit of pay ore. Nobody but a chump will expect to make a paying mine out of a vein which does not show pay ore somewhere on the surface.

Don't be a chump. Remember that a mine out of which one cannot make money has no present value. Its prospective value depends upon surrounding conditions and indications. Indications which don't assay well are quoted 'way below par. A chump often goes half crazy over the discovery of a piece of rich ore as big as his thumb, and at night rolls up in his blankets and revels in dreams of wealth. The next setting sun finds him as poor as ever, when, if he be a thoroughbred instead of a grade chump, he immediately proceeds to paint things red.

The prospector who is not a chump works along steadily, reads and studies, and learns from observation and experience of others. He gets an occasional fairly good thing, sells it for a reasonable price, and finally moves down to Denver, buys a pretty cottage, and settles down to spend his days in comfort and peace, teaching his children not to be chumps.

**DECISION ON MINING LAND.**—Judge Deady delivered an opinion in the United States District Court yesterday in the case of the United States against Reed and Eccles. The case is one of considerable interest, having been brought to deprive defendants of title to a farm under the plea that the land was mineral land. The farm in question is situated on Jackson gulch, a short distance above the town of Jacksonville. Vast quantities of gold were taken out of this gulch some 30 years ago, but there has been no mining done in that vicinity for many years. The claim in question was located by an old miner who, if mining had been practicable there, would have sought for the gold in the ground instead of planting peach trees on it. It is well known that there is gold in all the gulches around Jacksonville, which could be mined with profit if water in sufficient quantities could be had. But it was held in this case that mining with profit was impracticable on the ground in question, and therefore the bill was dismissed. One singular feature in the matter is that parties who were instrumental in having the suit brought have lots of land in the same vicinity, which was taken up as agricultural land. From this decision it appears that even where land is known to contain mineral it can be taken as agricultural land if more valuable for that purpose.—*Oregonian*.

**UTAH MINING LAW.**—Utah's Supreme Court has decided that the original locator is entitled to the whole of a vein, a part of the apex of which is within his discovery, even if it shall be established later that the outcroppings of the vein are wider than the side lines of the location; that the discoverer is not restricted as to the width of his vein, but only as to its length. Another finding, which is new in mining jurisprudence, but which seems to be sound, is that where two veins unite into one in the depths the apex shall be considered as the point where they unite, and the oldest location shall hold the united vein.

The *Spearfish Register* (Dakota) speaks very encouragingly of the prospects of the mines lying west and south of that city, and feels confident they will develop into bonanzas.

## USEFUL INFORMATION.

## How Milk is Spoiled.

Milk will absorb odors at one time when it would not at another. It readily takes in vapors and odors from the air when it is at the same temperature or colder than the air that surrounds it, but parts with its own odors when warmer than the air with which it is in contact. When cold air touches warm milk, the air expands and becomes lighter and rises. As it expands, its capacity for holding vapors, gases, or odors, is so much increased that it is not only able to hold all the odors and moisture it contained before, but it is enabled to take in more, and hence it is ready to take up, and does take up, any odor or vapor which is volatile enough to rise out of the milk. Thus, cold air, even if it is not quite as pure as one might desire it for breathing, does not contaminate warm milk, but, on the contrary, actually becomes an aid in purifying it. A pail of freshly drawn milk, so long as it remains much warmer than the air in a stable, may stand in the stable unharmed, provided nothing but the air, or what is in the air, touches it. If a vessel of cold milk is placed in warm air, the effect will be reversed. When warm air touches cold milk, the air becomes condensed, and its capacity for holding moisture and odors is so much diminished that it becomes unable to retain the load it was carrying, and is forced to deposit its burden on the surface of the milk, to be absorbed and held in the milk or its cream in the same way that the air on a hot day unburdens itself on the surface of a vessel of ice-water, where the depositions become apparent in the form of dew. If a pail of warm milk and one of cold milk are placed side by side in the same stable, one may be growing purer and the other more foul at the same time, so much has the fact of temperature to do with the absorbing power of milk. Under the law of the diffusion of gases, aeriform bodies will, to some extent, force themselves into liquids like milk or water, when all are at the same temperature, but that law is largely controlled by relative temperatures.

Does the reader ask how stable odors do get into milk, if not absorbed by the milk after it is drawn? The answer is, they get into it through the breath of the cow. Standing in a stable filled with foul air, a cow cannot avoid taking in at every breath the odors with which it is loaded. Upon entering the lungs they are forced at once into the circulation. The blood becomes charged with them, and the milk, which always serves as a means of unloading the blood of its impurities, as well as its nutriment, also becomes loaded with the odors intensified, greatly to the disgust of those who use the milk. It is surprising to those who have never carefully noted the facts, how soon and how effectually foreign odors, good or bad, are taken into milk in the air breathed by milk-giving cows.

There is no surer way of befouling milk than by forcing cows to breathe the confined air of their stables, saturated with the fumes of their perspiration and excrement. The consequence of breathing such odors is so plain and certain that it seems strange that it should be permitted to the extent it is. The assumption so commonly made, that the milk absorbs the scent after it is drawn, is doubtless one of the prominent causes. It is time that delusion was dispelled, and that dairymen should appreciate the fact that if they are to have pure-smelling and pure flavored milk when their cows are in the barn, they must contrive to keep the odors of the stable from the nostrils of their cows and give them pure air to breathe. Hurrying the milk out of the barn may be a good thing to do, but it will not remove the common cause and frequent occurrence of stable odors in milk.—*Live Stock Journal*.

**A HAT WHICH TAKES PHOTOGRAPHS.**—The last new thing in hats beats all that has gone before it, and is scarcely likely to be equalled by anything that can follow after it. Herr Luders, of Gorlitz, has patented a photographing hat. The novel headress contains in its upper part a small photographic apparatus and a number of prepared plates. In the front of the hat there is a small circular opening, behind which the lens is fixed. By means of a string on the outside of the hat, its wearer, whenever he finds himself enjoying a pleasant view or attended by an agreeable person, can instantaneously photograph the landscape, the lady or the gentleman, unconsciously, within the range of the instrument.

**THE KING OF SPIDERS.**—A French entomologist has described the bird-spider of tropical America, the largest of the several hundred known species of spiders, as a formidable creature having a body four and a quarter inches long, or a diameter of seven inches with the legs extended. Its nest, in the center of which its 1500 or 2000 eggs are deposited, is so strengthened as to be capable of arresting a small bird; and the spider is sufficiently powerful to destroy not only young birds and adult humming birds but large lizards and reptiles.

**LUMINOUS STONE.**—A method of utilizing the luminous powder prepared mainly as a sulphide of calcium for admixture with cements, plaster of paris and concrete, has been recently invented by E. Ormerod and W. C. Horne, of London, the object being to prepare the articles

with a self contained phosphorescent property, instead of coating them with a luminous paint. As an example, the patentees take of cement, such as is known as Keen's Parian or other suitable make, in varying proportions, as, for instance, two pounds to five pounds to one pound of the luminous powder; mix the same with water, and then mold it to required shape in the usual way, or lay it on to ceilings or walls by means of a trowel. The patentees attach importance to placing the molded articles, as soon as they have been dried, in a bath of paraffine wax and benzoline or other suitable weather or water-proofing substance. In the case of using the luminous cement upon a wall or ceiling, they sponge or brush the surface over with a solution of paraffine wax and benzoline or other suitable damp-proofing solution. The uses of a luminous cement are manifold, e. g., for the garden—luminous concrete as edging to garden paths and carriage drives, for guides and beacons at the entrance gates of drives, insides of stables, the base of balustrades, or the entirety of balustrades. For roads—as luminous beacons at corners of dark country lanes, and at the ends of bridges, ends of walls, and curbs of foot-paths. For docks—for edging of piers and wharves. For water works—for the safety and dispatch of night work by the erection of luminous guides and beacons, and for fire-plug notices on walls. In short, for any places where the light of day will sufficiently excite the phosphorescent property as to render the cement or concrete work luminous by night.

**ACIDS IN LUBRICATING OILS.**—How acids in lubricating oils can be detected is told thus by *Power*: By analysis in a laboratory, or by putting the sample to be tested in a clear glass bottle with a copper wire running down through the cork air tight. Stand the whole in a sunny place and leave for two or three weeks; then if on removal verdigris or green rust is on the copper, there is an acid in the oil. This is a rough effective test for engine-room use.

**TO PREVENT THE CRACKING OF WOODEN FAUCETS, etc.,** put the articles in melting paraffine, and heat them there at a temperature of 212 degrees F., until bubbles of air cease to escape from the wood. The whole is then allowed to cool to about 120 degrees F., when the wood is taken from the bath and cleaned from the adhering paraffine by rubbing with a dry piece of cloth.

**SALT IN SEA WATER.**—If a box six feet deep were filled with sea water and allowed to evaporate under the sun, there would be two inches of salt left on the bottom. Taking the average depth of the ocean to be three miles, there would be a layer of pure salt 230 feet thick on the bed of the Atlantic.

## GOOD HEALTH.

## Poison in Milk and Cheese.

The frequent reports of cases of apparent poisoning from eating cheese, milk and ice cream has led to a careful scientific examination of those substances, with a view to ascertain how the poison exists therein. About a year ago, says an exchange, Dr. Victor C. Vaughan, of the University of Michigan, succeeded in isolating, from some samples of cheese that had produced alarming symptoms in many persons, a highly poisonous ptomaine, which he named tyrotoxin (cheese poison).

His knowledge has been gained largely through experiments upon himself and some of his more enthusiastic students. He found that the same symptoms were produced by the isolated poison as had been observed in those who had partaken of the affected cheese. They consisted principally of dryness and constriction of the fauces, nausea, retching, vomiting and purging. Although in several cases the illness was very severe, all finally recovered.

Further investigations have led to the discovery that tyrotoxin may be developed in milk, and is probably responsible for the several cases of poisonous ice cream that have recently puzzled the medical authorities. It is also believed to have an intimate connection with cholera infantum and kindred diseases, a view that is sustained by the severity of its effects upon young animals.

It was found by Dr. Vaughan that milk which was presumably normal when first obtained yielded crystals of the poison after long standing in a tightly-closed bottle.

A sample of ice cream which had made 18 persons quite ill was also examined by the same method, and the aqueous solution of the tyrotoxin was given to a cat. The effect was distinctly noticeable in 10 minutes, when the animal began to vomit and show other characteristic symptoms. There seems little doubt that the poisonous element in the cream was due to the presence of the alkaloid.

Dr. Vaughan is of the opinion that the production of the poison is due directly or indirectly to the growth of some micro-organism.

The presence of butyric acid has been demonstrated in the specimens of cheese, milk, and cream from which the poison was obtained, and it has been suggested that the generation of the tyrotoxin was the result of a butyric acid fermentation. It is known that the action of the butyric acid on ammonia produces an alkaloid known as coniine, and it is quite possi-

ble that tyrotoxin may be formed by the action of decomposing nitrogenous substances on butyric or other fatty acid. From its physiological effects, it has been inferred that the alkaloid contains two poisons.

**THE ACTION OF THE HEART.**—As with each stroke the heart projects something like six ounces of blood into the conduits of the system, and as it does so some 70 times every minute and 4200 times in an hour, this implies that it does the same thing 100,800 times in 24 hours, 30,000,000 times in a year and more than 2,500,000,000 times in a lifetime of 70 years. The mechanical force that is exerted at each stroke amounts to a pressure of 13 pounds upon the entire charge of blood that has to be pressed onward through the branching network of vessels. According to the lowest estimate that has been made, this gives an exertion of force that would be adequate, in another form of application, to lift 120 tons one foot high every 24 hours. Yet the piece of living mechanism that is called upon to do this, and do it without a pause for three-score years and ten, without being itself worn out by the effort, is a small bundle of flesh that rarely weighs more than 11 ounces. It is in the nature of the case, also, it must be remembered, that this little vital machine cannot be at any time stopped for repairs. If it gets out of order, it must be set right as it runs. To stop the beating of the heart for more than the briefest interval would be to change life into death. The narrative of what medical science has done to penetrate into the secrets of this delicate force-pump, so jealously guarded from the intrusion of the eye that it cannot even be looked into until its action has ceased, is, nevertheless, a long history of wonders.—*Edinburgh Review*.

**A PHYSICIAN'S PREDICTION.**—A recently published volume, the work of Dr. Austin Flint, of New York, is said to contain a remarkable prediction respecting the progress likely to be made in medical practice in the next 50 years. A press notice of the book says that the author expresses great confidence that the principle of the telephone will, by and by, be applied to intrathoracic respiratory and heart sounds, so that they will be transmitted to the ear more distinctly than they now are by the stethoscope. As consequences of this advance Dr. Flint points out that not only will these sounds be transmitted from the patient to the physician, no matter how distant the one may be from the other, but also that "the sounds from the chest of a patient may be phonographically registered, transported ever so far, and made available after an indefinite period."

**EFFECTS OF MENTAL OVERWORK ON THE TEETH.**—According to the *British Dental Journal*, the teeth of hard-worked pupils of the Paris public schools deteriorate a few weeks after their entry. The second dentition is often premature. Dr. J. S. Williams has shown that any mental strain shows itself upon the teeth in a very short time, both in increased decay as well as in increased sensibility of the dentine. Dr. D. M. Parker has reported that these same changes are always apparent in men who are in training for athletic trials. These observations show that they are matters which demand serious consideration from educators. Certainly a good education ought not to bring decay to any organ of the body, but the reverse. The fault must be with the system of education rather than with education itself.

**TREATMENT OF A DOG BITE.**—Persons who have been bitten by dogs, whether mad or otherwise, should at once cleanse the wound very thoroughly with warm water. If the dog is believed to be mad, after cleansing the wound suck it with the mouth, so as to draw out as much blood and fluid from the part as possible; continue this for some time. If this cannot be done by the sufferer, then some friend should do it for him. There is not the slightest danger in this operation unless there is some abrasion on the lips or in the mouth. After this has been done, cauterization may be resorted to, but it is hardly necessary. To be doubly sure, let the bitten person take, if possible, Turkish baths two or three times a week for six or eight weeks. This of itself is a very excellent preventive, from its cleansing effects.—*Herald of Health*.

**BLINDNESS DUE TO DECAYED TEETH.**—Dr. Widmark, a Swedish surgeon, having as a patient a young girl in whom he was unable to detect the slightest pathological changes in the right eye, but who was yet completely blind on that side, observing considerable defects in the teeth, sent her to M. Skogsborg, a dental surgeon, who found that all the upper and lower molars were completely decayed, and that in many of them the roots were inflamed. He extracted the remains of the molars on the right side, and in four days' time the sight of the right eye began to return, and on the eleventh day after the extraction of the teeth it had become quite normal. The diseased fangs on the other side were subsequently removed, lest they should cause a return of the ophthalmic affection.

To apply a mustard plaster so as not to blister the skin, mix the mustard with the white of an egg instead of water. The plaster will draw thoroughly without blistering the most delicate skin.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**SUTTER CREEK.**—Cor. Amador Ledger, Sept. 18: The disposition of the property belonging to the Eureka mine is progressing rapidly. The framework of the 40-stamp mill has been sold to parties in town and several persons are having cheap buildings put up on the strength of this purchase. I have nothing new to report with regard to the future of the mine; the prevailing opinion is that everything will remain quiet for some time. A slight accident occurred at the South Spring Hill mine a few days ago. A portion of the hoisting machinery gave way. The men were in the mine at the time and were compelled to climb out by means of the ladder. Mechanics are at work, and everything will be running smoothly in a short time.

## Butte.

**WEST BRANCH DISTRICT.**—Butte Record, Sept. 18: Mr. James Peale was down to-day from the West Branch Mining District and gives a favorable account of mining prospects in that vicinity. A tunnel is being run in the Holborn claim, and it is expected that pay dirt will soon be reached. It has heretofore been worked by pining. The drift diggings of Mr. Smith is also making preparations for work. The supply of water for the claim is small and requires to be stored. The drift claim of John Dix is also being successfully worked. Altogether the prospects of a successful mining season are confidently anticipated by those interested in mines in that vicinity.

**NEW QUARTZ MILL.**—Oroville Register, Sept. 16: Oregon Gulch in early days was famous for its gold mines, and now it looks as though the source of the gold, the parent quartz ledge, was about to be developed as a paying mine. A tunnel has been run a distance of 300 feet and the ledge struck. Side tunnels are now being run north and south to open and develop the ledge. The rock prospects well and almost assures \$10 a ton. The ledge is 8 feet wide and continues to improve in richness the more it is developed. The foundation for a new 10-stamp quartz mill has been laid and a part of the machinery is already on the ground, while the remainder will arrive this week. Mr. Charles Diter, superintendent, is pushing things as fast as possible, and expects to have the mill running before the middle of October. Mr. John Nesbit, one of the principal owners in this mine, is an old and experienced miner and has worked for years in developing the lode.

## Calaveras.

**RICH ROCK.**—Calaveras Chronicle, Sept. 17: We were shown some specimens of very rich rock Monday last, they were taken from the lead owned by Mr. John Etchevery, near the Cold Spring Cottage. The rock was taken from a depth of 40 feet, at which point the vein is three feet in width. The rock shown us assays \$300 per ton.

**RED GULCH.**—Cor. Calaveras Chronicle, Sept. 17: It remains to be seen in these latter days whether the expected mining boom so long looked for will receive its proper impetus. The certain movements of capital taking place nowadays point to favorable anticipations in that direction, and many mines through this portion of the mineral belt will receive sufficient development, either to prove some of them paying mines or with adverse results, during the present and ensuing year. The present prospects that have been recently opened here will prove to the mining world that ore containing gold in paying quantities will be extracted from them in the near future. Extensive mining work will be vigorously prosecuted, shafts will be sunk, tunnels run, mills and hoisting machinery erected and the work carried on on a grand scale. English capital is being introduced into this section, and should their efforts be crowned with success a prosperous era will undoubtedly follow, for there are mines that would pay well were they handled and properly developed, one of which I may mention, namely, the Foot & Thompson. This is a ledge of large proportions, having produced a large amount of gold bullion in its early history. At no distant day this will prove to be a paying property. It is at present idle. The Butcher John mine near here is being blessed with a rich strike. The shaft is 40 feet in depth with a good-sized ledge in the bottom. Some of the ore will go well up into the hundreds. Some good news has reached us from West Point and the mines adjacent to that locality. The Keltz mine is yielding splendid dividends to its owners. Ore which is refractory is being shipped to Selby's Smelting Works at Vallejo. The Soap Root mine, owned by John Henry, has shipped 40 tons of sulphuret ore to the same works. The Lockwood mine, with 11 men, is producing two tons daily of ore yielding \$70 per ton. The Water Lily mine has taken the lead, showing a four-foot ledge of fine sulphurets and galena which is literally spangled with gold. The Fine Gold mine, near Railroad, continues to ship gold bullion and is looking very well. It employs 40 men.

**BONDED.**—Calaveras Prospect, Sept. 17: The Rathgeb mine has been bonded to an English company for a large sum. A force of men have been employed in the work preparatory to building a 30-stamp mill, which will be erected on Calaveritas creek below where the old water wheel has stood for many years. The Banner mill has a contract to cut over 100,000 feet of lumber to be used mostly in the erection of the mill. Some of the heavy timbers are already on the ground, quite a number of laborers have been employed in and about San Andreas, and every one appears to feel that our town will soon assume a livelier aspect. There appears to be very little difference of opinion in regard to this mine, and there is no doubt but that it will prove to be one of the best paying mines in the county. It is not merely a prospect but a well-defined lead which shows for itself.

**BIG MILL.**—Mountain Echo, Sept. 15: Lumber has been hauled to the Gold Cliff mine, preparatory to commencing operations. The mill, as before stated, is to be a 60-stamper, and will have a crushing capacity of about 140 tons per day. When the

quartz mills now in course of construction in this mining district are completed (including those in operation), the aggregation of stamps will be over 140.

## El Dorado.

**MILLS AND STRIKES.**—Sacramento Record-Union, Sept. 22: The quartz mines in the neighborhood of Shingle Springs are looking fine and some are paying quite handsomely. The Vandalia mine was recently sold to Kelly, Ives & Co., of San Francisco, for \$20,000, who are planning the erection of a new mill. This mine is situated five miles south of Shingle Springs, near the Big Canyon gold mine, formerly known as the Orofino. The latter is having erected a 20-stamp mill, a carload of the machinery of which went up from this city yesterday. Those mines have been sufficiently prospected and developed to show a large quantity of pay ore, and their yield is no uncertainty.

The Barnes mine, three miles east of Shingle Springs, on what is known as the "Blue Stone ridge," has again started up after lying idle for several months. This is one of the most regular paying mines in the State, is easily and cheaply worked, and has proved a veritable bonanza to its owners. It is showing better ore now than on any of the upper levels.

J. W. Hodgkin & Co., of the Pyramid mine, have bonded the celebrated Gray mine on Gray's Flat, four miles northwest of Shingle Springs, and have commenced operations on a large scale. This is one of the most celebrated mines in the section. Several fortunes have been taken out of it, and the mine has never been systematically worked. The miners seem to have only coyoted out the rich pockets, and left the main body of ore. Some of the pockets, or rich spots in the ledge, paid as high as \$30,000 to the ton. It will now be worked for the first time systematically, and no doubt will pay handsomely. The Springfield mine and the Springfield extension, near Mud Springs, are being vigorously prosecuted, the former paying handsomely, the latter showing well, and promises to be equally as good, if not better, than the former. Several mines are being worked with profit in the vicinity of Log Town.

N. S. Miller, from less than a ton of ore from his mine, some four miles north of Mud Springs, some days since, with a hand mortar, took out \$1495. All of the ore is not so rich as that, yet none of it is barren. All pays well for milling.

Frank Miller has a mine near Missouri Flat which he has sunk a shaft upon some 50 feet. The ledge is three feet in width, has well-defined walls, and all the rock, from the surface to the bottom, which is easily mined and milled, averages \$11.50 per ton. Several mines in that section, also in the neighborhood of Sugar Loaf, are paying well.

The old Pacific, in the time of Placerville, one of the best pieces of mining property in the State, which has been idle for some time, owing to a "game of freeze out" that has been going on in the directorate, will start up in a few days. This mine employs upward of 100 men, and when it is running adds much to the life of the county seat.

Tommy Davidson has a mill running on a mine between Mud Springs and Shingle Springs, and is said to be turning out bars of bullion regularly.

There is quite a boom in quartz mining at Grizzly Flat. It is not a recent boom, but a continuation of a boom that commenced there some five years ago. Grizzly Flat has become a large and prosperous town, and the numerous quartz mines, her main support, seem to be permanent and inexhaustible. The mines at Uniontown and Coloma are paying well, the old Peterson mine at the latter place, owned by Sacramento citizens, declaring handsome monthly dividends.

The mines on the Georgetown Divide are equally as promising. New companies have gone into Greenwood, Garden Valley, Spanish Dry Diggings, Mt. Gregory, Georgetown, Georgia Slide and Tip-ton Hill districts, and the most flattering reports are heard from all.

## Los Angeles.

**COAL DISCOVERY.**—Orange Tribune, Sept. 10: Mr. D. N. Harwood called on us on Monday, and informs us that he has recently discovered an extensive vein of coal near his bee-ranch, in the Santiago canyon, and has very flattering prospects for a valuable mine. He has made a claim of 320 acres, has had the proper surveys made, and will commence operations toward opening the vein at once. He will put on a force of men and run night and day. The croppings are in sight, nearly half a mile apart, and the indications are good for a strong vein. This is a fortunate discovery, not only for Mr. Harwood, but for this part of the valley. The Santa Clara mine, which has hitherto supplied the coal for this section, has become exhausted, and work has shut down entirely. Mr. Harwood calls his new find the "North Star." We hope it will prove as good as it looks.

## Mariposa.

**INGENUITY AND ENTERPRISE.**—Mariposa Gazette, Sept. 18: In company with Mr. Geo. E. Crowell, a mining gentleman from San Francisco, on Tuesday last we visited Dr. Robinson, on Sherlocks, who has recently erected a five-stamp steam-power quartz crushing mill on the McCann mine. The new shaft, which is to the rise of 100 feet deep, is timbered with a view to safety, and no better piece of work have we seen in a mine. The plant of the new engine and the frame-work which carries the stamps and the mortar-bed is constructed with masterly skill, both for safety and durability. The little engine with all its compactness is a beauty within itself. It performs all that is required; pumps the water, raises the carloads of dirt and rock to the surface; each carload amounting to 700 or 800 pounds, using only 40 pounds of steam. The power of the engine can be increased sufficient to run 20 stamps whenever required. The stamp, bed-plate and mortar are all as near perfect as human ingenuity has thus far devised. No mercury is used in the battery, and it is claimed by the doctor that not a speck of gold escapes or is lost.

## Nevada.

**THE MEADOW LAKE MINES.**—Truckee Republican, Sept. 15: A writer at Meadow Lake says the new mill will be completed in a few days. The bond for the Excelsior mine is for \$60,000, contingent upon the success of the electric process. The season is too far advanced for any great amount of work to be done this year, but if the experiment is successful, there will be a live town at Meadow Lake next year. About 100 locations have been

made so far. A pack-train from Cisco, 12 miles, brings in stores and also carries mail to and fro.

**PENNSYLVANIA MINE.**—Grass Valley Union, Sept. 16: The lessees of the Pennsylvania Con. mine, on Kate Hays Hill, have had a crushing of 26 loads of quartz at Riley's mill. The yield exceeds \$40 a load without the sulphurets, which are said to be very rich, and will add from five to ten dollars to the value of each load of ore. The mine is showing up splendidly and the lessees and stockholders are sanguine in their expectations of the richness and permanency of the promising mining property.

## Placer.

**STRIKE.**—Placer Republican, Sept. 15: The expected strike in the Live Oak mine, west of the May Flower at Chappellets, took place on Monday of last week. Gold in big paying quantities was found sooner than expected, as the bedrock is still pitching. The best part of this new strike is that about 60,000 shares of the company's stock are owned by residents of this county, among whom are F. Chappellet, P. Cray, George Threlkel, C. T. Adams and others. Reports from Charles Harley's mine—the Excelsior—continue to be most favorable, as the prospect is better every day. New and heavy pumping machinery has been put in.

## San Benito.

**OIL.**—Hollister Independent, Sept. 14: A. J. Chaney, the driver of the stage between Hollister and the New Idria mines, informs us that the prospectors for oil in Grizzly canyon find every indication that the country can be made very productive. The appearance of the soil and the general features of the country all along the Tres Pinos and San Benito creeks are much the same as along the famous Oil creek in Pennsylvania. Of course this in itself amounts to no proof of the presence of oil, but there is the fact of a bed of coal existing near Erie and the oil springs in Grizzly canyon, which, taken together, have a possibility that at some future day that whole section may be rich in its oil productions. It is a matter well worthy investigation.

## Shasta.

**IRON MOUNTAIN.**—Shasta Courier, Sept. 18: Iron Mountain mine has again been experted by the representative men of capitalists who think they know good ore when they see it. The expert took away sample lots of ore. He made no hesitation in saying that the machinery hauled to the Mountain at great expense was of no use in the reduction of the ores there. Tons of the same quality of rock sent to Denver yielded from \$300 to \$500 per ton, failed to pay for working by the new mill machinery. Such ore cannot be allowed to run to tailings and waste. Iron mountain will soon boom again.

**STRIKE.**—Shasta Democrat, Sept. 15: The new strike in the Cressus mine, on Squaw creek, is turning out big, and consequently the owners are happy. Sunderhouse, Busch & Co., who have had a working bond on the Snyder mine, failing to make arrangements with the owners that would suit them, threw up the bond. Andy Fife has bonded the Habish mine, the first extension south of the Florida in Old Diggings district, and is preparing to set up his Huntington mill on the river at the mouth of Spring creek, where he will haul the ore a distance of two miles. Mining news from Deadwood is most flattering. The McDonald Bros. and Frank have "struck it richer than ever" in their lower level. The Wiley mine is turning out \$60 ore. Tom Green's mine is yielding richer than ever, and the Scorpion, Washington, Black Bear and Gibson mines are doing likewise, so says John Shed.

## Sierra.

**CLEVELAND MINE.**—Sierra Tribune, Sept. 18: The cleanup here for a 26-days' run amounted to \$3100. The prospects at this mine are improving daily, and an extra force of miners will be employed before many weeks.

**EMPIRE MINE.**—The Empire mine, situated in Gold Valley district, ten miles from Sierra City, is owned by a wealthy San Francisco company, with E. D. Ayer as superintendent. The mine drifts in about 300 feet. The lode or ledge averages eight feet in width. The ledge is a well-defined, true fissure vein, and runs northeast and southwest. The dip of the lode is an angle of 52 degrees. This lode will average from \$40 to \$50 per ton. An 80-stamp mill will be erected by next spring. A saw mill is now in course of construction. The store purchases of this mine are made at Sierra City.

**LIBERATOR GRAVEL CLAIM.**—The Liberator gravel claim, situated at Deadwood, a few miles below Downieville, is principally owned by John Wood and P. Dorsey. The running of a tunnel was commenced about two years ago, and up to date 1600 feet have been run. The prospects at this mine are good.

**POKER FLAT.**—Mountain Messenger, Sept. 18: This noted mining camp, whose canyons, gulches and river beds were so richly laden with gold nuggets in the days of the long ago, immortalized by Bret Harle, would scarcely be recognized by the old-time residents. The lower part of the town, down stream, where used to be crowded together hotels, stores, saloons and cabins, daily thronged with hundreds of busy miners, is now but piles of bowlders and debris, only a few roughly-constructed houses remaining of the once large and prosperous town. There seems to be, though, a prospect in the near future of a revival of at least some of the good old times gone by. Recently, in four days, \$1200 was pounded out of quartz from the Belmont ledge. W. F. Baker, mining on the west branch of Canyon creek, just above the falls, northeast of Poker Flat, has a good-paying placer claim. G. C. Wilbur, whose similar diggings adjoins Baker's, took out lately \$40 in a day. This is a good tract of mining ground. Frank Kinselback, of Alleghany, is here developing the Rattlesnake ledge, located a mile northeast of the Phoenix, and obtains good prospects. Jas. Kendall has done well in his gravel mine this year, and is preparing to resume work next season. Four men are working at the Belmont ledge, taking out pay. Balarat Co. have let a contract to run a hundred feet of tunnel to A. C. Burlington, through cement to bedrock. Gravel over the cement pays \$1.50 per carload, and beyond is expected to yield \$5. Simon Whitehead, Cold canyon, has reached fair-paying gravel. Rouse & Co., Deadwood, are rolling out gravel worth \$3.50 per carload. T. C. Corlette is sinking a shaft at the

head of Tennessee ravine, and has obtained encouraging prospects. His gold is the same as that of the Howland Flat lead. Brown, Hill & Co. are running a tunnel at Steamboat and have good prospects. Phoenix ledge, owned by Chas. Sutherland, is one of the most promising in Sierra county. Large pieces of ore, several pounds in weight, are ribboned with gold, and there may be here a second Sierra Buttes or Young America. Forest Queen Co., and whose ground adjoins north of the Grand Prize, propose to start a tunnel very soon, at the most practicable point, to develop their claim, considered valuable mining property. Sunnyside Co., west of the Grand Prize, have their main tunnel in about 500 feet, face in soft, dark slate rock, with prospect of pay gravel 100 feet ahead in the ridge.

## Trinity.

**NEW RIVER.**—Trinity Journal, Sept. 18: Mr. George Dean, of White Rock, arrived in town on Thursday and gives a favorable account of the New River mines. About 100 men are now in that district and none idle. The Ridgeway, Hard-tack, Mountain Boomer, Grover Cleveland, Tough Nut, Sherwood and other mines are taking out rich rock. Everything is flourishing.

**A BIG FIND.**—Mr. Jacob Bowerman tells us that Jesse H. Tourtellotte has struck a very rich spot on Rich Gulch, a tributary of Digger Creek, near Minersville. It is probably a pocket, the extent of which is as yet unknown. As much as \$60 was washed from a single pan.

## Tuolumne.

**OLD TUOLUMNE.**—Independent, Sept. 18: A trip to the Old Tuolumne mine, last week, satisfied your correspondent that pluck and energy, as well as capital, are necessary in mining. We found the mine in charge of Foreman R. C. Davis. The hoisting works and appurtenances are first-class, the pipe is four-inch gas pipe and the fall for hydraulic pressure unparalleled. We manned the ladder and descended into the mine by an incline shaft 150 feet deep in which a well-defined lead of varying thickness is visible all the way down. At the bottom of the incline drifts have been run north and south—the south drift running toward a rich ore body which appears on the surface. At the Experimental Gulch mine we find a decided change since our last visit. The buildings are finished, with the exception of the mill building.

## NEVADA.

## Washoe District.

**BEST AND BELCHER.**—Virginia Enterprise, Sept. 18: On the 600 level, west crosscut No. 1, being found to be in the west country rock, was discontinued. Crosscut No. 1 east was extended 34 feet, making a total length of 236 feet. A south lateral drift is now being run in the good quartz vein passed through in running west crosscut No. 1. This lateral drift is all in quartz of a very promising character, which may lead to something good. At the Osbiston shaft, the water being now fully under subjection, next in order comes the proposition to sink deeper. During the week the old southwest drift on the 2500 level, which extends through the Gould and Curry to the Savage north line, has been cleaned out and repaired for a distance of 350 feet, and the work is still being proceeded with. The object is to find a suitable belt of dry ground in which to sink a deep winze, instead of sinking the Osbiston shaft deeper. A large three-compartment winze is proposed to be sunk to the depth of 500 feet or more in Gould and Curry ground, the proposition being to carry it to a depth corresponding with the 3200 level of Savage, Hale and Norcross and Chollar and the Combination shaft.

**ALTA.**—On the 700 level, where all the work of this mine is being conducted at present, connection was made with the old Lady Washington shaft last Saturday, giving an excellent air circulation. An old drift to the northward at that point is now being cleared out and repaired to the distance of 140 feet, or to a point where good ore is known to exist. The south drift along the east side of the Keystone vein has been carried well into Alta ground. The good ore vein found several months ago in Alta ground by two crosscuts west, 25 feet apart, shows the vein to be from 3 to 5 feet in width, and not 15 or 20, as has been erroneously stated. It shows widest in the north crosscut, and is good ore that assays high and will pay well under the stamps. All preparations are made for crosscutting, and Supt. Boyle is awaiting orders from below in order to do so. There is a total distance of 1200 feet to be crosscut, and valuable results are anticipated.

**JUSTICE.**—A force of men will be employed at once, getting the machinery of the main Justice works in order for starting up the first of the coming week. The shaft is 1300 feet deep, but no regular drift explorations or ore-extraction work was done below the 1100 level. Work through this shaft was suspended five years ago, since which time but little work has been done in the mine beyond the extraction of a small amount of ore at the south end, through the Woodville shaft, by leasers. But little work was done at the north end of the mine, and in the present renewed operations it is proposed to develop the true merits of that section, as well as other ore-producing points.

**POTOSI.**—Diamond drill hole, No. 8, on the 3100 level, is in 140 feet. As before stated, it is being run in Chollar ground, but by the Potosi company, to test the large quartz vein which runs through both mines on the east of the main lateral drift. This drill hole was started about 550 feet south from the north line of the Chollar. The drillings yield low assays, showing the whole ledge to be mineralized.

**HALE AND NORCROSS.**—Crosscutting both east and west on the 3200 level, near the deep winze, and extending the lateral drift northward, constitutes the work being done at present. All this work is being done about in the middle of the mine, therefore 200 feet or more from the Savage south line.

**SAVAGE.**—On the 600 level the large ore vein or deposit developed shows a considerable amount of rich ore, which, if found to extend to the 800 level, will prove to be of great value. On the 800 level the lateral drift south to intersect the above vein is making good headway.

**SIERRA NEVADA.**—On the 520 level work in crosscut No. 3 west, near the face of the north lateral drift, has been suspended, and a crosscut



east, opposite to it, was started, which is now in 60 feet. Face in vein porphyry and other material, showing no value.

**CROWN POINT AND BELCHER.**—During the week over 100 miners have been put to work at ore extraction, the increase of water in Carson river allowing of a partial resumption of work at the mills. How permanent this improvement is remains to be seen.

**KENTUCK.**—Forty tons continues to be the regular daily yield. The Rock Point mill, where the rock is reduced, is only able to run a portion of its stamps owing to lack of water power in the Carson river.

**GOULD AND CURRY.**—The crosscut east from the upraise above the 150 level is in streaks of ore, promising better developments. It is being steadily extended eastward.

**OPHIR.**—The exploration and development drift south on the 1300 level is being steadily advanced. Material, vein porphyry with streaks of quartz and clay.

**UTAH.**—On the 500 and 1300 levels the drifts are being cleared out and the timbering repaired preparatory to further explorations.

**MEXICAN AND UNION.**—The drifts and crosscuts north and west on the 700 level are making good progress, with promising indications.

**OCCIDENTAL.**—The surface machinery, etc., is being put in order, ready for mining operations.

**YELLOW JACKET.**—Daily yield about 100 tons, keeping the Brunswick mill well supplied.

#### Columbus District.

**CANDELARIA MILLING CO.**—*True Fissure*, Sept. 18: The mill has been running steadily during the past week with one day shift. There are 20 stamps now running on Georgene. It will be shut down about Monday, when it will be cleaned up preparatory to making a short run on ore from the Enterprise. Superintendent Giguon is now surveying the pipe line to Trail canyon. The frame for the Georgene hoisting works is in place and the work is being actively pushed. It is reported that the Georgene Mining Company has been incorporated in New York.

#### Eureka District.

**ORE SHIPMENTS.**—*Sentinel*, Sept. 18: During the past week ore shipments were made from the district to the two reduction works in town as follows: To the Richmond works—Kentuck mine, 2 tons; Mountain Boy, 1; Marguerita, 30; Monroe, 1½; Silver Lick, 15; Eureka Star, 2; Jackson, 37; Bullwhacker, 2; Eureka Tunnel, 10; Brown, 2½; Geddes and Bertrand, 7½; Reeves and Berry, 1½. To the Eureka Con. works—Bullwhacker mine, 5½ tons; Morey, 7; Dundersberg, 64; Summit, 7; Bay State, 11; Grant, 5½; Hamburg, 47; Featherstone, 8.

#### Gold Mountain District.

**LIVELY.**—*Candelaria True Fissure*, Sept. 13: Mining is quite lively in this district at present. Peter Anderson is running his two steam arastras on gold ore from his claims. He has about 12 men working in his several mines. They take out the ore and pay him \$10 per ton to work it, keeping what they can make above that figure. B. F. Leete has finished grading for his mill and a portion of the machinery is in place. He expects to have everything in running order in about 10 days. The mill will work about 10 tons per day. H. H. Robinson is having five tons of rich gold ore worked at the Stewart mill. It is expected that it will pan out big. Guy Thorpe has six men working. He shipped last week a test lot of a little more than three tons to be worked at the Douglass mill in Dayton.

#### Jackrabbit District.

**ORE BODY.**—*Pioche Record*, Sept. 15: Word reached town from Jackrabbit that it is believed that the miners have just encountered the ore body in the Onondaga mine. They have struck the outer edge of a body of solid carbonate ore, the extent of which it is unable to yet determine. The veins of ore are gradually drawing together. The main body cannot be far off. The work of next week will likely decide the matter. The first piece of the ore struck taken out, with its outside coating of lime on it, was sent to town and assayed over 41 ounces.

#### Pioche District.

**RICH ORE.**—*Pioche Record*, Sept. 15: The relocators of the Gray Eagle mine, well up on the side of the mountain above the Alps, and the claim out of which such rich ore and over which considerable fighting was done in days of yore, are extracting what looks to be rich ore. They found a little seam of ore in the side of the shaft about 15 feet below the surface, and following it in it keeps gradually widening and is liable to widen out sufficient to give the boys a stake. It is difficult to decide which, the prospector or the leacher, erects the most towering castle in the air. Of late several of the leachers in this neighborhood, after their cleanup, have postponed their tour to the Holy Land.

#### ARIZONA.

**CHERRY DISTRICT.**—*Prescott Courier*, Sept. 13: Jas. Allen has purchased the interest of Mr. Bonham in the B. S. B. mine, Cherry district. Mr. Smith (Yank) is the other owner. It is a gold mine, and considerable gold has been arastraed from it. It is opened to a depth of 75 feet. In the same district Hardy & Co. are drifting on the Etta mine at a depth of 100 feet. They have four feet of quartz, all of which is rich in gold. Campbell, Munds & Olden have got as high as \$700 per ton gold out of their extension of the Etta. Cherry district is about 30 miles east of Prescott, in the Black Hills.

**STONEWALL.**—*Silver Belt*, Sept. 14: All the lessees on the Stonewall claim at McMillen are doing well. J. K. Smith and Charlie Newton have taken out considerable rich ore, and Lewis and West, for the short time they have been at work, have a splendid showing and are getting out very rich ore. Jose Solis & Co. are also making good wages. The greatest strike, however, made in the Stonewall for a long time was the recent one by Meyers & Co. In a week they took out about five tons of ore, estimated to be worth \$6000 to \$8000.

**OLIVE CAMP.**—*Tucson Star*, Sept. 15: For some time past Pima mining district, some 20 miles south

of Tucson, has attracted considerable attention. There are over 100 men at work in this district and there is room for a good many more. The camp is supplied with splendid water, which is hauled every day by Mr. Brown from a canyon two miles from the camp. There are several claims being worked now, and newcomers are leasing some of the claims for a duration of six months, paying 15 to 20 per cent for the privilege. The old San Xavier mine has been shut down for a short time, but will resume operations very soon under the management of a new company, who contemplate building reduction works there for their own convenience, as they have about 20 carloads of ore which will pay if they have their own works, but not to ship as long as the freight rates are so very high. The shaft has been sunk 245 feet, and they have good water; then they have an incline of 175 feet. Dr. W. A. Clark has charge of the mines at present. The Olive was located and is worked now by Messrs. Frank Allison, Jas. K. Brown and S. B. Conley. They have shipped \$29,600 worth of ore from this claim within the past eight months. The Annie is owned by Messrs. J. K. Brown and O. J. Doyle, who are still working it with a force of six men. The shaft is down 119 feet; the ore averages 207 ounces. Messrs. Brown and Doyle have several mines leased on their claim which are paying well. The Matchless is owned by E. B. Gifford and Warren Allison, but has been leased to George Bogan and Mr. Curry. The shaft has been sunk 50 feet; the ore is very good, averaging about 150 ounces. The quality of the ore seems to improve as they go down. The Horse Shoe is leased by Johnnie Devine, J. B. Scott and Mr. Steratt. The shaft is down 55 feet. The ore averages 175 ounces. They have just received returns from their last shipment, which averaged 175 ounces. The Pioneer is owned by the Rusk Bros., but has been leased by W. S. Neville and Mr. Freese. The shaft is down 78 feet, and the ore averages about 153 ounces. The Pima is leased by Messrs. White and Kenglar. The shaft is down 56 feet, the ore averaging 100 ounces. They have over a carload on the dump now ready for shipment.

#### COLORADO.

**SALE OF THE WHALE.**—*La Plata Miner*, Sept. 11: Messrs. J. Downen and A. T. Grigg, on the 27th of July, 1885, leased and bonded the Whale lode from John and Michael O'Neill, the owners. The claim was nothing more than a favorable-looking prospect, but the men took hold and diligently prosecuted work in sinking a shaft and running tunnels, and taking out no ore except what was in the way of development and enough to pay the expenses as the work progressed. Up to date only 15 carloads have been shipped, of a gross value of \$11,250, but the mine is now in a magnificent condition and there is any quantity of ore in the drifts ready to be stoped out. The mine was bonded for the sum of \$7000, including the extension, which makes a claim of 3000 feet on the same vein. The lessees, still wishing to add more development to the property, concluded to sell an interest in order to obtain a deed to the property and continue the work, and on being offered \$10,000 for a one-third interest by Mr. E. K. Smith, accepted the offer. It will therefore be seen that in addition to placing the mine on a paying basis, in one year Messrs. Downen & Grigg have paid for the mine and have \$3000 spending money. The deed was made out to Mr. E. K. Smith on Saturday last, who gave his check for \$10,000, and the former lessees at once turned over \$7000 to the original owners, Messrs. John and Michael O'Neill. The new owners will let a contract at once for 400 feet of additional development, and commence the erection of buildings for the accommodation of the men. No ore will be stoped out until next season, when the mine will be worked for revenue.

#### IDAHO.

**FROM THE GOLD BELT.**—*Wood River Times*, Sept. 15: Wm. H. Atkinson came in to-day from the Gold Belt. He reports considerable activity there since Mr. Murphy bonded the Alaska, Jumbo, Tip-top, and other claims for sums aggregating \$120,000, and unless he greatly mistakes the signs of the times the Gold Belt will be, ere many months, much livelier than now, and employ a large number of men. The bond on the Alaska, etc., is to run 60 days only.

**RUMORED SALE OF THE MINNIE MOORE.**—It is rumored on the street that the Minnie Moore mine has again been sold, and to another English company. The price to be paid is stated at a round million dollars. This rumor may be true, and it may not be; but certain it is that, a few weeks ago, Mr. Carmichael, while in Salt Lake City, stated that a good offer had been made for the property. From all accounts, the Minnie Moore is well worth the sum above stated.

**FROM SMOKY.**—James M. Wilson came in yesterday from Smoky. He reports all the mines being worked as looking well, and says that the King of the West is proving quite as good as the Carrie Leonard, as it shows ore in every opening. It seems as if they can't run a drift anywhere in that ground without encountering ore, and as depth is attained it proves richer. Some of that brought out a few days ago carried native, ruby and wire silver, and must be worth \$300 per ton. In the Sunday mine, near the King, the vein has been cut and driven upon for some time. The vein matter is mixed with ore, and a paying deposit is evidently not very distant from the present workings. In the Hardscrabble, which adjoins the Sunday, the workings are following the ledge, but only bunches of black sulphuret ore are encountered.

**MINING SALE.**—*Chall's Messenger*, Sept. 15: C. L. Randall has sold to Morris Ennis, the transfer being completed yesterday, a one-half interest in the Japan mine and a one-eighth interest in the Big Stiff mine, both situated in Snow-slide gulch, and about a mile southwest of the town of Bayhorse. These mines are in a good locality and are considered to be valuable properties.

**CUSTER.**—John L. Tonkins, superintendent of the Custer Company's mines up to a recent date, came out from Custer on Thursday and departed Friday morning for San Francisco. From there he goes to Baker City, Oregon, to take charge of a gold mine. Mr. Tonkins informed us that, during his superintendence of the mines of the company in Custer, which has been most of the time for the past

six years, there has been extracted above \$3,500,000 worth of the precious metals—principally silver.

**THE CARBON CENTER DISTRICT.**—*Coeur d'Alene Record*, Sept. 15: Enough has been done this summer on the principal prospects in the vicinity of Carbon Center to justify the prediction that that section is destined to be one of the most productive in Coeur d'Alene. Gold, galena and lead have been found in large quantities and there is sure to be a boom there as soon as some enterprising company takes advantage of the first-class inducements offered for profitable investments. Two new locations were made a few days ago by Win Evans and Phil Markson. They are called the Merrimac and the Hattie and are located about three miles from Carbon Center on Beaver and Carbon creeks. The Tough Nut is showing up well and a solid five foot vein has been uncovered on the Sunset. Yesterday we secured from Mr. Markson per mission to publish the returns from four assays of ore from the latter, made by Mr. Bryant, of Wardner, assayer for the Helena Concentrating Company: No. 1, 58 per cent lead, 19½ ozs. silver; No. 2, 69½ per cent lead, 24 ozs. silver; No. 3, 42 per cent lead, 17 ozs. silver; No. 4, 55½ per cent lead, 31 ozs. silver. All show a trace of gold. The principal properties can be easily and economically worked. A little more development will entitle several of the most promising prospects to the name of mines.

#### NEW MEXICO.

**COONEY CAMP.**—*Silver City Enterprise*, Sept. 16: Reports from Cooney camp say that the excitement among mine-owners and the people generally continues to grow over the exceeding richness and extent of the great strike in the Peacock mine. Everybody is elated over the prospect—which is now assured—of a genuine, substantial boom during the fall and winter months, and there is every appearance of great future prosperity for the business and mining interests of the whole district. A new stimulus has been imparted to the work of prospecting, and a great deal of money and labor will doubtless be attracted to the Mogollons through the developments that must be destined to follow. The Peacock strike has settled all question as to the permanency of the veins and rich ore at depth in Cooney, and everybody feels encouraged to go ahead and open the splendid prospects that are so numerous there. The latest from the Peacock is to the effect that there is a six-foot width of very high-grade ore, showing sulphide and native silver in quantity. Several large pieces brought into town are both rich and rare, much of the silver appearing in white filmy crystals numerous scattered throughout the quartz. The chute producing this character of ore has gradually opened as sunk upon, and appearances warrant the assertion that it will develop into one of the largest and richest ore bodies in this Territory. In general characteristics it resembles the famous Silver King ore, of Arizona, the quartz having the same clear, unaltered appearance, and the wire silver being found permeating the cleavages. Peacock stock just now is high up among the "fancies" on the St. Louis board, and with the prospects for extra dividends will continue to stay there. A lot of the new ore has already been produced from the deep shaft, and daily additions are being made. It is sacked and stored in the mill until the return of Mr. Miller, the president of the company, from St. Louis.

**A MILL.**—A. H. Cadwell, one of the three owners of the silver Rain-in-the-Face mine, is in the city for the purpose of having a five-stamp mill hauled to his mine. He reports mining interests in his locality prospering. Dr. Davenport hopes soon to erect a five-stamp mill. The Carlisle Company have finished grading for another 20-stamp mill in addition to the 20 stamps now running. The new stamps will soon be in place. The Carlisle Company struck a fine body of water this summer while prospecting a large body of ore, and now have water sufficient for 100 stamps. The water seeped through a seamed rock when the latter was first uncovered, but now comes in a strong stream. Lumber for the new mill building is now arriving from California. The business is reported to be entirely satisfactory under Supt. Huntley.

**BIG STRIKE.**—*Socorro Bulletin*, Sept. 15: John A. Miller is now dumping \$500 to \$600 silver and 7-ounce gold mineral out of his Peacock mine, at Cooney district, this county. This ore body is located in the 90-foot winze of the tunnel which runs in on the vein. The ore body is continuous and full width of the 539 winze. We have been semi-officially informed that another smelter is to be erected in this city at once.

**THE COMSTOCK OF THE ORGANS.**—*Rio Grande Republican*, Sept. 14: The *Republican* is not given to booming the mines of Organ without there is something of stability upon which to base assertions, believing that a false statement works injury to any camp; but all reports from the Stephenson mine are of such a character and from such reliable sources that we gladly herald to the world the fact that the camp has one of the great mines of New Mexico opened and producing. A few months ago Messrs. Foy and Barlen secured a lease on the property and following up the development of some former leasers soon showed up a body of ore that rivals anything yet exposed in the mines of that locality. From a carload shipment made in August the returns were \$33. This ore was taken from a face 30 feet wide, with neither wall showing, and was shipped without sorting. We are informed that a streak of nearly solid galena six feet in width yields \$150 per ton in silver. The capacity of the mine is now about two carloads a day, and about one in every five would be high-grade ore. A shipment will be made the first of the week. The Stephenson is not isolated by any means, and there are any number of properties which will be now opened out, the owners only needing the encouragement of a producing and paying property to induce them to work their mines.

#### OREGON.

**QUARTZ AND PLACER.**—*Jacksonville Times*, Sept. 17: Smith & Lynch have finished a long ditch to their placer mines on Wagner creek. S. Oyster & Co. are reported as having struck very good prospects in their placer mines in the Steamboat district. M. Y. Drake, Patrick Ivory and Paul Laborne have located a promising quartz ledge in Sterling mountain district, to be known as the Queen mine. John

Meldrum, from Steamboat, informs us that mining is about ended there for the season, on account of the scarcity of water. From John and Ed. Swinden we learn that L. D. Brown's quartz mill has arrived at Gold Hill, and will soon be put in position on the site of the one until late'y in use. The engine and all the necessary machinery for Baunle, Klippel & Co.'s quartz mill have arrived, and it is expected that everything will be in running order in a few weeks. This is one of the best mills that has ever been put up on the northwest coast, and we hope that the enterprise will prove an entire success. The *Oregonian* of the 14th says: "Another quartz mill, engine and boiler, was shipped from Portland yesterday by L. D. Brown to his mines in southern Oregon. It is a five-stamp mill, the stamps weighing 800 pounds each, and it is furnished with all the latest improvements. The whole outfit was manufactured in Portland, and is claimed to be the best mill ever made in Oregon. When the mill is erected Mr. Brown will have altogether 10 stamps running on the Swinden ledge. Professor Clayton's process will be employed and silver plates will be used instead of copper."

#### UTAH.

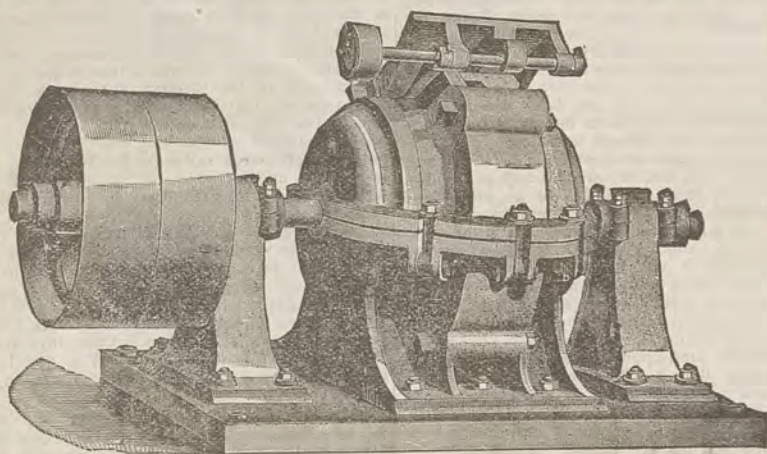
**REVIEW.**—*Salt Lake Tribune*, Sept. 17: The week has been one of fair activity in mining circles, without any event of marked moment. The mines all through the mountains are producing well and the outlook is excellent; the only trouble is the money-handlers' bear raid on silver. With the white metal at even one dollar an ounce great relief would at once be felt throughout all the silver-mining regions, and a heavy element of prosperity infused into all business transactions. The receipts for the week ending September 15th, inclusive, were of the value of \$160,235.14, of which \$114,793.56 was in bullion and \$45,441.58 was in ore. For the previous week the receipts were \$126,750.15 in bullion, and \$71,223.43 in ore, a total of \$197,973.58. The product of the Ontario for the week was 18,997.50 ounces fine bullion and \$9573.91 from ore sales. The mill, after a thorough renovation, has started again on another long run. The Daly sent out during the week 14 bars of fine bullion, 19,210.26 ounces; and lot 72 of ore, \$5887.71. All goes well with this property. Base bullion receipts in this city for the week were of the value of \$13,100; fine bars, \$39,341.13. The Hanauer smelter made bullion to the value of \$22,690 during the week; the Germania, nine cars, \$15,901.80. Ore receipts during the week were \$13,581.81 by Wells, Fargo & Company; \$22,520 (including \$3400 Crescent, and \$7520 Queen of the Hills) by McCormick & Company; \$9339.77 by T. R. Jones & Company; and by the Union National Bank lots 686 to 690, inclusive, of Antelope and Prince of Wales ore, 203,064 pounds value not stated.

**TINTIC.**—*Salt Lake Tribune*, Sept. 18: Tintic has long been a good mining district. One of the first starts here was at Homansville, where 12 years ago a 10-stamp silver mill was erected. It has four pans and two settlers, and is capable of reducing 10 or 12 tons of hard ore per day, and more of softer varieties. It now belongs to the Tintic M. & M. Co., of which Alex. Graham is superintendent. They are now employed in reducing ore from the Northern Spy and such other milling ores as they can buy. After looking over this property, the writer went to the Northern Spy group, located way up in the hills near the summit, dividing the property from the Eureka district on one side and the Mammoth on the other. The Spy group is located far above the others named. The Northern Spy group consists of the Northern Spy, Carissa, Alabama, James Blaine, James Fisk, Ben Butler and Orton. The main work is on the Spy and Carissa, while the other claims are side claims for protection and working ground. All have been patented, and belong to Graham and two or three associates East. The Northern Spy was discovered in October, 1880, and has been developed by a tunnel on the vein 1200 on the first level, being 600 feet each way, and at a depth of 100 feet below grass roots. The vein averages from 12 to 15 feet in width. The property is so situated as to give ample dumpage and ore houses, while it provides with necessary buildings for the men, etc. The ore is somewhat peculiar, there being streaks of lead ore, then comes milling ore, and the ledge so changing in quality of ore as to require constant watchfulness and very frequent assays. Less than six years ago the present owners purchased the property for \$33,000, since which it has paid back the money and given some dividends. In that time it has produced over \$200,000 for its owners. At one time 800 tons of picked ore was sold, which netted, after paying treatment and freight, an average of over \$53 per ton. The vein is in lime, has good walls, almost perfectly vertical. The lead ores run high in silver, carrying but little copper, and go about 10 per cent the value of metal in gold. They once took out 800 tons of milling rock that averaged \$32 in gold, but the ore usually mills in gold and silver from \$25 up to \$65 per ton. The ledge bears northeast and southwest. The Swansea, near Silver City, owned by Ritter, Elmer, Paxman and Hatfield, is being worked under lease by the last two named, who are making something above wages while developing the property. The Iron mines, which once shipped such large quantities of fluxing ore, are sending out about 1000 tons per month. The Ketchum (Idaho) smelter has been getting about 250 tons per month since the first of July. The Mammoth is doing nicely under the superintendence of Major A. B. Litchfield. The works at Tintic failed in the late experiment to make a success in the reduction of these ores. Major Litchfield took charge of the mine April 12th last. Samuel McIntyre has the general management of the Mammoth property, while Major Litchfield manages the mining. The mine has reached a depth of 675 feet, from the first level, which taps the mine at a depth of 600 feet. It has a fair hoisting works. A new boiler is being put in to enable them to make more steam. While this is being done the force of miners is 25 or 30, and will soon be increased to 65 or 70. The vein is an immense one, being 75 or 80 feet wide—an immense blow-out, in which are three well-defined pipes carrying pay ore, chiefly copper, and which averages about \$60 per ton. These pipes are at an angle with the trend of the vein, of about 45 degrees. These are surrounded with quartz, carrying little or no copper, but \$10 to \$25 in silver and gold. Large quantities of \$60 copper ore are being sent to Colorado, and \$25 milling ore is also being shipped.



**JOHN A. ROEBLING'S SONS CO.**  
**WIRE ROPE**  
 GALVANIZED SHIP RIGGING, MINING, TILLER,  
 ELEVATOR, TINNED, & COPPER ROPE, SASH CORDS.  
 LARGEST WIRE ROPE WORKS IN THE WORLD.  
**IRON & STEEL WIRE OF EVERY KIND.**  
 TELEGRAPH WIRE, HARD & SOFT COPPER WIRE  
 INSULATED FOR ELECTRIC USE.  
 WIRES OF IRON & COPPER. FENCE WIRE,  
 SWEDISH IRON WIRE, CRUCIBLE STEEL WIRE.  
 TRENTON, N.J. & 14 DRUMM ST. SAN FRANCISCO, CAL.

## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

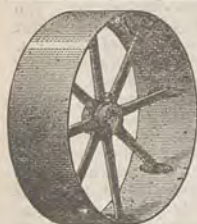
Reduction of Ores, Quartz, Phosphate Rock, Carbon, or  
 other Mineral Substance to any degree of fine-  
 ness in a rapid and economical manner.

Any method of amalgamation may be applied.  
 At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh  
 dry, and from 3000 to 6000 pounds wet.  
 All wearing parts easily and cheaply replaced. May be seen in operation at the New York  
 Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.  
 Certificates as to performance of the Mills, and any information required, furnished on  
 application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 & 106 Washington St., NEW YORK.  
 OR PACIFIC IRON WORKS, SAN FRANCISCO.

**Chicago Prices Beaten!**  
 ESTABLISHED 1860.  
**S. F. PIONEER SCREEN WORKS,**  
 221 & 223 First St., cor. Tehama, S. F.  
**J. W. QUICK, Prop'r.**  
 Sheet Metals of all kinds perforated for Flour and  
 Rice Mills, Grain and Malt Driers, Furnaces, Churns, Ce-  
 ment and Smut Mills, Separators, Revolving and Shot  
 Screens, Stamp Batteries and all kinds of Mining and Mill-  
 ing Machinery. Inventor and manufacturer of the celebrated  
 Slot Cut and Slot Punched Screens. Mining Screens a  
 Specialty, from 1 to 15 (fine).  
 Orders Promptly Executed



## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.  
**CLOT & MEESE,**

Sole Licensed Manufacturers of the  
**Medart Patent Wrought Rim Pulley**  
 For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington  
 Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and  
 Best Balanced Pulley in the World. Also Manufacturers of

**SHAFTING, HANGERS AND APPURTENANCES.**

Nos. 129 & 131 Fremont Street,

San Francisco, Cal.



THE CONSUMERS' COMPANY.

## VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.  
 SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.  
 SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank  
 Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**

218 California Street, San Francisco, Cal.

## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

**GIANT POWDER or DYNAMITE,**  
 Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and  
 GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast-  
 ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and  
 saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

**BANDMANN, NIELSEN & CO.,**

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

## THE SCIENTIFIC PORTABLE FORGE



AND  
**BLACKSMITH HAND BLOWERS.**

GUARANTEED

The Lightest Running! The Strongest Blast!  
 The Most Durable!

ADAPTED TO ALL KINDS OF WORK,  
 AND MADE IN STYLES AND SIZES TO SUIT.

THE FOOS MANUFACTURING CO., - Springfield, Ohio

## THE JENKINS STANDARD PACKING

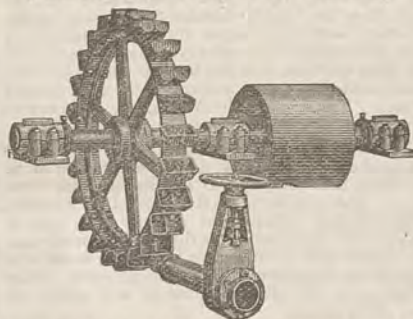


For Sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.

Manufactured only by  
**JENKINS BROS. 71 John St., New York.**

## PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED  
 by the Idaho Company at Grass Valley, Cal., and  
 gave 90 2 per cent, distancing all competitors. Send for  
 circulars and guaranteed estimates.

L. A. PELTON,  
 Nevada City, Nevada Co., Cal.  
 AGENTS—PARKE & LACY, 21 and 23 Fremont Street  
 San Francisco, Cal.



WATER TANKS! WINE TANKS!  
**CALIFORNIA WINE COOPERAGE CO.**

FULDA BROS., Proprietors,

30 to 40 Spear St., - San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.



THE Sign of the Arkansaw Cough  
 Syrup is looking you all square in the  
 face.

Do you want a sure, safe and reliable  
 Cough Syrup? Are you troubled with a  
 Cough, Cold, Bronchitis or Lung Com-  
 plaint? Do your Babies keep you awake  
 all night with Hacking Coughs, Colds in  
 the Head, etc. Do you want something  
 reliable in the house to meet these  
 emergencies? We answer to all: "Go  
 to your Druggist and get a Bottle of the  
 Arkansaw Cough Syrup, and be troubled  
 no more." Price, 50 cents per Bottle!

For Sale by all Druggists.

**RICHARD C. REMMEY, Agent,**  
**Philadelphia Chemical Stoneware Manufactory,**

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of  
 all kinds of  
**Chemical Stoneware**

—FOR—  
 Manufacturing  
 Chemists.  
 Also Chemical Brick  
 for Glover Tower.

INVENTORS, TAKE NOTICE

**L. PETERSON, MODEL MAKER,**

258 Market St., N. E. cor. Front (up stairs), San Francisco.  
 Experimental machinery and all kinds of metal, tin,  
 and Brasswork.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

**MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.****PUMPING****ENGINES**

—AND—

**MACHINERY,****CORNISH****PUMPS.****FRASER & CHALMERS,  
MINING MACHINERY,****ENGINES AND BOILERS.**

Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

**CORNISH ROLLS,****JIGS and TROMMELS.****HOISTING****ENGINES,****HALLIDIE'S****WIRE ROPE****TRAMWAYS.**

GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

UTAH OFFICE—SALT LAKE CITY, UTAH.

NO MORE SLIPPING OF BELTS!  
NO LOSS OF POWER!

**CHAS. McCORMICK'S**

Improved Composition for

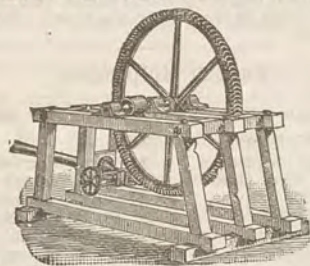
**PAPER PULLEY  
COVERING.****Cheap & Durable**

A Saving of 50 per cent in Power.

**SATISFACTION GUARANTEED.****CHAS. McCORMICK**

Can be found at Savage's Foundry, 135  
Fremont St., San Francisco, Cal.

Refers to best firms in the city.

**KNIGHT'S WATER WHEEL**

For Mills, Pumping and Hoisting.

OVER 300 IN USE!

**All Estimates Guaranteed.**

SEND FOR CIRCULAR.

**EDWARD A. RIX & CO.,**

Sole Agent,

18 and 20 Fremont Street, San Francisco.

**MACHINE TOOLS,  
PRESSES AND DIES,****PUNCHING and SHEARING  
MACHINERY.****F. A. ROBBINS,**

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and  
Dies, 20-inch Engine Lathes,  
12-inch Shapers.

Punching and Shearing Machinery for  
Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

**H. P. GREGORY & CO.**

Nos. 2 and 4 California St., - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

**MACHINERY**

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING  
MACHINERY.

FRANK & CO.'S WOODWORKING  
MACHINERY.

NEW HAVEN MANUFACTURING CO.'S  
MACHINISTS' TOOLS.

BEMENT & SON'S MACHINISTS  
TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM  
PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND  
EXHAUSTS.

SHIMER MATCHER HEADS.

BRAINARD MILLING MACHINES.

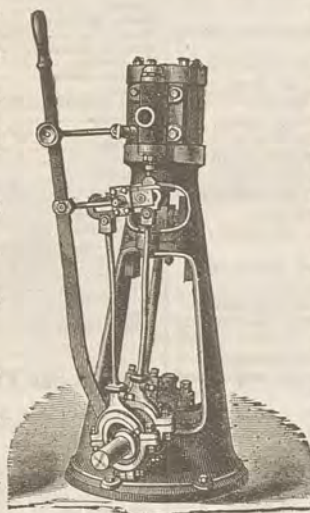
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISH-  
ERS.

**YACHT ENGINES.**

WILLIAMSON BROS' HOISTING  
ENGINES.

ATLAS ENGINE WORKS ENGINES  
AND BOILERS.

PAYNE'S VERTICAL AND HORI-  
ZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS  
AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECT-  
ORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACK-  
ING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHN'S ASBESTOS PACK-  
ING, PAINT, ETC.

**ENGINES and BOILERS**

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

**MILL SUPPLIES AND LUBRICATING OILS.****THOMAS PRICE'S ASSAY OFFICE,**

CHEMICAL LABORATORY,

**BULLION ROOMS and ORE FLOORS,**

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed  
of in the Open Market to the Highest Bidder.

**Metallurgy and Ores.****SELBY****SMELTING and LEAD CO.,**

416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY  
And Assay Office.**

Highest Prices Paid for Gold, Silver and  
Lead Ores and Sulphurets.

...MANUFACTURERS OF...

**BLUESTONE,****LEAD PIPE,****SHEET LEAD,****SHOT, Etc., Etc.**

ALSO MANUFACTURERS OF

**Standard Shot-Gun Cartridges,**  
Under Chamberlin Patent.

**WM. D. JOHNSTON,****ASSAYER AND ANALYTICAL CHEMIST.**

514 Kearny Street,

SAN FRANCISCO, CALIFORNIA

**ASSAYING TAUGHT.**

Personal attention insures Correct Returns.

**JOHN TAYLOR & CO.,**

IMPORTERS AND DEALERS IN

**ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,**

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists,  
Mining Companies, Milling Companies, Prospectors, etc.,  
to our full stock of Balances, Furnaces, Muffles, Crucibles,  
Scorifiers, etc., including, also, a full stock of  
Chemicals.

Having been engaged in furnishing these supplies since  
the first discovery of mines on the Pacific Coast, we feel  
confident from our experience we can well suit the de-  
mand for these goods, both as to quality and price. Our  
New Illustrated Catalogue, with prices, will be sent on  
application.

Our Gold and Silver Tables, showing the value per  
ounce Troy at different degrees of fineness, and valuable  
tables for computation of assays in grains and grammes,  
will be sent free upon application. Agents for the Patent  
Plumbago Crucible Co., London, England. Also for E.  
G. DENNISTON'S Silver Plated Amalgam Plates. The  
plates of this well-known manufacturer are thoroughly  
reliable, and full weight of Silver guaranteed. Orders  
taken at his lowest prices.

JOHN TAYLOR & CO.

**Nevada Metallurgical Works.**

NO. 28 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1860

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the

most suitable Process for Working Ores.

Special attention paid to Examinations of

Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt, )

Mining Engineers and Metallurgists.

J. KUSTEL. H. KUSTEL.

**METALLURGICAL WORKS,**

318 Pine St. (Basement, )

Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my

Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical Instruction given Treating Ores by im-  
proved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

**C. H. AARON,****ASSAYER AND METALLURGIST,**

NOGALES, ARIZONA,

Will attend to business in connection with mines in So-  
nora or Arizona.



The California  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

**FLOUR AND OTHER MILLS.**

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.



## Mechanics' Fair Prizes.

## Award of Gold and Silver Medals.

As the Mechanics' Institute Fair closes this week, the public will be interested in knowing who the fortunate winners of the gold and silver medals were. We therefore publish the annexed list:

## Gold Medals.

W. H. Ohmen, best automatic cut-off steam engine.  
Dow Steam Pump Works, for best steam pump, Pacific Coast manufacture.  
Baker & Hamilton, best display of agricultural implements.  
California Wire Works, best display of cactus barbed wire.  
George H. Tay & Co., best display home manufacture stoves and ranges.  
Hall's Safe and Lock Company, for fire and burglar-proof safes.  
Weed & Kingwell, for brass and plumbers' work.  
John Mallon, for art-stained glasswork.  
David Kerr, best two-horse truck.  
A. Folsom & Son, for best display of vehicles.  
Kreling & Son, general display of furniture.  
H. Liebes & Co., for fur goods.  
California Cotton Mills, for manufactured cotton goods.  
Pioneer Woolen Mills, for blankets, flannels, etc.  
Redington & Co., chemical and pharmaceutical goods, home manufacture.  
J. Gundlach & Co., California wines and brandies.

## Grand Silver Medals.

San Francisco Tool Company, machinists' tools.  
S. B. Page & Co., best rock-breaker.  
G. & E. Pennington & Sons, home manufacture, tool steel bars.  
P. Liesenfeld, best display of billiard tables and fixings.  
Carlson & Currier, silk thread and twist, Pacific Coast manufacture.  
Giant Powder Company, for giant powder.  
J. Roach, mathematicians' and surveyors' instruments.  
California Electric Light Company, for electric lights and dynamos.  
Electrical Supply Company, for electrical regulators.  
Standard Soap Company, for all exhibits.  
Class 16—Will & Fink, best carving set, Pacific Coast manufacture.  
Class 17—B. Nathan & Co., display of cut table glass, porcelain and fancy ware.  
Class 20—Kohler & Chase, display of pianos, Pacific Coast manufacture.  
Class 45—Jones & Lotz, best general display of photographs.

## Silver Medals.

Union Iron Works, superior workmanship and automatic cut-off engine.  
Byron Jackson, automatic cut-off engine.  
A. W. Bull, best portable engine for general use.  
George Cummings & Co., for sectional forge and hand-blower.  
John Simonds, best general display of saws.  
Pacific Manufacturing Company, windmill working model.  
Palmer & Rey, best general display of printing machinery.  
Constant Auger, for miniature working steam engine.  
E. G. Damiston, for amalgamating plates.  
W. I. Tustin, for Tustin's rotary pulverizing mill.  
Pacific Coast Vacuum Furnace Co., for vacuum furnace and smoke consumer.  
W. T. Y. Schenck, for cotton hose and hose reels.  
L. A. Owen, for steamboat and yacht models.  
John Olsen, for model of full-rigged ship.  
California Silk Culture Association, for silk-reeling machine.  
J. L. Hicks, New York and Helpmate sewing machine.  
H. C. Fiske & Co., best display of sewing machines.  
Baker & Hamilton, "Perfect" gang plow.  
More Bros., for Buckeye binder.  
Hawley Bros. Hardware Co., Buckeye mower with self-rocker.  
Baker & Hamilton, Benicia ditching plow.  
Goldian Nut Lock Association, for Goldian nut locks.  
A. G. Kittredge, for ornamental wrought-iron work.  
A. F. Meyer & Co., for gas stoves.  
Baker & Hamilton, combined header and thrasher.  
Liddle & Kaeding, for display of fishing tackle.  
H. B. Cook, for Cook's biceptor.  
Mighells & Richards, best fire-proof safes.  
Frank A. Davis, for cutting dies.  
Will & Finck, best display of cutlery.  
S. G. Williams & Sons, for mantel grates.  
Ackerman Bros., display of cut glass and fancy ware.  
Sanitary Plumbing Manufacturing Co., automatic water-closet.  
A. S. Graff, display of California-made lamps.  
John Mallon, for ornamental cut and bent glass.  
Conover Piano, for excellence of structure, action and tone.  
Fred Trebert, for hand-carved objects.  
Kohler & Chase, brass wind instruments.  
Thomas Bree, display of banjos.  
Studebaker Bros. Manufacturing Company, display of carriages and buggies, two medals.  
E. W. Shaw, for best open buggy and for top buggy, three medals.  
McCue Carriage Company, for best Victoria top rockaway and hearse.  
Heywood Bros. & Co., best display of willow-ware furniture, two medals.  
Chadbourne & Co., for parlor set and upholstery.  
Pacific Spring and Mattress Company, for folding lounge.  
S. W. Clark, for decorative wall hangings.  
Jos. Fredericks & Co., for bedroom furniture.  
Korbel Bros., for wine tank.  
Dr. W. S. Halpruner, for anatomical lasts.  
L. T. Koesel, best display of trunks and bags.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SAIR.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co.	Nevada.	39.	25. Sept 15. Oct 21.	Nov 10. B. Burris.	309 Montgomery St
Bodie Con M Co.	California.	5.	50. June 21. Aug 23.	Oct 18. G. W. Sessions.	309 Montgomery St
Bullion M Co.	Nevada.	31.	30. Aug 31. Oct 5.	Oct 26. R. R. Grayson.	327 Pine St
Bedrock M Co.	Arizona.	2.	10. Sept 13. Oct 18.	Nov 8. J. L. Hunt.	808 Montgomery St
Champion M Co.	California.	22.	40. Aug 31. Oct 5.	Oct 21. T. Wetzel.	522 Montgomery St
Con Imperial M Co.	Nevada.	23.	10. Aug 5. Sept 8.	Sept 28. C. L. McCoy.	329 Pine St
Chollar M Co.	Nevada.	21.	50. Aug 24. Sept 29.	Oct 20. C. E. Elliot.	309 Montgomery St
Eureka Con M Co.	Nevada.	10.	1.00. July 28. Sept 6.	Sept 25. E. H. Willson.	328 Montgomery St
Golden Jacket M Co.	Nevada.	2.	10. Sept 1. Oct 14.	Nov 4. R. G. McClellan.	331 Montgomery St
Indian Spring Drift M Co.	California.	6.	03. July 26. Aug 30.	Sept 30. L. H. Sharp.	213 Sansome St
Liberty Hill Con M Co.	California.	1.	15. Sept 1. Oct 7.	Oct 28. F. E. Luty.	330 Pine St
Live Oak Drift M Co.	California.	2.	05. Aug 9. Sept 15.	Oct 4. T. Wetzel.	522 Montgomery St
Loreto M & M Co.	Mexico.	9.	40. Aug 5. Sept 6.	Sept 29. G. T. Bridge.	324 California St
Mount Cory M Co.	Nevada.	1.	1.00. Aug 25. Oct 2.	Oct 23. G. Frier.	309 Montgomery St
Mayfield Gravel M Co.	California.	32.	25. Sept 6. Oct 15.	Nov 12. J. Morizio.	328 Montgomery St
Nevada M & M Co.	Nevada.	1.	1.00. Aug 25. Oct 2.	Oct 23. G. Frier.	309 Montgomery St
North Banner Con M Co.	California.	14.	11. Aug 7. Sept 9.	Sept 27. T. J. Mitchell.	309 Montgomery St
Occidental M Co.	Nevada.	7.	30. Aug 9. Sept 13.	Oct 4. A. K. Durbrow.	309 Montgomery St
Pilgrim M Co.	Idaho.	6.	01. Aug 7. Sept 17.	Oct 16. A. Halsey.	328 Montgomery St
Potosi M Co.	Nevada.	10.	30. Aug 31. Oct 5.	Oct 28. C. E. Elliot.	309 Montgomery St
Silver Lining M Co.	Nevada.	2.	10. Sept 14. Oct 18.	Nov 5. A. H. Clough.	431 California St
Sierra Nevada S M Co.	Nevada.	86.	25. Sept 11. Oct 13.	Nov 1. E. L. Parker.	309 Montgomery St
Utah M Co.	Nevada.	53.	60. Aug 24. Sept 28.	Oct 15. A. H. Fish.	309 Montgomery St

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Eureka Con M Co.	Nevada.	E. H. Wilson.	328 Montgomery St.	Annual.	Oct 18
Golden Fleece Gravel M Co.	California.	W. J. Gleason.	310 Phelan Block.	Annual.	Sept 28
Paradise Valley M Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	Annual.	Sept 29
Plumas Con M Co.	California.	J. L. Fields.	328 Montgomery St.	Annual.	Oct 11
Jupiter M Co.	California.	Edward Land.	309 Montgomery St.	Annual.	Sept 25

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	25.	Aug 25
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Aug 16
Young America M Co.	California.	J. Nash.	328 Montgomery St.	40.	May 20

O. A. Cook & Sons, for leather belting.  
California Fire Apparatus Manufacturing Company, for display of leather goods.  
A. F. McNulty, for handsome boots and shoes.  
B. F. Farrar, for specimens of curled hair and sectional mattresses.  
California State Silk Association, for raw silk raised in California.  
The Evening Post, for California-made printing paper.  
California Hosiery Company, display of woolsens and underwear.  
F. Thomas, dyed and cleaned articles.  
T. S. Clark & Sons, for table-bed and camp-tables.  
Joe Poheim, best display of gents' suits.  
Collins & Co., best display of hats and caps.  
M. J. Keller, best display of shirts.  
P. F. Butler, best display of millinery.  
Freud & Sons, best display of corsets, bustles and braces.  
Mrs. Murray, best display of Pacific Coast manufactured cigars.  
Henry Lake, best shoe blacking.  
Pacific Graphite Manufacturing Company, for stove polish and axle grease.  
Western Perfumery Company, best display of perfumery and toilet articles, two medals.  
American Oil Company, for whale-oil soap, etc.  
Lynde & Hough, for home-manufactured cod-liver oil.

Merten, Moffitt & Co., for Buhach Insect Powder.  
Union Oil Company, for quite pure California olive oil.  
Mrs. H. E. Boyes, for antique work and dried flowers.  
J. H. Drummond, for antique specimens, curios and fancy canes.  
Thain Bros., best general display of confectionery.  
Horace Davis & Co., samples of flour, with special mention for their excellent quality.  
Chas. Laumeister, for meal of several kinds.  
J. H. Burnell, for the best ale.  
Fredericksburg Brewing Company, best steam and lager beer, two medals.  
Philadelphia Brewing Company, for excellence of steam and export lager beer, two medals.  
Pacific Press Publishing House, for display of bookbinding and printing.  
E. G. Dennison, for case of plated silverware.  
A. Jackson, for electrical clock.  
Electrical Supply Company, for cabinet battery.  
Meyer, Marshall & Co., for artificial illuminating apparatus.  
George E. Davis, for brooder in operation.  
Dr. C. W. Leek, sample of dental engine and tools.  
Wm. Beeman, for artificial limbs.  
Pacific Coast Home Vapor Bath Company, for vapor bath and disinfectant.  
Mrs. W. P. Sweetman, for lace work.  
Ciprico & Marais, for dovetailing saws.  
Baker & Hamilton, thrasher and separator, with recleaner and Jackson's self-feeder.  
Mrs. Gerard, best collection of specimens of ceramic art.  
M. Roth, marble statuary.  
Mrs. J. T. Terry, modeling in plaster.  
T. R. Southern, general display of drawing.  
Students of St. Mary's College, best specimen of penmanship.  
A. P. Flaglor, retouched photographs.  
Bertha Christian, best colored photographs.  
Charles Lanier, best photographs finished in crayon.  
Charles Lanier, finished cabinet photographs.  
Henry C. Owens, display of amateur photographs.

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Sept. 2.	WEEK ENDING Sept. 9.	WEEK ENDING Sept. 16.	WEEK ENDING Sept. 23.
Alpha.	.60	.55	.60	.70
Alta.	1.05 .90	.95	1.25	1.50
Andes.	.25	.15	.25	.15
Argenta.	1.15	1.15	1.35	1.35
Belcher.	1.35	1.05	1.20	1.00
Bell.	.10	.15	.10	.10
Bullion.	.15	.15	.10	.10
Bonanza King.	.20	.30	.35	.60
Bodie Con.	2.30	2.85	2.40	2.55
Benton.	.15	.25	.20	.30
Bodie Tunnel.	.50	.60	.50	.50
Bulwer.	1.45	1.85	1.70	1.65
California.	2.25	3.10	2.15	2.65
Challenge.	1.45	1.70	1.65	1.75
Champion.	.60	.75	.60	.70
Chollar.	.60	.75	.60	.70
Confidence.	2.20	2.40	2.50	2.50
Con. Imperial.	.05	.10	.05	.10
Con. Virginia.	2.25	3.10	2.15	2.65
Con. Pacific.	.15	.15	.15	.15
Crown Point.	.80	1.00	.95	1.10
Day.	.25	.30	.30	.30
Eureka Con.	2.80	3.50	3.20	4.00
Eureka Tunnel.	1.45	1.85	1.70	1.65
Excelsior.	.15	.10	.10	.10
Grand Prize.	.75	.95	.80	.80
Gould & Curry.	.75	.95	.80	.80
Goodshaw.	1.10	1.45	1.15	1.40
Hale & Norcross.	1.00	1.30	1.50	1.75
Holmes.	.15	.15	.15	.15
Independence.	.50	.45	.40	.60
Justice.	.50	.45	.40	.60
Martin White.	2.50	2.50	2.50	2.50
Mono.	.60	.80	.60	.65
Mexican.	.60	.80	.60	.65
Mt. Diablo.	1.25	.70	.55	.45
Northern Belle.	.60	.75	.70	.65
Navajo.	1.50	1.75	1.85	1.90
North Belle Isle.	.80	1.25	.80	1.25
Occidental.	1.15	1.65	1.25	1.55
Opbir.	.30	.35	.30	.35
Potosi.	.40	.50	.35	.40
Pinal Con.	2.20	2.70	2.30	2.55
Savage.	.55	.65	.50	.55
Seg. Belcher.	.55	.65	.50	.55
Sierra Nevada.	.55	.65	.50	.55
Silver Hill.	.15	.20	.15	.20
Silver King.	.15	.20	.15	.20
Scorpion.	.15	.20	.15	.20
Syndicate.	.15	.20	.15	.20
Toga.	.15	.20	.15	.20
Union Con.	.51	.60	.45	.55
Utah.	.70	.85	.65	.75
Yellow Jacket.	.80	.90	.70	.90

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., Sept. 23.	200 Independence.....	25c
250 Alta.....1.35@1.40	200 Mexican.....	50c
100 Andes.....1.00	300 Mono.....	2.50
350 B. & Belcher......90 @ .95	650 N. Belle Is.....2.30@2.35	
50 Bodie Con.....2.65	400 Navajo.....	.75c
50 Bulwer.....1.65	150 Ophir.....	1.30
200 Benton Con......30c	1250 Savage.....	1.70
180 Belle Isle......35@.40c	150 Sierra Nevada.....	40c
100 Chollar......40c	200 Silver Hill.....	.15c
200 Con Va. & Cal.....2.75	100 Syndicate.....	.10c
50 Crown Point.....1.00	10 Utah.....	.45c
200 Grand Prize......35@.40c	100 Union Con.....	.35c
300 Gould & Curry......60c	100 Yellow Jacket.....	.90c

## New York Metal Market.

Telegraphic advices dated Sept. 23d give the following New York prices:

BORAX—6 1/4 @ 7 1/4 c.  
BAR SILVER—95 1/2 per oz.  
COPPER-LAKE—\$11.00.  
IRON—No. 1, \$17 @ 18.50.  
LEAD—\$4.85 @ 4.95.  
QUICKSILVER—43 @ 43 1/2 c.  
The following is the latest by mail from the "New York Metal Exchange Market Report":  
COPPER—Firm, spot closing 10.60c @ 10.90c. Transferable Notices (Lake) issued at 10.85; Transferable Notices (Chili) issued at 10.85.  
LEAD—Dull at \$4.65 @ 4.70c spot. Transferable Notices issued at 4.75.  
TIN—Firm at \$21.85 @ 22.00. Transferable Notices issued at \$21.85.  
Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$21.80 @ 22.15; Billiton Tin, \$21.90 @ 22.25; Banca Tin, \$22.05 @ 22.40; Baltimore Copper, \$9.25 @ 9.60; Orford Copper, \$9.75 @ 10.00; P. S. C. Copper, \$9.35 @ 9.65; Foreign Lead, \$4.85 @ 4.90; Foreign Spelter, \$4.70 @ 4.75.  
MAKER'S PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge, \$15.00 @ 16.00. Hudson River, Grade No. 1, \$18 @ 18.50; No. 2, \$17.00 @ 17.50; Grey Forge, \$15.00 @ 16.00. Southern, Grade No. 1, \$17.00 @ 18.50; No. 2, \$16.50 @ 17.50; Grey Forge, \$15 @ 16.

## New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

DUFFY WAVE MOTOR Co., Sept. 16.—Objects are to utilize the ocean and other bodies of water as a motive power and to furnish the city and county of San Francisco with power, light, heat, compressed air and salt water; to buy, sell and manufacture all material relating to supplying power, heat and light, compressed air and salt water. Capital stock, \$1,000,000, in 10 shares. Directors—Terrence Duffy, Chauncy Park, W. A. Williams, John Belter and Michael Brown.

MILLIKEN TRACTION ENGINE Co., Sept. 17.—Object, to manufacture traction engines and all forms of agricultural, mining and milling machinery. Capital stock, \$300,000, in 80,000 shares. Directors—W. H. Milliken, A. J. Bryant, P. L. Weaver, G. G. Francis and W. H. Knight.

JOHN T. CUTTING Co., Sept. 18.—Object, to buy and sell real estate, and pack vegetables, fruit and fish. Capital stock, \$100,000, in 1000 shares. Directors—John T. Cutting, C. T. Knudsen, T. W. Collins, L. W. Bartell and C. Q. McDonough.

EMPIRE G. M. Co., Sept. 21.—Capital stock, \$1,000,000. Directors—M. A. Shepherd, W. R. Judson, A. Judson, E. Green and J. H. Oliver.

ODORLESS APPARATUS Co., Sept. 20.—Object, to carry on and manage in Australia, Japan and the Republic of Mexico the business of excavating vaults, sewers, wells and cesspools, etc. Capital stock, \$2,500,000, in 550 shares. Directors—A. K. Coney, W. T. Humphreys, G. J. Carpenter, Geo. W. Corbell and T. H. Reynolds.

THE HISTORY Co., Sept. 20.—Object, to manufacture and sell the historical works of H. H. Bancroft, to publish and sell other books, maps, etc., and to carry on a stationery and book business. Capital stock is \$500,000, in 10,000 shares. Directors—H. H. Bancroft, N. J. Stone, O. A. Stone, M. G. Bancroft, K. K. Bancroft.

INYO MARBLE Co., Sept. 20.—Capital stock, \$1,000,000, in 100,000 shares. Object, to quarry marble in Inyo county, Cal. Directors—Israel Luce, J. M. Keeler, H. B. Keesing, Samuel Keesing, F. Heller, Jr., J. P. Fraser and G. W. Luce.

## Mining Share Market.

The Justice mine, on the Comstock, now starting up, has been idle for the past five years. The movement in Alta, which adjoins it on the south, has probably caused this resumption of operations. Alta is the only one of the line that has shown any activity of late. Work is resumed in the Crown Point and Belcher mines, the cooler weather and consequent decreased evaporation having allowed the mountain springs to rise and induced a corresponding increase of water in the river, allowing of a partial resumption of work for the mill stamps, which were hung up. Only about half the number of miners required by full work have been put into the mines, although more will be if required. There is little to be said in the matter of news in the middle mines. The water is all out, and further explorations of the lower levels are being proceeded with in Hale and Norcross and Chollar. Ore developments are being proceeded with satisfactorily in Savage, and at the Osbiston shaft preparations are being made for sinking a large three-compartment winze below the old southwest drift on the 2500 level, in Gould & Curry ground. A better grade of ore is being extracted from the lower levels of the Consolidated California and Virginia than heretofore, as shown by the average assays and solid bullion results.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Navajo, September 15, \$10,000; Moulton, 14, \$13,160; Oro Grande, 12, \$4269; Barber's Mill, 12, \$1800; Navajo, 17, \$8500; Germania, 16, \$3558; Queen of the Hills, 16, \$1650; Nevada, 16, \$2500; Hanauer, 16, \$2080; Germania 17, \$1702; Stormont, 17, \$3130; Queen of the Hills, 17, \$1650; Alice, 12, \$21,260. Wells, Fargo & Co., of Salt Lake, shipped for week ending Sept. 15, in bullion, \$66,022; McCormick & Co., \$47,710; T. R. Jones & Co., \$25,241; Union National Bank, \$21,260; Moulton, 18, \$12,976; Hanauer, 14, \$2048. The banks of Salt Lake City report the receipt for the week ending Sept. 15, inclusive, of \$160,235.14, of which \$114,793.56 was bullion and \$45,441.58 was ore. Last week's bullion and ore output was: 22 cars bullion, 534,862 lbs; 15 cars lead ore, 542,930 lbs.; 4 cars copper ore, 115,550 lbs.; total, 41 cars, 1,193,342 lbs.

## San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Sept. 23, 1886.

ANTIMONY—French Star.	1 1/2 @	—
BORAX—San Bernardino.	— @	5 1/2
Armstrong.	— @	6 1/2
Iron—Glengarnock ton.	— @	22 50
Eglinton, ton.	— @	21 50
American Soft, No. 1, ton.	— @	24 00
Oregon Pig, ton.	21 00 @	—
Clippert Cap, Nos. 1 & 2.	22 00 @	23 50
Clay Lane White.	21 50 @	—
Shots, No. 1.	23 50 @	23 00
STEEL—English, lb.	10 @	15
Black Diamond, ordinary sizes.	4 @	5
Flow.	5 @	6
Machinery.	10 @	—
Sanderson Bros.	10 @	—
COPPER—	—	—
Brass—sized.	30 @	—
Bolt.	19 @	—
Sheathing.	30 @	—
Ingot.	13 @	13
LEAD—Pig.	4 75 @	—
Bar.	5 25 @	5 50
Pipe.	8 @	—
Sheet.	8 @	—
Shot, discount 10% on 500 bag.	1 65 @	—
Buck, 3 bag.	1 85 @	—
Chilled, do.	2 05 @	—
ZINC—German.	9 @	10
Sheet, 7x3 ft, 7 to 10 lb, less the cask.	7 1/2 @	—
QUICKSILVER—By the flask.	— @	37 50



## List of U. S. Patents for Pacific Coast Inventors.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING SEPTEMBER 14, 1886.

- 349,075.—ORANGE PEEL SEPARATING AND SHREDDING MACHINE—Barnard & Benedict, Los Angeles, Cal.  
 349,080.—HORSESHOE—J. E. Bingham, Walla Walla, W. T.  
 349,081.—HORSESHOE—J. E. Bingham, Walla Walla, W. T.  
 349,082.—HEADLIGHT LAMP—E. Boesch, S. F.  
 349,088.—BRIDLE BIT—Geo. A. Doherty, Crescent Mills, Cal.  
 348,956.—WORKING SHIPS' PUMPS—E. Everding, Eureka, Cal.  
 349,110.—LAMP BURNER—C. H. Maisch, Carson, Nevada.  
 349,051.—PREVENTING OBSTRUCTION OF STREETS AT FIRES—J. R. Meyers, S. F.  
 348,993.—RENDERING FIBER WATER-PROOF—Pearce & Beardsley, S. F.  
 348,994.—INSULATING WIRE FOR ELECTRICAL PURPOSES—Pearce & Beardsley, S. F.  
 348,995.—PAPER AND PRODUCTS—Pearce & Beardsley, S. F.  
 348,996.—ROOFING FABRIC—Pearce & Beardsley, S. F.  
 349,058.—CONCRETE MOLD FOR WELLS, ETC.—E. L. Ransome, S. F.  
 349,181.—FEED-WATER PURIFIER—W. J. Smith, S. F.  
 349,066.—TREE COVER—J. Stahl, S. F.  
 349,071.—HEEL DIE—W. Watson, Victoria, B. C.  
 349,192.—WELL-BORING TOOL—J. A. Woodhouse, Santa Ana, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
 G. W. INGALLS—Arizona.  
 E. L. RICHARDS—San Diego Co.  
 R. G. HUSTON—Montana.  
 GEO. McDOWELL—Santa Clara Co.  
 FRANK W. SMITH—Utah and Colorado.  
 M. S. PRIME—Marin Co.  
 W. J. TULLIS—Humboldt Co.

## Acid-Proof Paint.

Among the meritorious exhibits at the Mechanics' Fair, to which was awarded a Silver Medal, is the display by the Paraffine Paint Company, whose main office is at 310 California street. The property which this paint possesses of resisting acids and chlorine gas, as well as defying the effect of long submersion in water, makes it of particular value in gold mills using the chlorine gas process, the tanks containing the solution being rendered watertight and impervious to the acid by its use.

After being subjected to a severe test it has been adopted, among other places, at the Amador Reduction Works at Sutter Creek, and the Phoenix works at Drytown, Cal., where a variety of substances, such as tar, asphaltum, pitch, white lead, black varnish and other materials, had been used without success. This paint is also used extensively in woolen mills for coating tanks, iron pipes and other surfaces in contact with sulphuric and muriatic acids, against the injurious effect of which it has been found to afford complete protection.

S. WENBAN has shipped from Beowawe eight bars of bullion, valued at \$8000, from his mine at Cortez, Nev. This bullion was produced by the leaching process.

## ASSESSMENT NOTICE.

**Truckee Ice Company.**—Location of principal place of business, San Francisco, California. Location of works, Martus Creek, near Truckee, Nevada county, California.

NOTICE is hereby given, that at a meeting of the Directors, held on the 1st day of September, 1886, an assessment (No. 1) of Ten Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 202 Sansome Street, room 4, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 4th day of October, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 25th day of October, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

GEO. W. SCOTT, Secretary.  
 Office—No. 202 Sansome St., room 4, San Francisco, California.

## WANTED!

Man of Capital and Mining Experience to buy a number of claims, all in the hands of prospectors. Three Locations on same vein, 10-25 feet; formation, slate hanging, granite footwall; assays from \$10 to \$90 per ton in gold and silver, with a little copper in it. Can be opened and worked with tunnels to a depth from 400 to 2000 feet. Plenty of water and densely timbered. Title perfect. About 20 miles from N. P. R., Montana. No Reduction Works in the vicinity. Will bear close investigation. Great chance for practical mining men of some means. Price, \$30,000. For further particulars, address

J. W. LIND,  
 Marysville, Lewis & Clarke Co., Montana.

## Practical Treatise on Hydraulic Mining.

By AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdies, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by Dewey & Co., Publishers, 252 Market St., San Francisco.

THE GUTTA PERCHA AND RUBBER MANUFACTURING CO.  
—MANUFACTURERS OF—  
**RUBBER GOODS.**

Patentees of the Celebrated "MALTESE CROSS" Brand Carbolized Hose.

The Best Belting for Threshing Machines is our **MONARCH RUBBER BELTING**, made with Cotton Stays or Flexible Rivets.



We have also the Patent **RED STRIP Rubber Belting**, and our Superior **STANDARD Rubber Belting**. Send for Price List of kind wanted.

JAMES F. HOUGH, General Manager of San Francisco and Portland, Or., Branches 15 and 17 FIRST ST., near Market, SAN FRANCISCO, CAL.



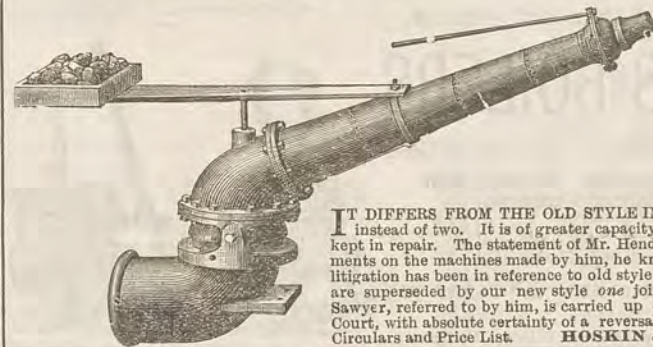
THE  
IMPROVED  
FORM  
—OF—  
SINGLE-JOINTED

**HYDRAULIC GIANTS.**

We are now in the field as manufacturers of SINGLE-JOINTED HYDRAULIC GIANTS, and are prepared to furnish the several sizes with quick dispatch, and they will be found to be the equal of, if not superior to, a similar form ordinarily known as the Marysville Nozzle, and will quote prices upon application.

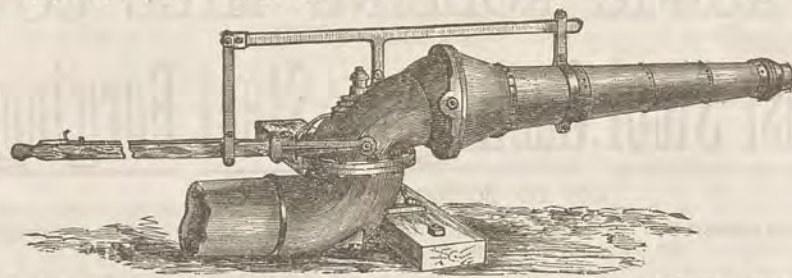
**JOSHUA HENDY MACHINE WORKS,**

Nos. 39 to 51 FREMONT ST., SAN FRANCISCO, CAL.



This cut represents our  
IMPROVED  
HYDRAULIC  
MACHINE.

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.  
**HOSKIN & CO., Marysville, Cal.**

**IMPROVED FORM OF HYDRAULIC GIANTS.**

The above cut illustrates the **IMPROVED FORM OF HYDRAULIC GIANTS**, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

**JOSHUA HENDY MACHINE WORKS,**  
 39 to 51 Fremont St., San Francisco, Cal.

**NATIONAL ASSURANCE CO.,**  
OF IRELAND.**ATLAS ASSURANCE COMPY.,**  
OF LONDON.**BOYLSTON INSURANCE COMPANY,**  
OF BOSTON, MASS.**H. M. NEWHALL & CO.,**  
GENERAL AGENTS,  
809 & 311 Sansome St., San Francisco, Cal.**THE RUSSELL PROCESS COM'Y.**

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
 Room 709.

**San Francisco Cordage Factory.**  
Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.  
 Extra sizes and lengths made to order on short notice  
**TUBBS & CO.**  
 411 and 413 Front St., San Francisco

**HEALD'S BUSINESS COLLEGE,**  
24 Post St. S. F.  
Send for Circular.**REGISTRATION**

—FOR THE—

**General Election.**

All electors desiring to vote at the General Election, to be held November 2, 1886, must be registered regardless of any previous registration.

Registration for the General Election to be held November 2, 1886, will commence at the office of the Registrar of Voters, in the basement of New City Hall, on WEDNESDAY, August 4th, and will continue until MONDAY, October 11th, inclusive. Office hours, 9 o'clock A. M. to 5 P. M.

By order of the Board of Election Commissioners.

P. F. WALSH, Registrar.

August 1, 1886.

**American Exchange Hotel,**

SANSOME STREET.

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

**Board and Room, \$1.00, \$1.25 and \$1.50**  
 PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

**Dewey & Co.'s Scientific Press**  
Patent Agency.

OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

DEWEY & CO., Patent Agents.

No. 252 Market St. Elevator 12 Front St.  
 S. F. Telephone No. 658.

A. T. DEWEY. W. B. EWER. GEO. H. STRONG.

**ORE FEEDERS.**

We direct attention to an advertisement, which appears in our journal, of the "Original Roller" Ore Feeder, manufactured by the "Joshua Hendy Machine Works," of Nos. 39 to 51 Fremont St., this city.

As the manufacturers of a similar form of Feeder, known as the "Templeton Roller," claim that it is superior to any other style, and cite those in operation at the "Bunker Hill" mill in Amador county, we expressly contradict the statement, and in substantiation submit a copy of a letter shown to us by a representative of the "Joshua Hendy Machine Works," which speaks for itself.

BUNKER HILL GOLD MINING CO.,  
 AMADOR CITY, CAL., July 12, 1886.

To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: We have used the "Challenge" and "Roller" or "Templeton" Ore Feeders in our mill for the past three years, and I am free to say that I consider the "Challenge" far superior to the "Roller" Feeder, in that most important of all things in a quartz mill, namely, the regular feeding of ore to the batteries. If the "Roller" Feeder is regulated to feed finely pulverized ore, the coarser ore will choke the outlet of the Feeder, and no ore can reach the batteries. If, on the other hand, it is regulated to feed coarse ore, then the fine ore when it comes will slice right through and fill the batteries. The "Roller" Feeder requires constant attention. Yours truly,  
 (Signed) N. W. CROCKER, Supt.

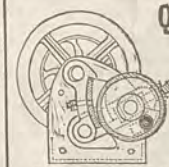
W. E. CHAMBERLAIN, JR. T. A. ROBINSON.



Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

**LIFE SCHOLARSHIPS.....\$75.**

Ladies admitted into all departments. Day and Evening Sessions during the entire year.  
 Call, or send for CIRCULAR to  
 CHAMBERLAIN & ROBINSON, Prop's.

**QUARTZ BREAKERS!**

—AND—

**Pulverizers Combined.**

To Run by Hand or Power.  
 Mining Machinery of Every Description; Drawings, Plans and Specifications.

E. J. NICHOLS, 316 Mission Street, S. F.

**RUPTURE!**

A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort night and day. Gives universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDDER, (Druggist) 701 Market Street, cor. Third, San Francisco.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

**Engraving** Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.



NOTICE TO  
**MINING MEN,  
ENGINEERS, CONTRACTORS,**  
and others interested in  
**TUNNELING, SHAFT-SINKING, ETC.**

**Engineers' Tables of Progress**

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

**NEW YORK  
AQUEDUCT TUNNEL**

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, etc., address:

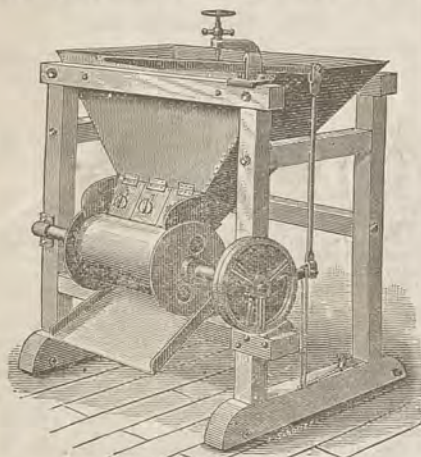
**INGERSOLL ROCK DRILL CO.,**  
REPRESENTED BY

**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

THE ORIGINAL  
**Roller Ore Feeder.**



This form of Ore Feeder is well adapted  
for its peculiar work.

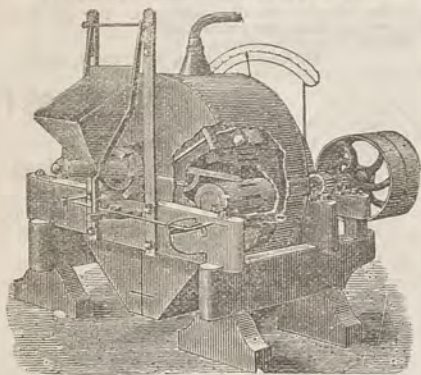
In reference to a similar form of "Roller" Feeder,  
which is being manufactured and offered for sale in this  
city, and of which a cut appears in this journal, we have  
to say that the Superintendent of the Bunker Hill Gold  
Mining Company states that the "Challenge" is far su-  
perior to the "Roller," he having had both of them  
operating side by side. We shall be pleased to show this  
letter, upon application, to any one interested.

We are also manufacturers of the "Challenge" and  
"Stanford Improved."

Prices furnished by the

**JOSHUA HENDY MACHINE WORKS,**  
89 to 51 Fremont St., San Francisco.

**Tustin's Pulverizer  
WORKS ORE WET OR DRY**  
FULTON IRON WORKS, S. F.



MANUFACTURED BY

**HINCKLEY, SPIERS & HAYES,**

**A Good Opportunity for a Ma-  
chinist.**

A variety of good Tools, Patterns, etc., with business  
for sale cheap by a party retiring from business. A  
splendid opportunity for an enterprising mechanic.

Address A. B. O., care of this paper.

**HOOD'S FOUNDRY COKE.**

Consumers are respectfully informed that owing to inferior brands of Coke having been sold  
in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co.  
(Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting  
that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,  
Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded  
to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quanti-  
ties to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**  
316 California St., San Francisco.

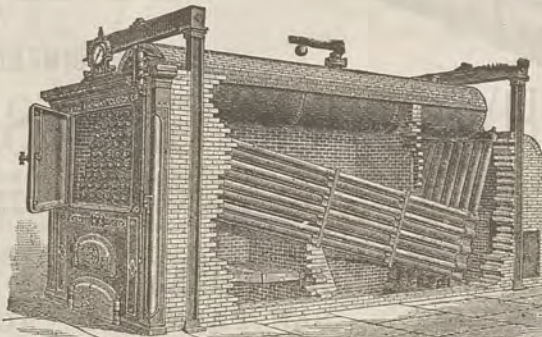
**FULTON IRON WORKS,**  
HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

MANUFACTURERS OF

San Francisco.



BABCOCK & WILCOX BOILERS.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure  
or Compound, Stern or Side-wheel En-  
gines.

MINING MACHINERY—Hoisting En-  
gines and Works, Cages, Ore Buckets,  
Ore Cars, Pumping Engines and Pumps,  
Water Buckets, Pump Columns, Air Com-  
pressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for  
Dry or Wet Crushing, Amalgamating  
Pans, Settlers, Furnaces, Retorts, Con-  
centrators, Ore Feeders, Rock Breakers,  
Furnaces for Reducing Ores, Water Jack-  
ets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MA-  
CHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines  
and Boilers, Dredging Machinery, Pow-  
der Mill Machinery, Water Wheels.

**ENGINES AND  
BOILERS**

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries

OF EVERY DESCRIPTION.

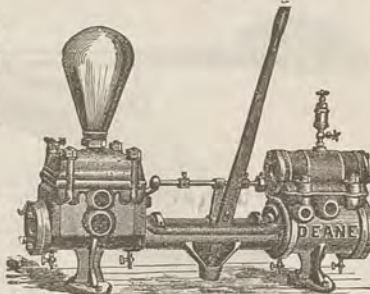
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

**PACIFIC ROLLING MILL CO.,**  
.....MANUFACTURERS OF.....

**Cast Steel Castings and Steel Forgings**

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.

—ALSO—

**HOMOGENEOUS STEEL, SOFT and DUCTILE,**  
SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

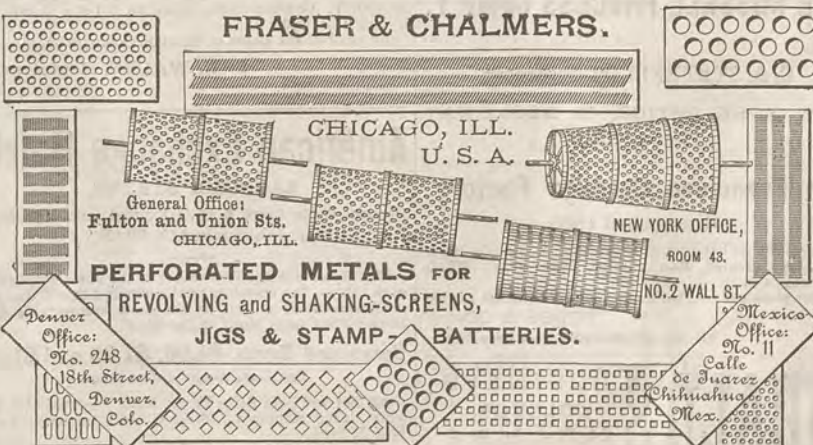
ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**

**FRASER & CHALMERS.**



UTAH OFFICE—SALT LAKE CITY, UTAH.

**Iron and Machine Works.**

**Golden State & Miners Iron Works.**

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board **AMALGAMATORS,**

**Golden State Pressure Blowers.**

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON THORNTON THOMPSON

THOMPSON BROTHERS,

**EUREKA FOUNDRY,**

139 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

**CALIFORNIA MACHINE WORKS,**

**WM. H. BIRCH & CO.,**

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

—BUILDER OF—

Steam Engines, Flour Mill,

Mining, Saw Mill and

Dredging Machines

Brodie Rock Crushers,

Steam Power, Hydraulic,

Side Walk and Hand-Power

ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic

Safety Catches for Elevators. All kinds of machinery

made and repaired. **ORDERS SOLICITED.**

**UNION IRON WORKS,**

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

**STEAM ENGINES, BOILERS AND ALL**

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery

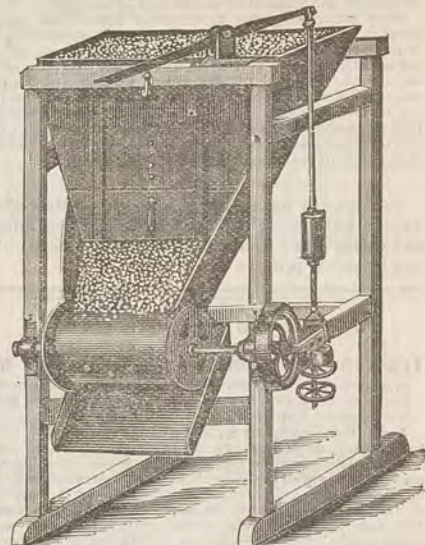
constructed, fitted up and repaired.

Front Street, Between N and O Streets,

SACRAMENTO, CAL.

**THE ROLLER ORE FEEDER**

[Patented May 28, 1882.]



This is the best and cheapest Ore Feeder now in use.  
It has fewer parts, requires less power, is simpler in  
adjustment than any other. Feeds coarse ore or soft clay  
alike uniformly, under one or all the stamps in a battery  
as required.

In the Bunker Hill Mill it has run continuously for two  
years, never having been out of order or costing a dollar  
or repairs.

**Golden State and Miners' Iron Works.**

Sole Manufacturers,

237 First Street, San Francisco, Cal.

**N. W. SPAULDING  
SAW COMPANY**

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

**CHISEL BIT**

CIRCULAR

**Saws.**

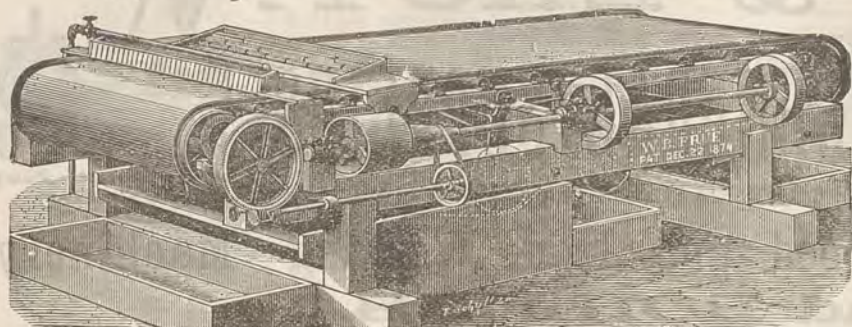
**SAW MILLS AND MACHINERY**

Of all kinds made to order. Send for Descriptive Cata-

logue. 17 and 19 Fremont St., San Francisco.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS.**  
(\$575 00), F. O. B.

**OVER 1,000 ARE NOW IN USE.** Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1888. Patents applied for.

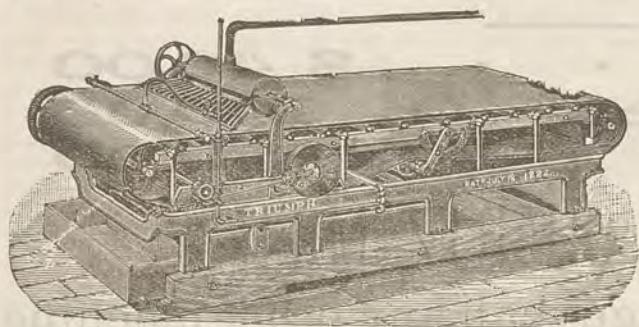
N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

# \$1,000 CHALLENGE ACCEPTED, PRICE, FIVE HUNDRED AND FIFTY DOLLARS (\$550.00).



**THE  
"TRIUMPH" ORE CONCENTRATOR.**

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

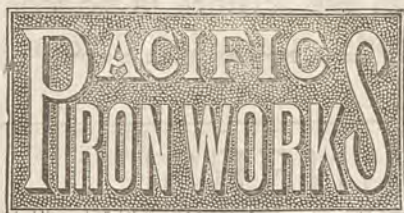
They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE, placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.



1850. 1885.  
**RANKIN, BRAYTON & CO.,**  
...BUILDERS OF...  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

## WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



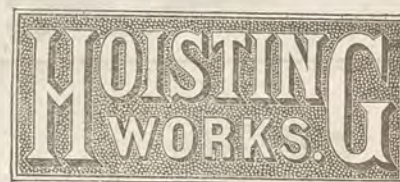
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH of the YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



**BAKER'S MINING HORSE POWER.**

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700 pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE of CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.  
J. C. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

## STEAM, AIR, AND HYDRAULIC MACHINERY.

**Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

## UNION IRON WORKS,

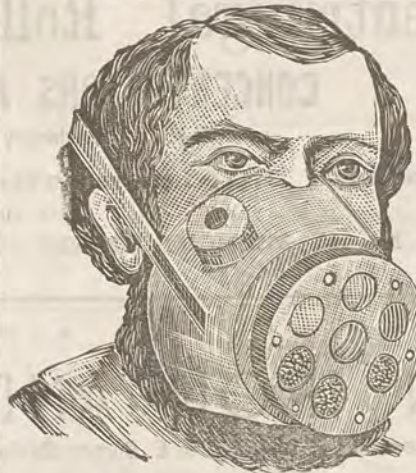
Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.



## PATENT LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning  
and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, Threshing and Stock-driving, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,  
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.

## CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

**STEIGER & KERR, Occidental Foundry,**

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



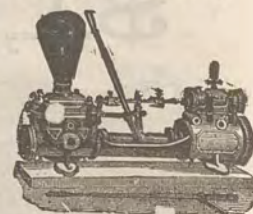
Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

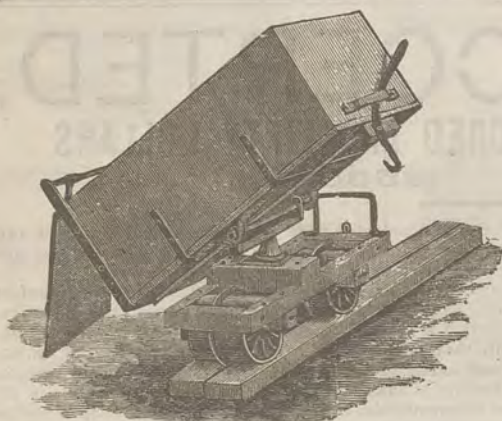
## MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Knowles Steam Pump  
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.



JAMES' PATENT ORE CAR.

# TATUM & BOWEN,

34 &amp; 36 FREMONT ST., Donahue Block, SAN FRANCISCO.

91 &amp; 93 FRONT ST., PORTLAND, OREGON.

Ore Car, . . . .	\$ 40.00
Rock Breaker, . . . .	100.00
Quartz Mill, . . . .	350.00

## THE JAMES QUARTZ MILL

Saves a Higher Percentage than any other machine.

Its action is a reciprocating motion of four separate and distinct Dies attached to a heavy casting in such a way that the **WHOLE WEIGHT and FORCE OF BLOW ACTS ALTERNATELY ON EACH DIE.** In this respect it resembles the Stamp Mill, and in point of amalgamation is superior to any machine in use. There is no wear, except on Shoes and Dies, and there is no expense for setting. Weight, 3000 pounds. Capacity, 6 Tons in 24 hours through No. 40 Screen. Requires 4 H. P.



SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

**BEST SOFT LAKE SUPERIOR COPPER USED.**

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.**  
**E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR &amp; CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

# F. A. HUNTINGTON,

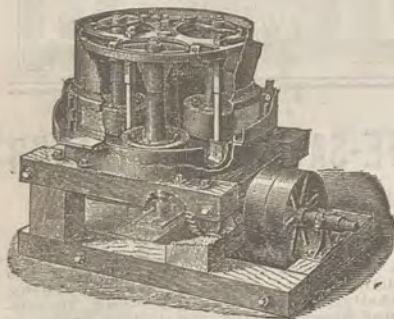
MANUFACTURER OF

## Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,

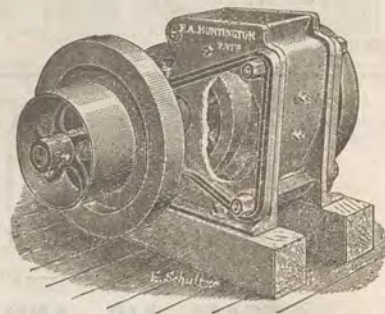
**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.



Centrifugal Roller Quartz Mill.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

# THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

**QUARTZ MILLS**—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
**AIR COMPRESSORS**—Rope Power Transmission.  
**HYDRAULIC PUMPING** and Hoisting Machinery.  
**WROUGHT-IRON WATER PIPE** a Specialty. *Note*.—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.  
**SAW-MILL MACHINERY** of all kinds.  
**STEAM ENGINES**—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
**SOLE MANUFACTURERS** for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.  
**MACBETH PATENT STEEL-RIM PULLEYS**—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

**REFRIGERATING MACHINERY** for Steamships, Breweries, and Cellars.  
**WILSON'S PATENT GAS-PRODUCER.**  
**STEAM BOILERS** of all descriptions.  
**SUGAR MACHINERY**—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.  
**STEAMSHIPS**—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.  
Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.  
Send for Circular and Price Lists.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, OCTOBER 2, 1886.

VOLUME LIII.  
Number 14.

## Concentration of Iron Ores.

In the MINING AND SCIENTIFIC PRESS of August 14th we gave an engraving of a jig used for concentrating iron ores, and promised to give a description of a whole plant for this purpose put up by Arthur F. Wendt at the Crown Point mines, New York. That plant is nearly a counterpart of that since erected by Messrs. Copeland and Bacon, contractors, for the Theal mine, Putnam county, New York, which is illustrated by the accompanying plate. The only difference is in the support of the crush-

until it is delivered, free from adhering gangue, in any chosen receptacle, no manual labor whatever is employed.

The practical results of the Crown Point plant are as follows: Ore treated in 10 hours, 80 tons; percentage yield of ore in concentrations, 28 per cent; average per cent of iron in concentrations, 65 per cent.

The power required is about 40-horse power, and at Crown Point, where, for the major portion of the year, this power is furnished by water, the cost is considerably less than \$1 per ton of dressed ore. A curious feature of the

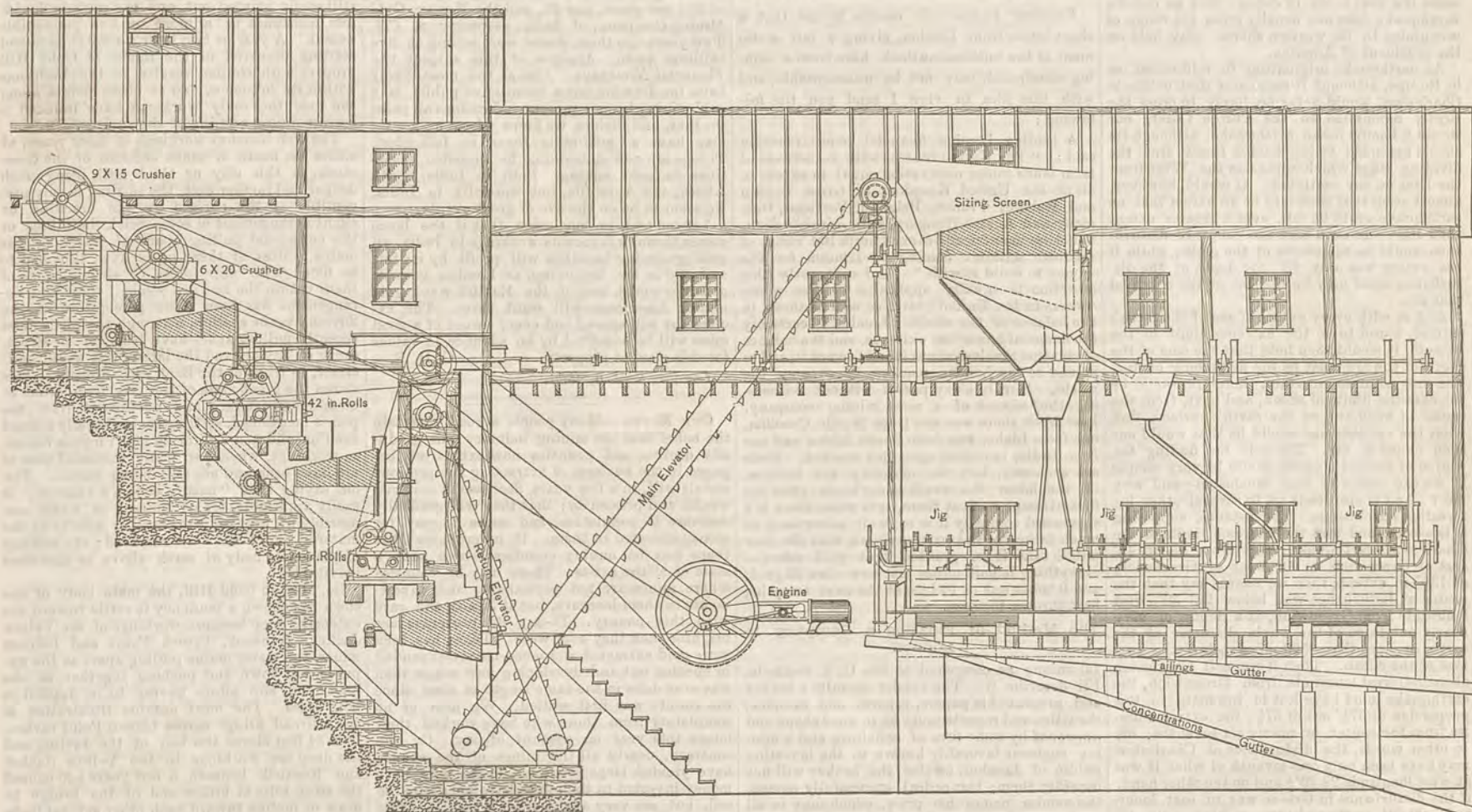
## Utilization of Ozocerite.

Ozocerite is a mineral wax or native paraffine, rather scarce and found only in few localities. It usually occurs in beds of coal or associated bituminous substances. It is like wax or spermaceti in appearance and consistency, ranging in color from an impure white to black, but is frequently brown or green.

Some years since a deposit of this substance was discovered in Southern Utah—the only place in this country, as far as we know, where it has been found. It was considered so valuable

like railroad ties. Notwithstanding the high temperature, which reaches 140° F., the ties retain their shape and hardness. These asphalt ties are used all along the road, except at the ends and center of every rail, where, as yet, wooden ties are employed. In this way about \$800 a mile is economized.

THE regular annual meeting of the Anti-Debris Association was held at Yuba City Saturday. Reports of the work accomplished during the past year were rendered, and an outline made of the work yet to be done. The expenses for



WORKS FOR THE CONCENTRATION OF IRON ORES AT THE THEAL MINE.

ers. At Crown Point this support is a wooden tower; at the Theal mine, masonry foundations are used.

By reference to the plate, the whole construction will be readily understood. Raw ore is dumped on the upper floor by an automatic skip. It is fed by hand into the 9x15-inch crusher, and thence passes by gravity through a 6x20-inch crusher, 16x36-inch rolls, and 12 by 24-inch rolls.

The whole operation is automatic. Screens are inserted between the different crushing machines, to remove any ore that will pass through a  $\frac{1}{2}$ -inch mesh. The screens also serve to feed the various machines regularly, thus contributing, in a measure, to the rapid crushing.

A bucket elevator raises the crushed ore to the sizing screen, where grading into two sizes is effected. The coarse ore from  $\frac{1}{2}$  inch to 1-16 inch in diameter is fed automatically to four jigs. The fine ore is fed to two jigs. From the moment the ore enters the large initial crusher

jigging is the elimination of phosphorus. At Crown Point this is not very marked, because the raw ore is extremely low in that impurity; but at the Theal works the results are striking. Thus, concentrations and tailings contained by analysis, respectively, .18 and .297 per cent of phosphorus. Again, an average of a lot of raw rock showed .18 per cent, and the concentrations therefrom .08 per cent of phosphorus. This is practically converting a non-Bessemer into a Bessemer ore.

It might be doubted whether this process could be applied to iron ores other than magnetites, in which the ore occurs in grains of considerable size; but Mr. Wendt states that experiments have proved that there is no difficulty whatever with specular ores, although the degree of concentration is not equal to that of magnetites.

THE cars for the electric road have arrived at Los Angeles.

that a Boston company was formed to work the deposit, which has since been mined extensively and to some profit. Samples analyzed in this city were found to contain a large percentage of white wax of the kind used in making paraffine candles.

A new and important application of ozocerite has been recently discovered in Russia. It is now used for making ties on the Transcaspian railroad, which has already passed Oschabat and nearly reached Merv. The process of manufacture is very simple and inexpensive. Kyra, the local name for ozocerite, is found there in thin layers of seven-inch thickness. In its primitive state it contains a certain percentage of decayed matter. To remove this, the ozocerite is melted in large caldrons; the refuse sinks to the bottom and the pure ozocerite collects at the top. This purified ozocerite, melted and mixed with 75 per cent of limestone and 25 per cent of fine gravel, gives a very good asphalt, which is pressed in boxes shaped

the past year were \$21,062, sixty-two dollars in excess of the receipts. George Ohleyer, B. F. Walton, C. K. Dam, C. E. Saxey and B. D. Grey, all members of the old Board, except the last named, were elected directors for the ensuing year.

THE stockholders of the Portland Reduction Works have formed a permanent organization, as follows: President, W. S. Ladd; Vice-President, W. A. Jones; Treasurer, James Steel; Secretary, J. M. Arthur. Board of Directors—W. S. Ladd, S. G. Reed, James Steel, W. A. Jones, Charles F. Powell, C. H. Prescott and F. J. Cavell. The buildings of the company in East Portland are rapidly approaching completion.

THE Peerless Mining Company has been sued by John Keegan, who seeks to recover \$400 on four orders of \$100 each, executed in his favor by the mining company, and which Keegan alleges they now refuse to pay.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eps.

## Earthquakes.

## Can Predictions be Made?

EDITORS PRESS:—Prof. John Milne says: "How to predict earthquakes and how to escape from their dangers are problems which, if they can be solved, are of extreme interest to the world at large."

The recent calamity that has befallen Charleston will doubtless direct the attention of Americans, and especially scientists, to unfold the laws of earthquakes more than they have ever done before. Prof. Milne, of Japan, has well explained the various instruments in use for determining the force and direction of the source of earthquakes, etc., and probably many of the philosophers in every civilized country are as familiar with the several seats of disturbance which induce earthquakes within specified ranges, as astronomers are with the grouping of the celestial constellations. But, while undoubtedly a large number of earthquakes may be so classified, like wheels within wheels, yet there are many others of such colossal extent that they would appear almost to overcome every seemingly natural barrier. Neither the breadth nor the depth of the Atlantic ocean—with all its innumerable deep-sunk, but, in fact, highly elevated ridges and reefs of rocks overflowed for many thousands of feet above by the ocean currents—forms any insurmountable obstacle to the same seismic influence felt from Greece in the Mediterranean sea to Charleston on the shores of the Atlantic; or Japanese, or even Javanese earthquakes, being felt right across the immense basin of the Pacific ocean and the South American coast, or perhaps in California. Yet perhaps the same law that holds in Japan—that an eastern earthquake does not usually cross the range of mountains to its western shores—may hold on the continent of America.

An earthquake originating in mid-ocean, or in Europe, although it may carry destruction to Charleston, would never be likely to cross the Rocky mountains to the Pacific Coast, nor would a Pacific ocean earthquake, although its effects extended to the Pacific Coast, cross the dividing ridge which separates the West from the East on our continent. It would, however, almost seem that it should be an axiom that no earthquake could be felt over a greater extent than 180°. In such case the center of disturbance would be the center of the globe, while if the extent was only 90° the depth of the disturbance could only be the sine of the chord of that arc.

And so with every extent of arc of the earth's surface, found to be the extreme limit of the tremor; it would then hold that the sine of the chord of the arc must be the disturbing center. The first point to ascertain, therefore, would be the extreme limits of shock, and next, from the center of such arc, on the earth's surface, find what the vertical sine would be that would cut such chord of arc. The rule for finding the source of any earthquake would be very simple if we can arrive at that conclusion—and why not? And it also leads us to several other interesting conclusions. For instance, supposing it is ascertained that the extreme limits of the Charleston earthquake were from about 45° east of Greenwich to 90° west of Greenwich, or 135° in extent; then we should say that the center of disturbance was below 22° 30' west longitude from Greenwich, at a depth of very nearly one-third of the whole diameter of the earth, or more than 2500 miles below the surface of the ocean. Then if we call Charleston about 80° west longitude from Greenwich, the earthquake must have lost in intensity in the proportion of 57½° out of 67½°, the extreme limits from the center, or nearly six-sevenths; or, in other words, the disturbance at Charleston may have been only one-seventh of what it was at west longitude 22° 30'; and on the other hand, if the disturbance in Greece was in east longitude 22.30° or thereabouts, making only 45° east from the great center of disturbance, it was probably at least one-fifth the greater in intensity in Greece than at Charleston.

But we should naturally look for the greatest disturbance at the Azores, or Western Islands, and St. Michaels, or in the longitude of about 20° and 25° west of Greenwich. Now, that, according to the story of Atlantis, has been one of the greatest scenes of disturbance on the face of the earth, when we consider that the Azores are now only the mountain peaks of a sunken continent of 2000 or 3000 miles in length and 1000 miles in width. The same mighty power that buried it in the depths of the ocean can, of course, uplift it again, in due time, if it is so ordered; and at all times it will be deeply interesting to take record of any changes that may occur in that land of the earliest mythologies of which we have any trace.

The question of the possibility of the prediction of earthquakes is a very interesting one, and not at all ignored by Professor John Milne. It is manifest that there is no effect without a cause, and as scientists become familiar with the extent and consequent sources of earthquakes, so such occurrences lead to consideration of what may occur within comparatively short periods. Mr. Wiggins, of Canada, is said to have predicted the Charleston earthquake some

18 months since, to occur when and where it did—about August 31st last. My impression is that he published a pamphlet which many newspapers called attention to, and ridiculed; but if these predictions have been verified, scientists cannot now ignore them, and the line of argument should be critically and carefully examined which has led to such remarkable results.

The stepping-stones to discovery have in all ages had to overcome much skepticism. In the 19th century, therefore, we should be rather indulgent to receive patiently and impartially any reasonably stated evidence that has for its sole object the advancement of science. It may help us greatly in a path that may seem otherwise deviant and impracticable to advance in, and enable us to arrive at conclusions that may be of signal benefit. Surely, if a full inquiry had been made 18 months ago into Mr. Wiggins' theories in support of the prediction of the recent earthquake at Charleston, some steps might have been taken to have rendered the city or the buildings more secure. San Francisco long ago took warning and has numerous earthquake-proof buildings, sufficient at least for ordinary liabilities, and wherever and whenever science points to probable future dangers on this coast or elsewhere, from earthquakes, all the provision that man can make to avert the worst consequences of such calamities should be put in hand in due time.

Mr. Wiggins should be invited, therefore, to present his views in detail, with suitable diagrams to illustrate the whole matter, before a Government-appointed board of scientists, that due inquiry may be instituted, and if Mr. Wiggins should not yet be exactly on the right track, still such an inquiry, earnestly followed up in good faith, would certainly lead to sound conclusions and may be fraught with almost incalculable benefit to ourselves and coming generations.

A. F. G.

## Floating Mines in London.

## American Mines Abroad.

EDITORS PRESS:—It occurs to me that a short letter from London, giving a fair statement of the business outlook here from a mining standpoint, may not be unacceptable, and with this idea in view I send you the following:

A leading London financial paper recently said: "The United States, with an acreage of farm lands under cultivation equal in extent to all of the United Kingdom of Great Britain and Ireland, France, Belgium, Portugal, Germany and Austro-Hungary, still, *mirabile dictu*, our American friends cannot build 100 miles of railroad without coming to London for the money to build it with." And apparently this assertion is equally applicable to the mine-owners in the United States as well as those in the balance of the world. London is certainly the financial hub of the universe, and the balance of creation revolves about it and toward it, and to it, and as the London markets go so goes the world. Hardly a day passes without witnessing the advent of a new mining company. Last week there was one from North Carolina, one from Idaho, two from South Africa and one from India, launched upon this market. Some are successes, but the majority are failures. Of the latter the world never hears after the first attempt to float them, yet when there is a successful company it is so well advertised, so much talked of and written about, that the dear public take it for granted that gold mines—everything is gold mines just now—are all good, and 9 times out of 10 bite at the next tempting bait thrown to them.

## The Method of Floating a Company in London

Is unique as compared to the U. S. methods. I'll describe it. The vender consults a broker and presents his papers, reports and samples; the titles and reports must be in good shape and approved by some firm of solicitors and a mining engineer favorably known to the investing public of London, or else the broker will not consider them; this ordeal successfully passed, the vender names his price, which may be all cash or partly cash and partly a stock consideration; this agreed upon, the broker prepares to bring out the company. The first step in this operation is to secure a chairman for the board of directors; nobody untitled will answer for this office, and the broker tries the entire list if he is not at first successful. Dukes, earls, marquises, viscounts, lords, baronets; he doesn't want an earl if he can get a duke, and so down to a sir, which latter he is mostly obliged to accept; the chairman secured, the remainder of the board is made up of business men, naval and military officers, members of parliament, etc. Upon the social standing of the board, solely depends the success of the scheme, and if it is headed by a duke or earl—a very rare occurrence—the stock is sure to go off quickly and at par. I must not forget to mention the fact, for it is an important consideration, that the services of the board have been secured for a certain block of full paid shares, the size of the block varying and dependent upon a variety of circumstances, but under the most favorable auspices the allowance is always liberal; this is distributed where it will do the most good, and then a day is set for

## "Bringing Out" the Company.

This operation is a simple, but not an inexpensive, one. The *modus operandi* is to advertise in every daily paper in London an abridg-

ment of the prospectus of the proposed company, and this advertisement occupies from a column to half a page of space; hence it is obvious that in newspapers with a daily circulation of from a quarter to half a million copies, such a "card" will cost (as they say in England) "a lot of money." These advertisements are usually worded in this style (I quote from a current prospectus): "Capital, £85,000 in 17,000 shares of £5 each; 11,500 shares are offered for public subscription. Payments, 10 shillings on application, £1 10s on allotment, £1 one month after allotment, and £2 two months after allotment, etc." If the public comes forward and subscribes for the stated number of shares, it is then said to "go," otherwise it is either a failure or else the unsubscribed stock is underwritten, i. e., taken by the promoters—vender and Board of Directors.

This is all very quickly explained on paper, but it is quite a different matter to float a company. If the mine is a "going concern," that is, if it is being successfully operated and is paying moderately well, it is a comparatively easy matter to get it sold at a fair price; but, on the contrary, if it is an idle property, whether from inherent worthlessness or from lack of means on the part of the owners, it is next to an impossibility to get a good broker to touch it. I know men in London who have been here two and three years trying to place mines, but because they are not "going concerns," they have been unable to accomplish their object, and they are liable in the end to return to the United States both wiser and poorer. There is every indication of a

## Mining Boom for this Coming Season.

And if the signs do not fail, rich harvests will be reaped by the fortunate owners of good properties. The causes for these prognostications are traceable to the recent successes of a few well-known mines; the two most prominent among quite a number of this class are the Montana, of Helena, M. T., quoted yesterday at £9½ per share, par £1, and the Mysore Gold Mining Company, of India, yesterday at £7½. Two years ago these shares were selling at five shillings each. Apropos of this subject the *Financial News* says: "One of the most likely baits for drawing out a speculative public is a gold-mining boom; present indications all point to that, and before we know where we are we may have a gold-mine fever in full blast. Things are now in training for possible sensations in gold mining. Both in India, South Africa, and Australia, but especially in India, we seem to be on the eve of great events."

Let me add, in conclusion, that if the boom comes through favorable workings in India, all gold-producing localities will profit by it; for, as I said in the beginning, as London goes so goes the world, and if the English want gold mines, Americans will want them. The excitement will spread and every owner of a good mine will be benefited by an advance in values for this class of property.

C. H. E.

London, Sept. 6, 1886.

OUR MINES.—Many people abroad entertain the belief that the mining industry will gradually decline, and counties now extensively engaged in the business of extracting the precious metals will, in a few years, decrease in material wealth and prosperity; that they will gradually decrease in population, and cease to pay for money invested in them. It is probable that there may be mining counties where such a state of affairs exists. There may be counties where mines are not permanent, and investments in them insecure, but it is not the case with this county. To-day its prospects are brighter than they ever were. There has been more gold extracted and more money expended in opening out and developing new mines than was ever done in the same length of time since the county was first settled. We hear of no complaints from those who have worked their mines this year on account of pay. On the contrary, nearly all the mines of the county have yielded large returns. Those who have money invested in the mines have no desire to sell, but are very anxious to invest in other mines. Outside capitalists will find a confidence exhibited by men of means living in the county, that will convince them of the permanency of the mining interest. Instead of the mines playing out in a few years, it is believed by those who are competent to judge that for years to come the amount of bullion extracted will be larger than it is to-day, and the number of mines many times greater than at present. The outlook could not appear more encouraging, and argues well for the future of the county.—*Nevada Co. Transcript*.

THE Oroville Mercury says: "There will be no mining of any consequence at Big Bend this summer. They have a flume 1000 feet long and 18 inches wide that is now carrying the water in the river the tunnel would not take, which is about 10,800 inches. By running this water thus the permanent dam can be constructed this summer. They are now preparing to put in the machinery to enlarge the tunnel this winter, and will in a short while commence the work. The necessary enlargement will be made, and next summer a large portion of the bend will be mined."

CHEAP LABOR.—The best female lace-makers of Saxony are not able to earn more than 60 cents a week.

## A Restless Foundation.

## The Towns on the Comstock.

Ever since the first workings of the Comstock, says the *Virginia Enterprise*, or from the time when ore was commenced to be extracted in large quantities from the body of the great lode, some portions of this city and Gold Hill have been moving in some direction or other. This has been, and still is, owing to the vast amount of mining going on down beneath the foundations. This is easily understood when it is borne in mind that the first mining was at the outcrop of the ledge, at the western side of both towns, and passing beneath, at an angle of 45° eastward and downward, these workings have been extended to beyond the eastern borders, or about a mile from the croppings or place of commencement.

The first extensive settling of the ground was caused by the caving of the large worked-out chambers in the upper workings of the Gould and Curry mine, above B street, to the depth of 300 or 400 feet. A considerable extent of the surface sank in, and subsequently, by degrees, the surrounding territory, including a long section of B street and the west side of C street, settled considerably, and all toward the Gould and Curry workings. Scores of buildings whose foundations were thus disturbed were thrown out of line, and some brick buildings nearly or quite ruined. This settling was aided much by the upper workings of the Savage mine, which were merely a continuation of the Gould and Curry. On the west side the settling extended to the highest croppings, the great mass of the mountain side gradually sliding downward and eastward, leaving a long cleavage or offset some hundreds of yards long and from two to six feet high, following the croppings north and south, which was plainly to be seen from C street. This occurred about 23 years ago, but the marks mentioned are still easily pointed out, and the settling doubtless continues to a more or less perceptible extent. A year or two later a similar cave and settling occurred in the mines of Gold Hill proper, with similar results to the buildings within its influence, and at other points along the lode the early workings have induced a corresponding settling of the surface.

The rich bonanza workings of later years, at either the north or south sections of the Comstock, in this city or Gold Hill, being much deeper and further east, the settling is only perceptible at the surface by the cracking or slight derangement of some brick buildings or the occasional pulling apart of water or gas mains. Most of these pipes have thus had to be fitted with slip joints or sleeves, some of them within the last few weeks. This pipe derangement has been more perceptible at the Sutton avenue section, although the pipes most recently pulling apart have been on B street, south of Taylor, and the latest, last week, on C street, in front of the Bank of California. This shows the great mass of the city foundation to be moving eastward and northward from the points mentioned, settling concentrically toward the Consolidated California and Virginia bonanza workings, whence so many thousand tons of ore have been and are still being mined. The old saying that "nature abhors a vacuum" is easily applicable, for no timbers or waste can possibly fill in mine workings as solidly as the material which has been removed; the settling of the whole body of earth above is therefore inevitable.

So, also, in Gold Hill, the main body of the town has shown a tendency to settle toward the extensive deep bonanza workings of the Yellow Jacket, Kentuck, Crown Point and Belcher mines, the water mains pulling apart at the upper end of town and pushing together at the lower end, slip joints having to be applied in both cases. The most notable illustration is the railroad bridge across Crown Point ravine. It is 84 feet above the bed of the ravine, and the deep ore workings in the Yellow Jacket and Kentuck beneath a few years ago caused the steep hills at either end of the bridge to draw or incline toward each other several inches, a fact easily demonstrated by the railroad track, and the abutments of the bridge itself. Subsequently the much more extensive bonanza workings in the Crown Point and Belcher mines further south checked this movement, and the hills have since been as gradually receding.

The only solid section of ground on the line of the Comstock is the Divide, between this city and Gold Hill. No extensive ore bodies have ever been found beneath that locality, consequently no great chambers have been excavated to cause any settling above. Not that the dwellers on that section are therefore any safer than anywhere else on the Comstock, for notwithstanding the demonstrated fact that the broad piece of Mt. Davidson's rugged side upon which this city is located is eternally moving in some direction or other, there can be no sudden or disastrous cave down into the mining depths, and most residents would not know that their houses were moving at all were they not told.

THE GREAT REFLECTING TELESCOPE, at Melbourne, is devoted chiefly to the observation of nebulae. With it have been discovered indication of great changes in some of these celestial bodies during the last few years, such changes being sought to confirm the generally accepted nebular theory of the origin of the solar system.



## High Explosives.

Ever since the first successful introduction of nitro-glycerine as a blasting agent, numerous devices have been resorted to with a view of lessening the danger attendant upon the manufacture, transportation and handling of this powerful explosive. It is a well-known fact that nitro-glycerine in its raw state is far too powerful an agent for general use, so that it has been necessary to prepare from it blasting compounds of varying strength, which, at the same time, must be possessed of great durability.

After a series of most elaborate experiments in both Europe and America, methods have been discovered whereby nitro-glycerine can be so mixed with both inert and active materials as to produce not only an explosive of any desired strength, but such that can be handled and transported with comparative safety. As a matter of fact, some of the nitro-glycerine explosive compounds now in use are far safer than the old black powder formerly exclusively used in connection with mining.

The nitro-glycerine compounds in use in this country are very numerous, one of the best known being that called Hercules. In Europe the word dynamite is applied to all compounds of nitro-glycerine. In the past few years there has been a rapid increase in the number of nitro-glycerine compounds for blasting purposes, the manufacturers of each variety claiming that their powder possesses great advantages over all others.

It is an unfortunate fact that many, if not most, of these new innovations are absolutely devoid of merit, and are quite often extremely dangerous, the character of the ingredients being such that one reacts on the other, giving rise to spontaneous decomposition, which, under favorable conditions, will result in spontaneous combustion.

These compounds are boldly placed on the market, generally with fanciful names, and without regard to the fearful risk of life attendant upon their transportation and use. In most European countries, but more particularly in Great Britain, the manufacture of high explosives is subject to constant inspections, and no compounds are allowed to be placed on the market which are imperfectly or dangerously prepared.

With a view of showing the miners of this coast the nature of the work performed by these inspectors, some abstracts will be given from the "Report of Her Majesty's Inspectors of Explosives," for 1885. Deaths in the manufacture of explosives during 1868, 1869, 1870, inclusive, 43; deaths in the manufacture from 1868 to 1874, 39½; deaths in the manufacture from 1871 to 1874, 37; deaths in the manufacture, eight years, 1878 to 1885, 8.25; deaths in the manufacture in 1885, 5.

"In the report for 1882 and 1883 we made some observations on the subject of *blasting gelatine* in the production of a uniformly satisfactory quality of which explosive difficulties had arisen, leading, in 1882, to a suspension of the manufacture for a considerable time.

"In our last annual report we mentioned that the manufacture of this class of explosive had been resumed, subject to certain modified tests which had been formulated as the results of careful and prolonged researches by Dr. Dupre and Sir F. Abel.

"During the last year the manufacture of blasting gelatine and gelatine dynamite has been actively pursued, but we regret to state that the manufacturers have not invariably succeeded in finding a material which satisfies the tests for chemical condition; for although a large proportion of the material has furnished very satisfactory results, several instances have come under our observation in which the explosive fell sensibly short of the licensed requirements in regard to its condition of thorough purification, and we regret to say that it has been our duty to place not inconsiderable amounts under seizure on this account, and to require all blasting gelatine and blasting dynamite now in the company's magazine, and in those of their agent or under their control, to be returned to the factory.

"We are at present in communication with the manufacturers on the subject and have emphatically intimated to them that unless the tests laid down as formally accepted by them can be uniformly satisfied, the issue of the material must again be suspended. It is worthy of notice that, whereas, the former difficulties were connected with the physical character of the material, those now experienced have reference to its chemical character.

"Tonite and Potentite appear to find favor for certain classes of work. The tendency is decidedly in the direction of a development of the nitro-glycerine group of explosives as distinguished from the gun-cotton class.

"Eight applications for new explosives were referred to us during the year, but in two cases only would we report favorably.

"Imperial powder, an admixture of chlorate of potassium and charcoal, was condemned.

"Ammonia dynamite consisted of thickened nitro-glycerine, with which nitrate of ammonia was incorporated. Nitrate of ammonia is a very deliquescent salt and rapidly absorbs moisture from the air. In consequence of this, it soon liquefies and runs out of the cartridge, leaving behind the thickened nitro-glycerine only. This thickened nitro-glycerine by itself

is a soft, semi-fluid substance, and in its turn is liable to run out of the cartridge, particularly in warm weather, thus constituting a very grave danger. The report was consequently unfavorable.

"Forcite consists, professedly, of nitro-glycerine thickened or gelatinized by means of cellulose which has been subjected to the action of water in a high-pressure boiler. The samples submitted, however, consisted of a thin blasting gelatine, with which were incorporated nitrate of potassium, wood meal, and a small proportion of dextrine. The explosive did not show sufficient stability, and the report was consequently unfavorable."

Three other new powders, known as etnite and kinetite and turpine, are composed of various mixtures with chlorate of potassium. The report states of them: "All chlorate mixtures are liable to what is termed spontaneous ignition or explosion in the presence of a variety of materials, more particularly of such as are acid, or are liable to generate acid, and all chlorate mixtures are readily exploded by percussion, but more particularly by combined friction and percussion."

From the foregoing extracts from the report of Her Majesty's inspectors it is evident that there is great danger connected with the handling of many of the explosives now being sold. In addition to the great danger in their handling, there is also the great loss connected with their use, as it takes some time before the miner can become accustomed to the action of any new powder. Nothing can be of greater importance than an explosive of known and uniform strength. The character of the substances entering into the composition of the explosive, and their chemical and physical effect upon the nitro-glycerine and upon each other, should be known. Blasting gelatine, gelatine dynamite and ammonia dynamite are sold in the market, and the latter is sold without any intimation to the consumer that it contains tartrate of ammonia, which compound has received such unqualified condemnation in the report of Her Majesty's inspectors. Forcite is also being introduced here. The danger connected with this powder has also been given in the extracts from the inspectors' report. Purchasers should be careful to select only the high-grade powders which experience has proven are safe to handle and use.

In the dynamite and nitro-glycerine compounds which have a uniform composition of well-known ingredients, such as the Hercules powder, for instance, sold in this market, there is not the danger encountered in commoner powders. The company manufacturing this powder claim to have steered clear of all those objectionable ingredients that are prone to spontaneous decomposition, such as impure blasting gelatine, nitrate of ammonia, dextrine in all shapes and forms, and have rigidly adhered to the manufacture of a reliable and safe explosive, and have not, like some manufacturers, changed their formula with every change of the moon. With reliable powders of the high-grade class there is both economy and safety, and those which have a well-earned reputation in this direction are the cheapest in the end.

AN EXPERIMENT IN A CHARCOAL PIT.—A few days ago an interesting experiment took place at a charcoal pit five miles from town. It appears that the men at the pit were greatly blamed by their contractor for alleged carelessness in their work. He claimed that the returns of charcoal were insufficient for the amount of wood consumed, because of some waste in the burning. In order to show the falsity of this claim, the men selected a new pit, placed one dozen silk handkerchiefs at the bottom of it, and carefully piled on top of them 16 cords of wood. A fire was started and the wood burned. Upon the coal being removed, the handkerchiefs were taken out and found to be wholly free from injury. The result of the experiment so surprised the contractor that he immediately apologized to the men, and advanced their contract price to one-half per cent a bushel more than the contract calls for. In this connection it is interesting to note that over 80,000 bushels of charcoal are turned out in the pits here every year. The Buttes Company alone utilizes 20,000 bushels.—*Sierra Tribune*.

THE ORIGIN OF A SALT MINE.—On the eastern coast of the Caspian sea, a curious phenomenon is in progress. The Kara Bobbas is an estuary nearly separated from the main body of the sea by a bank through which there is an inlet. The evaporation from this gulf is so great that a current continually sets in from the Caspian; and as there is no return current, the water of the gulf becomes more and more saliferous, and a deposit of salt is in course of formation. In time this gulf will be cut off from the Caspian, and will then be dried up and become an extensive salt bed.

NAPHTHALINE, as a wood preservative, is now largely used in that capacity in Scotland, its action being to destroy all albuminoid compounds in the wood, leaving it dry and clean to handle, and with only a faint aromatic smell. The naphthalene is melted in a vessel capable of being tightly sealed, and the wood is laid in it until experience shows that the saturation is complete. The temperature at which timber is treated is kept as low as possible, so as not to injure the fiber.

## Tree-Planting.

The custom of appointing a tree-planting day now prevails in eight States and should find favor in every State and Territory. There is no State in the Union that needs trees more than California. We are glad to see the question again agitated. It cannot be too often and earnestly insisted upon. Were the farmers on the treeless plains of this State, in addition to their orchards and vineyards, to plant a few acres of forest trees, they would not only in the near future receive a rich reward in the shape of timber, but would largely solve the irrigation question.

History will vindicate the statement that one of the causes of the impoverishment of a country and the extinction of civilization has been the destruction of forests. The cutting down of trees means exhaustion of springs, changing the climate and producing arid desert wastes and excessive alternations of heat and cold. With the disappearance of trees, men vanish. This is the reason why Syria, Greece, Asia Minor and parts of Africa are so largely abandoned. The result of cutting mountain forests is that the surface water, produced by snow and ice, instead of being absorbed and retained by the vegetable coating, rushes down the valleys in tremendous torrents, and instead of penetrating and fertilizing the soil becomes the agent of devastation. We have one familiar illustration. The Ohio river overflows with almost every rainfall. The clearings on the slopes of the Alleghanies are said by those who have made a study of the problem to be the cause of this immense volume of water. In some sections of New York, where the forest trees have been cut away, it is said that wheat now often fails, from winter killing, although the soil is of excellent quality.

The plains west of the Missouri are now a promising theater of the tree-planting experiment. It is claimed that in some localities where farms have been made, villages built and trees planted, the dry, parched soil of 20 years ago is clothed with a rich verdure, and river-beds that were half the year dry are now constantly covered with running water. It is well known that the city of Denver was built on one of these ancient river-beds, where it was supposed water would never again flow; but there is now a permanently running stream, so large that it has been found necessary to bridge it.

If such is the value of trees and their effect upon climate, the subject of forest culture demands the attention of all cultivators of the soil. And nowhere is this claim more imperative than upon the farmers of California. The uninterrupted rays of the sun falling upon these plains, covered as they are in the late summer only by a dried vegetation, heat the atmosphere to such a degree that it is able to contain an unusual amount of uncondensed moisture. The consequence is, the moisture in the atmosphere is carried by the prevailing winds over the Sierra Nevada range until it reaches the Rocky mountains, where, being condensed, it falls in abundance of rain. The very nakedness of the earth's surface becomes the cause of perpetuating this condition from year to year. Nature has no power to arrest this evil. It must be done by artificial agency if it is ever done, and Nature kindly suggests the remedy. No well-wooded country ever suffers from a long-continued dry season. And who can doubt that if the plains and deserts of California were liberally covered with clumps of trees there would not be a greater condensation of moisture, and rain-showers would keep up a growth of vegetation later in the season? It may be as we have suggested, that forest culture on these dry and parched lands would tend to solve the vexed irrigation question to some extent. At all events, it is time our farmers were urged to preserve a portion of their forests and plant forest trees where they have none.

## Death to Coyotes.

The Red Bluff *Sentinel* says that B. A. Bell, supt. of the Gallatin ranch, has discovered an excellent plan to get rid of coyotes. He first had five iron picket pins made. He got an old ewe of little value and took her to the range where a band of mutton sheep were herded. He tied a rope about six feet long to her neck and the other end of the rope to a picket pin, which he drove into the ground. He then planted four steel traps at equal distances from each other in a circle, a short distance outside the circle that would be made by the sheep round. Over the ground and traps hay was spread so that the coyotes could not see them. The trick worked like a charm, and for three mornings in succession Mr. Bell had the satisfaction of finding a live coyote in one of the traps. He changed the location of the old ewe and caught two more coyotes. Since that time he has not been troubled with coyotes killing his sheep.

TRANSFERRING RAILROAD TICKETS.—The Supreme Court of Nebraska has ruled that a non-transferable railroad ticket, if sold to a third party, cannot be seized by a conductor from the holder on a breach of contract, the holder being entitled to possession in order that he may recover the amount paid for it from the vender.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

TREE COVERS.—Jasper Stahl, S. F. No. 349,066. Dated Sept. 14, 1886. This invention relates to a device for covering trees so as to inclose the tree for the purpose of introducing fumes to destroy scale or other insects which may be upon the tree; and, in connection with the cover, a mechanism by which it is raised, lowered and adjusted so as to be easily placed on the tree or removed therefrom.

BRIDLE BIT.—Geo. A. Doherty, Crescent Mills, Plumas Co. No. 349,088. Dated Sept. 14, 1886. In this bridle bit the mouth-piece has one of its ends split into longitudinal sections, hinged together and provided with a two-part socket, forming, when the sections of the split end are closed, a complete hole or aperture. A removable rein ring fits in this hole, and a tubular rubber piece or sheath fits on the mouth-piece.

HEEL DIE.—Wm. Watson, Victoria, B. C., assignor of one-half to Geo. M. Irving. No. 349,071. Dated Sept. 14, 1886. This die is intended for cutting out the sole-leather sections for the heels of boots and shoes. It consists of an expansible and contractible die, a handle with a cross-base on top of the die, and adjustable clamps through the cross-base and engaging the die, whereby it is rigidly fixed where adjusted. The object of the invention is to provide a simple and effective heel die adapted by its adjustments for cutting out various sizes of sole-leather sections.

AUTOMATIC ATTACHMENT FOR WORKING SHIPS' PUMPS.—Edward Everding, Eureka, Humboldt Co., Nev. No. 348,956. Dated Sept. 14, 1886. This is an engine or attachment for operating pumps on vessels, buoys, etc., where the rolling or pitching motion can be utilized for the purpose. It consists of a cylinder having a piston working within it, and a piston-rod which is connected with the handle of an ordinary ship's pump. The cylinder has a pipe extending from its lower end, either directly through the bottom of the vessel or otherwise, so as to enter the water so that the rising and falling of the vessel in the water operates the piston, and through it the pump. Suitable valves and pipes are provided.

WELL-BORING TOOL.—John A. Woodhouse, Santa Ana, Los Angeles Co., Cal. No. 349,192. Dated Sept. 14, 1886. The tool is intended for displacing boulders and stones in the hole in advance of the descending pipe. It consists in a cylindrical stock, a proper point, a series of expansible spring plates uniting the stock with the point, an expanding sector-block upon the head of the point and bearing against the spring plates, a rod screwed into the stock, and having a conical point for adjusting and operating the sector-block, and a peculiar guide and sinker coupled through the intervention of suitable jaws to the head of the tool. The tool is adapted for use in rocky strata, and it will displace and hold back loose rock, boulders, etc., leaving a space larger in diameter than the pipe which follows the tool.

CONCRETE MOLD FOR WALLING WELLS, ETC.—Ernest L. Ransome, S. F. No. 349,058. Dated Sept. 14, 1886. The patent covers certain improvements in that class of molds for concrete work which are adapted to expand and contract in order to be fitted in place, and relieved again after the concrete is filled in. These improvements consist of the construction of the elastic or springy bands which form the ribs of the mold, of two or more strips of wood bent to the necessary curvature or direction of outline and secured together, of the end standards of the bands, of the particular mechanism for effecting the expansion and contraction of the mold, of the particular mechanism for vertically adjusting the mold, and of certain details of construction.

PREVENTING OBSTRUCTION OF STREETS AT FIRES.—Julius R. Meyers, S. F. No. 349,051. Dated Sept. 14, 1886. The object of this invention is to prevent the obstruction of railroad tracks at fires and still provide for leading the hose back or forth as may be necessary. Pipes are placed at intervals and imbedded permanently in the street, passing transversely under the road-bed of the railway. Their ends are upturned and fit through the bottoms of boxes or casings, also imbedded beside the track. These boxes have covers, which, when removed, admit of reaching the upturned ends of the pipes which are prepared so the hose ends may be coupled to them. A section of fire hose from the hydrant or engine reaches to the imbedded pipe end at one side of the track, and other lengths of hose may be coupled to the opposite end of the pipe. The hose does not, therefore, cross the track, and cars may pass at any time. This device is specially adapted where cable cars are used, as the ordinary jumpers or bridges for hose cannot be used in the case of cable cars. The imbedded pipe would pass under the cable tube.

It is said that the application of a bit of ice, or even cold water, to the lobe of the ear will stop hiccupping.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$8. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Oct. 2, 1886.

## TABLE OF CONTENTS.

**EDITORIALS.**—Concentration of Iron Ores; Utilization of Ozerocite, 213. Passing Events; California Mining Progress; Mica; Local Experiments with Wave Power, 216. Centrifugal Pumps and Draining Machinery; Mining Accidents, 217.**ILLUSTRATIONS.**—Works for the Concentration of Iron Ores at the Theal Mine, 212. Early Forms of Centrifugal Pumps, 217.**CORRESPONDENCE.**—Earthquakes; Floating Mines in London, 214.**MECHANICAL PROGRESS.**—The Laws of Friction; Steel vs. Iron for Carriage Work; Successful Casting of Iron or Steel upon Brass; Electric Welding; Compressed Wood for Tooth Gearing and Shuttles; Glass Bearings; To Prevent Screws from Rusting; Furnace Sparks, 218.**SCIENTIFIC PROGRESS.**—A New and Valuable Discovery; Wind Pressure; Causes of Earthquakes; A Map of the United States; Magnesium as a General Illuminant; Eyeless Animals, 218.**ENGINEERING NOTES.**—A Petroleum Engine; Bridging the Hudson River; The Electrical Transmission of Power, 219.**USEFUL INFORMATION.**—A New Cement; Soldering Alloy; The Risk of Cleaning Pictures; Paper Roofing; Powdered Asbestos for Coating Walls, etc.; Cinchona in California; Railway Expansion; To Braze Iron Pipes; Olive Oil as a Lubricant, 219.**GOOD HEALTH.**—Pure Air and Pure Water; An Electrical Crematory; Courage in Disease; Stung by a Scorpion, 219.**MISCELLANEOUS.**—A Restless Foundation, 214. High Explosives; Tree Planting; Death to Coyotes; Notices of Recent Patents, 215.**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 220-21.**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 224.

## Business Announcements.

Frue Ore Concentrators—Adams & Carter.  
Water Wheels—J. Leffel & Co., Springfield, Ohio.  
Dividend Notice—Paradise Valley Mining Co.  
Mining Claims—J. E. Bickerton, Oakland.

See Advertising Columns

## Passing Events.

Silver still continues to advance, 96½ cents being bid in this city on Thursday. This is most encouraging to silver miners, who hope to see it up to \$1 an ounce before very long. Every cent makes a difference to those who are mining for this metal.

It is stated that the proprietors of the Virginia and Gold Hill Water Company are arranging to put in larger pipes across Washoe valley so as to furnish water enough to provide pressure for hydraulic pumps for the Comstock mines, and enough also for motive power for the stamp-mills. All this is in the direction of cheaper working of low grade ores.

Quicksilver has got up to \$40 a flask. This is a rise of \$10 a flask since the 1st of January. The rumors of the sale of the New Almaden mines to James G. Fair have not been verified.

As stated elsewhere in the PRESS, the gold quartz-mining industry of the State is still more active and attracting more attention. Men are at work in all of the camps developing new mines or reopening old ones.

**THE WIGGINS EARTHQUAKE.**—The cataclysm so confidently predicted by Mr. Wiggins to occur on September 29th did not come off on time. Though scientists everywhere stated that there were no means of predicting earthquakes, thousands of people were alarmed at the predictions of disaster, and felt sensibly relieved when the day passed as other days do.

## California Mining Progress.

The Land Office Department of the Central Pacific R. R. Co. in this city has a pretty good opportunity of learning of the gradual development of different portions of this State. For the first time in some years the officials notice that a revival is going on in mining affairs. Not only people from this State, but persons from the East, are looking to mining rather than to agricultural enterprises as a scheme for making money. A very considerable number of new quartz mines have been opened on the western flanks of the Sierra and much land which came within the railroad grant has been abandoned to miners who have proved its mineral character. The greatest activity in this direction seems to be in Butte county, where several new quartz mines are being worked successfully, some of them paying unusually well. A great many prospectors are out, and there will probably be before long new mines added to the list.

This proves what we have repeatedly said of late with regard to California progress in the quartz-mining industry. It may be said, however, that San Francisco is far from doing its share to this development. The city originated from the mining industry, built up by it, made famous by it, and having thousands of splendid structures erected through its instrumentality, pays slight attention to mining in these days. Its citizens seem to have forgotten that it was never more prosperous than when the mines were at their best, and that its progress has been comparatively slow since mining has been neglected. With few exceptions most of its wealthy men have ignored the mining riches so close to our doors.

Yet in spite of lack of encouragement, and against even a pronounced opposition, the mining industry of California has thriven and grown, until to-day the quartz and drift mines are in a better condition than ever before. By-and-by the citizens of the metropolis will wake up to find that the best mines are in the hands of people from other States and other nations. They will learn that the miners have worked out their own salvation, and learned to mine economically and with wisdom, so as to make the business more profitable than commercial venture; that the wide gold field which elsewhere would be more highly considered will pay better than loaning money on "securities," and that they have neglected opportunities for years which should have been taken advantage of.

The miners now scarcely think of looking in this city for aid. They go to New York, Boston, Denver, Chicago, St. Louis or London for purchasers. Abroad our gold mines are more highly thought of than at home. We have not been able, apparently, to see the difference between stock-dealing and mining, and because mining stocks are lifeless, we seem to think the mines are, too.

The truth is, there never was a time when over a score of California mines were listed on the Stock and Exchange boards. Most of them have been worked as business propositions, and to-day this is as true as ever. The stock lists show a paltry half dozen or so California mines, while thousands are being worked to profit. Every year, when the account of the year's work is summed up, California comes in the second place in total production of precious metals, and first as a gold-producer, as compared with other States and Territories. And yet more than half the people of this State think mining is "played out" in California. An industry which produces in new gold \$16,000,000 to \$18,000,000 a year is suffered to get on the best way it can without financial or legal encouragement. It is no product of barter or exchange, but bedrock production of so many new dollars each year. The money spent to produce it is not lost. It is still in existence in other hands, while the dollars produced are new, and added to the world's circulation.

If some dim realization of these facts could be brought to the minds of our communities—which it seems difficult to do—great good would result. As long as people consider an industry depressed they avoid it and help to crowd it down. Once let them realize its prosperity, they are willing to assist it. Those at all familiar with the subject are perfectly certain that the gold-mining industry of this State, under the improved existing conditions, will gradually increase in value and extent for many

years to come. Old mines are being reopened and new ones found in all directions in our mining counties. The center of our quartz-mining industry is in Nevada county, and in that region they are making more progress than ever. The miner built up this State, whatever may be thought to the contrary by late comers, and his industry should be better encouraged and fostered than it is. The MINING AND SCIENTIFIC PRESS, the oldest mining paper on this continent, which has watched this industry carefully for years, is perfectly confident that, though long depressed, the gold mining of California is on the steady up-grade of prosperity.

## Mica.

Mica is one of the commonest minerals and occurs in greater or less quantities in a variety of rocks. The term "mica" covers a number of mineral species all similar in their scaly structure and general chemical composition, yet only one of these species—muscovite—has any commercial value or is popularly recognized under the generic name. It is usually disseminated or minute scales of no practical value, its occurrence in sheets or plates large enough for economic working being quite limited. Even when found in suitable size and abundance it is apt to be defective in structure or so stained and spotted as to be worthless. To be advantageously marketed the mica should yield trimmed plates not less than three inches square, and these should be tough, clear, even in texture, without flakes, and capable of being smoothly split into exceedingly thin layers. Even in places where there is an abundance, only a small portion of the mineral taken out is available for use. The waste and clippings far exceed what is mined and marketed. It is chiefly used in the manufacture of stoves, lampshades and lanterns, although some of the finest mica is employed for the dial-plates of compasses. The waste trimmings, when ground, are used to a limited extent as an absorbent of nitro-glycerine in making high explosives, for glistening wall-papers, as a lubricant, in making "brocade" pigments, and as a substitute for asbestos in making fire-proof roofings.

The mineral is found all along the Eastern slopes of the Appalachian system on an almost continuous belt from Maine to Alabama; in numerous places it is mined in the New England States. In New Hampshire mica mining is quite an old and established industry along the belt of country southeastward of the White mountains. In all the Southern States it is more or less abundant. Mica mining has also assumed importance of late in the Black Hills, Dakota. In the best mine there only about five per cent of the total mica extraction is of merchantable quality. Some of the finest sells for \$3 to \$4.50 per pound. Custer county, Dakota, up to July, 1884, had produced 124,640 pounds of marketable mica, worth \$442,589. In Colorado, Wyoming, New Mexico, Arizona, Oregon and Alaska this mineral has been found, and in many places in this State. None worked here has ever been profitable, owing to its lack of clearness and proper texture. The best in the country comes from North Carolina and Dakota. It is difficult to find any market for mica on this coast, so that no mica mining of consequence has been carried on.

It is within the past two years that mica of the best quality, known as muscovite, has been discovered in Canada in marketable sizes and in paying quantity, and to-day several deposits capable of being developed into fairly productive mines are known. Two in the county of Frontenac, Province of Ontario, show well-formed, large crystals at the surface, imbedded in white quartz; another in Wakefield has been uncovered, and numerous "crystals" have been exposed, which, though small, are of excellent quality. In the Lake Superior and the Lake of the Woods districts good mica has been discovered in paying quantity, and a company has been formed in Winnipeg to work an important deposit in the last-mentioned locality. In British Columbia, also, a fairly good quality is known to exist, but no attempt has been made as yet to prove the size of the available "crystals" or the extent of the deposit in that province.

THE Black Hills has produced in the last ten years not less than \$25,000,000 in gold, silver and base bullion and placer gold, an average of \$2,500,000.

## Local Experiments with Wave Power.

Some very interesting experiments are being carried on at the ocean beach, about 1200 feet north of the Cliff House, with a view of utilizing wave power, the ultimate object being to supply this city with some 50,000 or 60,000 horse-power for industrial purposes, water being used instead of steam. The experiments are being carried out by E. T. Steen, a mechanic of this city, and several thousand dollars have been spent thus far for plant, trials, etc. The idea is to raise sea water, through the medium of a pump operated by the waves, to a height of about 350 feet, whence it can be directed into the city and the power used for elevators, mills, manufactories, etc.

The apparatus is exceedingly simple. A bridge has been built across a chasm into which the waves roll, and from the bridge is suspended a strong frame carrying a swinging arm or lever, the lower end of which carries a float or paddle immersed in the water. This lever or arm has its upper end suitably connected by rods that extend to a heavy crosshead. The lever is 32 feet long. The crosshead is connected with the plunger of a pump of 12 inches diameter and 13-foot stroke. The pump is 24 feet above low-water level. As the lower arm of the lever moves to and fro with the action of the waves it operates the pump, drawing the water from the sump and forcing it to the reservoir on the hill.

The float on the submerged end of the lever is intended to be only about one foot under water. It is not placed in the long rollers, but works in the water inside the first line of breakers, so it obtains the force which dashes the waves against the rocks. The operating lever swings on the arc of a circle, and can readily be withdrawn from the water as occasion demands, the power required to do this being furnished by a water-wheel.

It is intended, provided the experiments are satisfactory, to establish a line of these pumps and levers. Other pumps, 16 or 17-foot stroke, will be put up. Full stroke is seldom taken, the great length being given to provide for emergencies, so as not to break the pumps. At present they are pumping through pressure-valve and meter to determine power, etc. The force of the waves to the square foot is very large, and those engaged in the enterprise are of the opinion that storm waves will not seriously affect the motion. The high tides make no difference, either. The pumps, it may be stated, are placed horizontally.

When Balboa "discovered" the Pacific he stood knee-deep in the placid waters at Panama, and the name given the great ocean was appropriate to the locality. This far north, however, it is a misnomer, for the waves are large all summer, owing to our prevailing strong winds, and the winter storms off shore and near shore create large rollers constantly. There is always plenty of sea to operate a contrivance of this kind, therefore, in these latitudes. There has been plenty of talk of wave and tide motors for many years past, but this experiment is being put to practical test. When the results are formulated and details known, we shall give them in the PRESS. There is no intention of attempting to carry out the power scheme for the city manufactories, until a thorough demonstration of the practicability of the plan has been made.

MR. W. A. GOODYEAR, well known on this coast from his long connection with the California State Geological Survey, and his authorship of a work on the "Coal Mines of the Western Coast," has returned to San Francisco after an absence of several years. He proposes to settle in California again.

THERE is again talk of the Iron Mountain mine, Shasta county, being started up. It seems more probable that the failure there is due to lack of valuable material in the ore than to imperfect processes. And the same may be said of Meadow Lake district.

THE new stamp mill in Detroit district, Utah, has proven that there are gold ores there worth working. The great difficulty is the mill is far away from the mines, in order to be where water is obtainable in sufficient quantity.

POOL SALES of Lake copper, amounting to 20,000,000 pounds, have been made at 11½ cents per pound.



## Centrifugal Pumps and Draining Machinery.

[Written for the Press by J. RICHARDS.]

NUMBER 2.

## History of Centrifugal Pumps.

It will be proper here, and before entering upon a history of centrifugal pumps, to offer some remarks upon the United States Commissioners' report of the Vienna exhibition of 1873. To this report is due, unfortunately, in a great measure, the idea of such pumps being of European origin, both by the distortion of facts and the gross ignorance of hydrodynamics, which it presents.

Without wasting space to quote from this report, the following salient points appear (see pages 193 and seq.): (1) Appold was the introducer of this class of pumps. (2) They are misnamed centrifugal, because they do not operate by centrifugal force at all. (3) They operate by pressure the same as a turbine water-wheel. (4) When people understand their method of operating we may expect much improvement. (5) They should have disk runners, because the fan-wheels will soon wear out.

This much, I think, will do, and as it stands printed in a government publication, we can only deplore the stupidity, as well as presumption, of the commission who thus disposed of a subject that had 20 years before been carefully investigated by such men as Sir John Rennie, Professor Cowper, Mr. Whitelaw, Dr. James Black, Professor Rankin and many others. The most astonishing part is, however, that this report was passed and presented by Professor Thurston, who we can hardly suppose would fail to see its absurdity.

It would be as tedious as it is useless to search for the first application of centrifugal force to moving and impelling fluids. I presume each prominent nation in Europe considers the discovery as belonging to their people; and, as before remarked, it was a matter of no concern until it came to be applied to useful purpose and took place as a "manufacture."

There is too often a desire to place strained construction on old inventions or precedents, often taking form as ridiculous as unfair. Fortunately, in the present case, this necessity will not appear. To begin back far enough, however, to lend some air of antiquity to the subject, one of the oldest drawings, extant at this time, is that of Le Demours, a Frenchman, dating from 1732. It is a kind of "Barker mill" machine, and the forerunner of various other pumps on the same principle, that of Barker's mill inverted, which have been periodically invented ever since, one within the writer's knowledge a few years ago in California. The same invention, or "mode of operating," was soon and often discovered in connection with reaction water-wheels by their overrunning and drawing the water from the chute or inlet after the gates were shut.

Mr. Whitelaw, the inventor of reaction wheels, in their common or applied form, himself converted the method to pumping by centrifugal force, and made pumps of the submerged type that gave some very good results, which were fortunately tabulated in a careful manner, in 1849, at Johnstone, near Glasgow.

These tables contained factors for friction of both water and machinery, with exact measure of resistance and power that would do credit to a scientific committee of our day. The tables will be given in another place. Whitelaw's pumps were first made about the year 1848.

To begin at the true beginning, when centrifugal pumps first took practical and useful form we have to, as before claimed, come to the United States.

## The Massachusetts Pump.

A pump embodying almost every essential feature of modern practice was invented in Massachusetts in 1818—30 years before the same thing was applied in Europe, and 40 years before there was a modification there that can be called an improvement.

The drawing (Fig. 1) is a section through the Massachusetts pump. It is, as can be seen at a glance, the "parent of its tribe"—the completed machine, and in useful effect would equal, if not excel, either of the modifications exhibited at London in 1851, 33 years later.

It is proposed, however, in the present chapter to deal with the chronological part of the subject and discuss separately the merits and constructive features of the different pumps.

The Massachusetts pump fell on barren ground; there was at the time but little use in the United States for such pumps and but

scant means of communicating inventions over the country; as before remarked, there was land enough without draining; and water raising except from wells was exceptionally required. We, however, hear of the pump finding its way to New York in 1830 and being exhibited there with very satisfactory working results—guessed at then, no doubt, but still ascertainable even now.\* The casing was beveled from the center to the periphery, but not in degree to conform to volume and velocity as a theoretical pump of our day would be, but an approximation that showed the inventor had inception of the true working conditions.

The first pumps were made to operate under water like those of Bessemer, and I conjecture the improvements mentioned in connection with

said, this pump has of right a prominent place in our "history."

## Andrews' Pump.

The next to follow was Andrews' pump, invented or published in 1839. If the Massachusetts pump came near anticipating our best modern practice, the Andrews pump completed the matter, and leaves room for the lament of Lord Byron that "those thieving ancients have stolen all of our modern ideas."

The construction is shown in Fig. 3, and excepting the straight vanes and one or two less important points the pump is capable of high duty and conforms very nearly to good modern practice.

The value of curved vanes, as will be here-

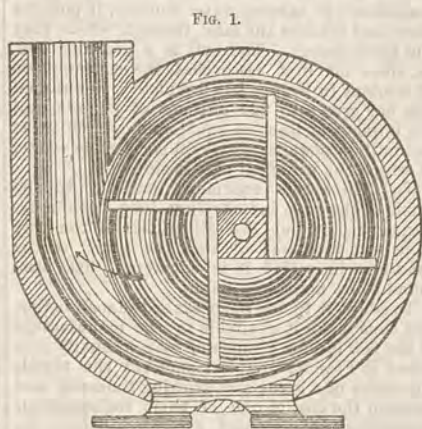


Fig. 1.

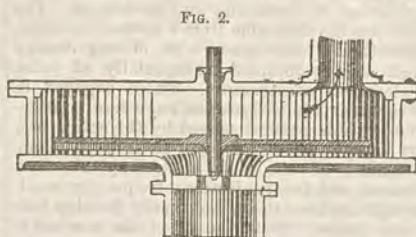


Fig. 2.

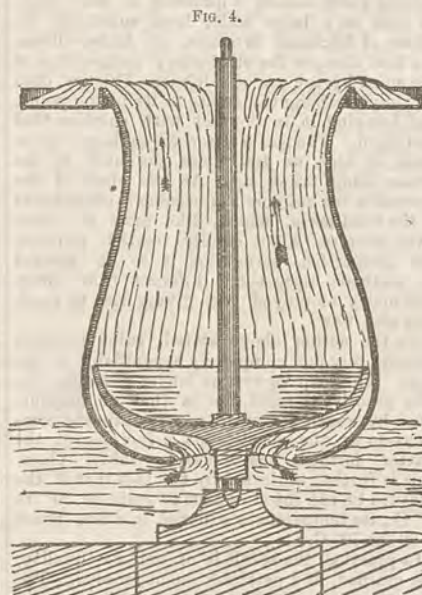


Fig. 4.

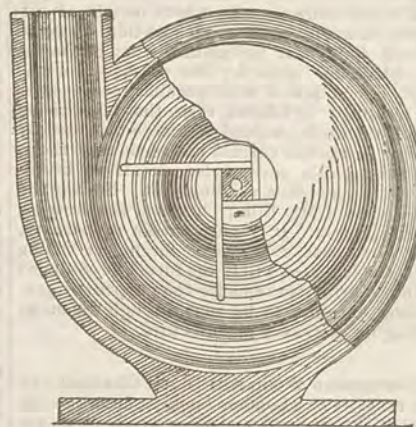


Fig. 3.

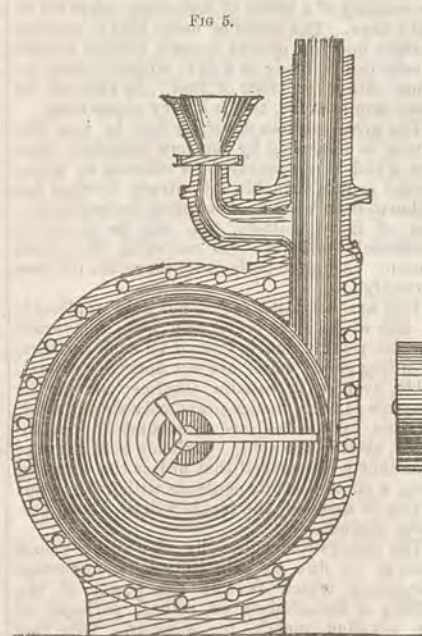


Fig. 5.

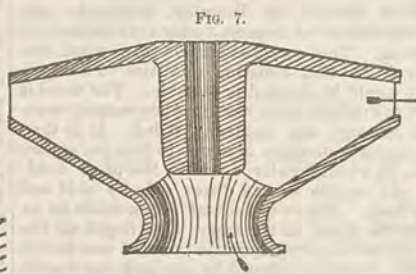


Fig. 6.

EARLY FORMS OF CENTRIFUGAL PUMPS.

the exhibition at New York, in 1830, to be the addition of side suction-pipes.

## Blake's Pump.

In 1831 Messrs. Blake, of the New Steam Mills, in Connecticut, invented a new centrifugal pump, shown in Fig. 2, and well worthy of attention as being the first of its type and almost identical with Bessemer's, of 1845 and 1849. It is, in fact, the better machine, if carefully compared, but subject, like nearly all disk pumps, to thrust upon the wheel, that would cause trouble in working.

It was in every sense a "departure," and is by no means obsolete at this day for high lifts. The force of the issuing water is lost, as may be seen by the annular casing and change of course; but this loss has to be measured by the relative speed between the wheel and off-flowing water, so that for high heads, as before

after explained, is dependent on speed or pressure and are not a qualifying factor of the pump's duty unless pressure be assumed, and I venture to claim that for low heads, this American pump of 1839, made long before any such machine was known in Europe, is, for low heads, capable of a duty within ten per cent of the best modern performance.

Its distinguishing feature comparing with its predecessor, the Massachusetts pump of 1830, is the cylindrical section of the casing, not differing at all from the patterns in use at the present time by several makers in the Eastern States.

The transverse section of the pump would show the "waterway" diminished from the inlet to the periphery to conform as nearly as practicable to volume and velocity; in fact I think it is in this respect much better proportioned than many pumps now being made and sold.

This pump, let it be remembered, was produced and publicly known five years before Mr. Gwynne's experiments at Pittsburg, and at a time and place that leaves only the Massachusetts pump as a possible precedent.

We must not, however, detract from the parent pump further than to call the present one an improvement. It is a step further in the art, and a very possible invention that any one might make, and is, I suspect, mainly the result of improvement in mechanical facilities for making the casing of two pieces of cast iron, and of cylindrical section.

## Whitelaw's Pump.

This brings us down to the time of Whitelaw's experiments at Johnstone. The exact time is not known, but it was between 1847 and 1849.

Mr. Whitelaw was the inventor of the water-wheel that bears his name, and his pumps which he describes as "especially suited for draining lands," are in most respects, as before said, an "inversion" of his water-wheels.

Fig. 4 will give an idea of the arrangement, which differs but little from pumps erected within a few years past by thorough engineering firms in England, and also of pumps made from the writer's designs now in use in California.

The most remarkable feature of Mr. Whitelaw's experiments is the very complete knowledge of hydrodynamics they show. The following are four columns out of nine his table contain:

No. of Experiment.	Revolutions of the Pump.	Loss by friction and other resistance in the pump.	Loss by force of water after leaving the pump.	Efficiency. Power of pump moving water being 100.
1	327.6	19,370	7,314	69.23
2	278.4	12,780	9,462	73.18
3	226.8	7,027	13,980	79.67
4	199.6	4,466	18,620	75.78
5	182.0	2,984	23,780	76.48

The power applied was by a dynamometer of delicate construction, and the experiments were in every way conclusive.

I do not give the formulae employed in the computations; this can be found in the *Practical Mechanics' Magazine* of 1850.

There is an erroneous opinion existing respecting the efficiency of pumps of this kind, of which more will be said hereafter; at present I will, however, point out that the effect produced by Mr. Whitelaw with his submerged wheel was seven per cent better than anything attained in the exhibition of 1867.

## Gwynne's Pump.

The next stage in our pump history begins with the experiments of Mr. Gwynne at Pittsburg in 1844. The pumps produced we can presume to be the same, or analogous to, the one patented six years later, and shown in Figs. 5 and 6. This pump affords room for extended comment, which must, however, be passed over here. It was the one shown in competition with the Bessemer and Appold pumps at the exhibition, and by no means so good a one as its predecessors in America, although more expensive and complicated. In support of this opinion I have only to refer to Messrs. Gwynne's modern practice. The discharge chamber was annular, as shown in the side view.

## Mining Accidents.

Abe Brockman, while working in a prospect claim on Kate Hayes hill, Nevada county, was caved on, and cut quite severely about the head.

The *Tidings* tells of two accidents in Grass Valley mines: At the Empire a piece of the ledge fell on the head of Thomas Halsall, cutting and bruising him severely. His escape from death was miraculous. Harry Thomas at the same mine was working around the stamps, when one of them fell and caught his right hand in such a manner as to hold it fast, while the stamp itself rose and fell with its accustomed regularity. Every movement of the stamps bruised the hand and cut the flesh nearly to the bone. In order for Mr. Thomas to extricate himself, the mill had to be stopped. No bones were broken.

Michael McNichols was killed and E. J. Morrow seriously wounded by the explosion of a number of blasts in a drift in the Lee Basin mine, at Leadville, Monday. The unfortunate miners had leased a portion of ground, and had drilled four holes during the morning, which they prepared to set off. Some delay in igniting a fuse detained them and the first blast exploded before the men reached a place of safety. McNichols had the back of his head crushed in by a flying rock, and was killed instantly, while Morrow escaped with a broken arm and several severe bruises.

\*Mr. L. Wagoner, C. E., of San Francisco, to whom this matter has been referred, estimates the efficiency of the Massachusetts pump at 50 per cent. His opinions are based upon a knowledge of the subject perhaps as complete as that of any engineer in this country.—J. R.



## MECHANICAL PROGRESS.

## The Laws of Friction.

1. Friction is greatly influenced by the smoothness or roughness, hardness or softness, of the surfaces rubbing against each other.
2. It is in proportion to the pressure, or load, that is, a double pressure will produce a double amount of friction, and so of any other proportionate increase of the load.
3. The friction does not depend upon the extent of surface, the weight of body remaining the same.
4. The friction is greater after the bodies have been allowed to remain for some time at rest, in contact with each other, than when they are first so placed; as, for example, a wheel turning upon gudgeons will require a greater weight to start it after remaining some hours at rest than it would at first. The cause of this appears to be, that the minute asperities which exist even upon the smoothest bodies gradually sink into the opposite spaces, and thus hold upon each other. It is for the same reason that a greater force is required to set a body in motion than to keep it in motion. If about one-third the amount of a weight be required to move that weight along in the first instance, one-fourth will suffice to keep it in motion.
5. The friction of axles does not at all depend upon their velocity; thus, a railroad car traveling at the rate of 20 miles an hour will not have been retarded by friction more than another which travels only 10 miles in that time. It appears, therefore, from the last three laws that the amount of friction is as the pressure directly, without regard to surface, time or velocity.
6. Friction is greatly diminished by unguents, and this diminution is as the nature of the unguents, without reference to the substances moving over them. The kind of unguent which ought to be employed depends principally upon the load; it ought to suffice just to prevent the bodies from coming into contact with each other. The lighter the weight, therefore, the finer and more fluid the unguent should be, and vice versa.—*Ex.*

## Steel vs. Iron for Carriage Work.

Mild steel is fast taking the place of iron in almost every direction. The editor of the *Carriage Monthly* was recently present and took a hand in testing some of the superior brands of this new steel. He says:

We took a sample bar and forged from the same a set of dash heels for a buggy, and when cold subjected them to all sorts of strain without fracture. We heated the same to about 700°, and cooled in cold water, and again put the forgings through another set of tests, and still no fracture. Welds are made and swaged and cooled off while at 500°, and could not be broken any more than could the same made in Norway. It was as easy to weld without flux as any ordinary iron. There was a density or hardness about it while forging it that follows in the working of Low Moor iron. When cold it is much stiffer than Norway, but will bend under a heavy pressure without breaking. It swages much smoother than iron, and consequently requires less filing or grinding. In the lathe, or on the planer, a smoother cut is made than with any known iron. Forgings can be made lighter with it than with iron, and still stand greater pressure or strain without bending.

We next had a piece lathed and casehardened with bone-dust, which was afterward put through the buffing process, with a view to show up seams, dirt or looseness. The result was, not a blemish could be detected. After nicking with a cold chisel we tried its breaking qualities over the sharp corner of the anvil, and after more than a dozen vigorous blows with a 14-pound hammer failed to break the specimen. With all these facts before us, we came to the conclusion that at last the carriage-builder has reached a proper metal for the production of his wares, provided the manufacturers will study their own interests by putting the same on the market in merchantable sizes. For all work which is subject to all sorts of adverse strains, it has no superior, if it has an honest equal, which we doubt.

**SUCCESSFUL CASTING OF IRON OR STEEL UPON BRASS.**—One of the latest inventions or discoveries in metallurgy is the casting of iron or steel on brass. It is a thing that it has often been sought to accomplish, but until recently without success. Experiments were made lately in Boston. The brass core, or whatever it may be, is first cast in the usual way, and is then molded in conjunction with the pattern, and when the latter is removed, it is allowed to remain in the flask, and the melted iron poured over it. This iron is prepared by a flux for ready amalgamation with the brass, and when the compound casting is taken from the sand, it is found to be a complete and well-connected piece. The union of the two metals is perfect, and they can be separated by melting the brass which runs at lower temperature than iron from its backing. For bearings for car axles and other things that now require solid and thick brass castings, costing quite heavily by the pound, the compound bearings, being more than three-quarters cheap iron, would form a cheap and efficient substitute. For pumps,

steam and fire engines, and many other machines and mechanical appliances, including bearings of shafting, the new compound metal will constitute a most efficient substitute for brass castings, and, what is more, an economical one. It might even be applied to ordnance of all descriptions, being used for the center or core of the cannon, and be strengthened by steel or tough iron cast on the outside. The invention seems to be a most promising and important one, and, when fully known, and if it bears out its promise, it cannot fail to come into use in nearly all lines of mechanical industry doing metal work.

**ELECTRIC WELDING.**—A new art has made its appearance and will no doubt find a wide application in electricity and mechanics. The great benefits derivable from a method by which a practically continuous wire of any desired length may be obtained are especially of value to electrical constructors. Those engaged in the manufacture of dynamos know how troublesome the enlargement caused by the splice in a wire is. In the winding of field magnets the thickening of the wire at such points is a nuisance, and the projections frequently break through the insulation, and finally develop into serious faults. With the aid of the new art it seems possible to join two wires so that the point of juncture is practically identical in size and texture with the remaining part. A remarkable fact in connection with this process is the readiness with which metals of different character can be made to weld. It would almost seem that the metals, when put in the "electrotonic" state by the passage of a current, are endowed with peculiar propensities for welding. It follows, then, that large pieces requiring to be welded would be benefited by having an electric current passed through them, even though the current alone would not be sufficient to generate a welding heat. Such is the experience of Mr. Elihu Thomson, the inventor of this process. It is quite within probability, therefore, that every large forging or rolling mill establishment will in the future be equipped with powerful dynamos for the purpose of generating currents to be sent through the metal during its process of manufacture.

**COMPRESSED WOOD FOR TOOTH GEARING AND SHUTTLES.**—The London *Engineer* describes the compression of beech and other woods by means of hydraulic presses, under the patent of Mr. Robert Pickles, of Bromley, England, who makes this wood a specialty for shuttles and for gearing. The compression of the wood improves its wear-resisting qualities to a degree that would be deemed impossible. The wood is first sawed into sizes necessary for making shuttles or cogs, and naturally dried. It is then put under a pressure of about 15 tons per square inch, in a rectangular space in the press holding six shuttle blocks, three side by side and two deep. Above is a metal block made so as to fit the space in the ram. The depth of the blocks before compression is two and one-fourth inches, which is reduced to one and one-fourth inches. The woods generally used for this purpose are beech, cornel and persimmon. The grain is very close, and the weight of compressed beech is considerably greater than that of boxwood, and when compared with uncompressed beech it is remarkably heavier. In regard to the wear of the wood for cogs it is stated that it will last a long time and run very easily.

**GLASS BEARINGS.**—Glass bearings and bushes for loose pulleys are now made by an English firm, Messrs. Powis, Bale & Co., of London. Mr. Bale's description says that Mr. Powis, with the object of reducing the working friction to its lowest limit, and experimenting with various materials, determined to try glass, and being highly satisfied with the results in his early trials adopted it. "The bearings are grooved or crenated in such a manner that the lubricating material is kept in circulation between the top and bottom half of the bearings; at the same time a current of air is allowed to pass through the bearing, thus keeping it cool while in work." It might be expected that frictionless bearings would not need ventilation.

**TO PREVENT SCREWS FROM RUSTING.**—It is well known that iron screws are very liable to rust, more especially when they are placed in damp situations. When they are employed to join parts of machinery they often become so tightly fixed that they can only be withdrawn with considerable trouble, a fracture sometimes resulting. In order to avoid this inconvenience, screws are generally oiled before being put in their places, but this is found to be insufficient. According to the *Moniteur Industriel*, a mixture of oil and graphite will effectually prevent screws becoming fixed, and, moreover, protect them for years against rust. The mixture facilitates tightening up, is an excellent lubricant, and reduces the friction of the screw in its socket.

**FURNACE SPARKS.**—The sparks collected in the extended smoke-box of a locomotive have considerable value as a fuel. This is known by the interesting fact that the contents of the smoke-boxes of bituminous coal-burning engines are being utilized for the fuel of two locomotives in the vicinity of Philadelphia, and that on the Reading road a consolidation engine has hauled a full train exclusively with such fuel. On some Western roads the same material is used in smith shops as fuel for forges.

## SCIENTIFIC PROGRESS.

## A New and Valuable Discovery.

Utilizing the Natural Grease in Wool in the Manufacture of Soap.

At a recent meeting of the National Agricultural Society of France, as reported for the *Textile Record*, the question of the utilization of the suint, the natural grease found in wool, was discussed. The subject is not a new one. Half a century ago, M. Chevreul had made known the elementary composition of suint, but from that day to this, little or no use has been found for it. Flowing from wool-scouring machines into natural water courses, it pollutes them and renders the land through which they run insalubrious. The evil is a growing one, as, since his first researches, the consumption of woolsens in France has doubled. Her annual clip has grown to 220 millions of pounds, and she imports at least an equal amount. Of these 440 million pounds, nearly 50 per cent is waste, of which the principal part is suint.

To utilize this enormous quantity to the profit of the soap industry has long been a favorite project, but the difficulties in the way have been too great, because the suint, in the condition in which it is extracted, has been found to be non-saponifiable.

To adapt it to the purposes of the soap boiler, and thus make it available in the manufacture of the 600 million pounds of soap annually produced in France, would at once rid the textile industries of a great and growing nuisance and cheapen the cost of one of their indispensable necessities. M. Rohart exhibited before the society above named a quantity of soap made by him on a large scale, from suint, at the works of Michaux Brothers, at Aubervilliers. He first changes the elementary composition of the suint by the use of sulphur. This he does by simply raising the grease to its fusing point, and bringing it in contact with sulphuretted hydrogen. The gas is absorbed in large quantities, as high as 100 times the bulk of the grease being taken up. At the close of the operation the sulphur has become a constituent of the fluid mass, which, like most all other fatty matters, when simply treated, acquires new properties, permitting it to be treated by methods altogether different from those previously employed and giving rise to products also new.

By the action above stated, suint becomes immediately and completely saponifiable in the cold. The soap formed no longer possesses the odor peculiar to suint, nor is that of sulphuretted hydrogen perceptible. An intimate combination of the constituent principles of the matter formed has therefore taken place. This is further indicated by the fact that if the mixture be run into the pans to grain at 30° to 40° C., its temperature will rise in a few hours to 60° or 70° C.

In practice, the result is of uniform quality, fine grained, and perfectly homogeneous. The operation is finished in an hour, while usually the making of a batch of soda soap takes six or eight days. The claim is made that if strong, upright machine mixers be used, 100,000 pounds of soap can be made in a day, without much expense either for labor or fuel. In view of its many applications, this is a very cheap soap.

The great interest naturally felt in this discovery is enhanced by the new chemical reaction which it has revealed—a reaction as unexpected as it is valuable. Contrary to what has hitherto been known concerning the saponification of fatty matters, this can be produced completely without first rendering the alkali caustic. Alkaline carbonates serve the purpose perfectly.

This new scientific fact is not only applicable to fats which have previously been converted into fatty acids, but is true of all such matters, including suint, which are not normally saponifiable, even with caustic alkalis; for in the presence of fatty bodies previously sulphurized, alkaline carbonates are immediately decomposed, even in the cold. Carbonic acid gas is so abundantly disengaged that unless the vessel be deep, a portion of its contents will froth over. If this be avoided, the result will be a soap perfectly defined.

The change undergone by the suint would seem to be due to substitution, a molecular movement which reveals the power of the affinity of the alkalis, or rather, perhaps, of the alkaline metals for sulphur. This fact must be recognized in accounting for the expulsion of carbonic acid from its combinations with potassa and soda. That, under the circumstances, this gas should be expelled, is not only a surprise to the scientist, but a great boon to industry. If, in the state of the caustic alkali, a certain quantity of soda cost 46 cents, that quantity in the form of carbonate would cost 29 cents, a difference of 17 in 46, say 38.5 per cent. Where, as in Marseilles, many millions of pounds of soda are annually used in the soap manufacture, the importance of this saving is manifest. Moreover, as the result is the same with the carbonate of potassa as with the carbonate of soda, it is doubtless possible to apply the process directly to the manufacture of soft soaps, using for the purpose the crude "pots and pearls" of commerce.

**WIND PRESSURE.**—The amount of pressure per square foot, with the wind blowing at 20, 30, 40, 50, 60, 70 and 80 miles an hour, is respectively 2, 4½, 8, 12½, 18, 25 and 32½ pounds.

## Causes of Earthquakes.

The following, from the *Boston Mercantile Journal*, will be read with some interest in connection with the address upon the same subject made by Prof. Le Conte, of the State University, at a late meeting of the Academy of Sciences in this city. The address alluded to was published in full in the *Press* of Sept. 11:

It is a curious fact that some days before the earthquake occurred Prof. Dawson, addressing the British Association for the Advancement of Science, said that "it was possible that there soon would be, or might even now be in progress, a new settlement of the bed of the Atlantic ocean, especially on its western side, and that there would possibly be at the same time renewed volcanic activity on the eastern margin of the ocean." This statement of possibilities reads almost like prophecy in view of what has since occurred, and it is in marked accord with the theory advanced by Prof. McGee, of the Geological Survey, that what has taken place is what he describes as "seaward slip." What he means by this expression is thus indicated:

"It is a movement of the coastal plain toward the sea. Let me say in round terms that we divide the region this side of the Appalachian Range into two portions. The granite or gneiss formation is called the Piedmont escarpment and extends from mountain ranges to about where Columbia is. The region this side of that is made up of what we call fragmental rock and is called the coastal plain. The theory is that this coastal plain has simply slipped seaward a bit and that the displacement produced the shock or tremor."

As to the cause of this "slip," Prof. McGee says that there is a tendency in that direction. Imagine a surface slightly inclined, with the coastal plain overlying it, and a sharp depression existing somewhere a hundred miles or so out at sea, and the tendency of the plain toward that depression is checked only by the resistance of friction. A point is reached, however, perhaps by reason of the readjustment of the earth's surface constantly going on, or by the deposits brought by the great rivers, where the pressure overcomes the resistance, and then a slip occurs.

**A MAP OF THE UNITED STATES.**—The Coast Survey and the U. S. Hydrographic office have spent many years in making an accurate survey of our coast line, at an outlay of about eight millions of dollars; but our internal surveys are quite inaccurate, except along the line of great trunk railroads. These surveys, as heretofore utilized by map-makers, are very inaccurate, some localities being placed fully five miles out of the way on our most accurate maps. A new map, however, is now in preparation by Col. Powell, which will be absolutely accurate within the limit of the scale of feet upon which it has been prepared. It will take about a year to complete this, and when done, it will be the only accurate map of the United States in existence. Astronomers have long claimed to have prepared a more accurate map of the moon, at a distance of 250,000 miles, than has yet been made of the State of New York from surveys made upon the ground. These maps, however, have been made by means of photography, and hence are more accurate in their outline than could have been obtained by hasty triangulations. Major Powell's map, however, will be as accurate a representation of the geographical location of the mountains, rivers and towns of our own country as the astronomers have yet prepared of the queen of the night. He has also in preparation a dictionary of altitude, by which he will set at rest the long-mooted question as to the relative sea level of the Atlantic and Pacific oceans. According to railroad levels heretofore made, the Pacific is supposed to stand about four feet above the level of the Atlantic. Within a year Powell will have settled this question.

**MAGNESIUM AS A GENERAL ILLUMINANT.**—It has been suggested that magnesium may, ere long, come into quite general use as an illuminant. Its practical introduction will depend very much, however, upon its cost, nothing but its high price preventing its practical use at this time. A few years ago it was sold at \$40 a pound. Now, by a new process, German, it can be sold at \$8 a pound, and there is little doubt that before long it will be produced even more cheaply. Its use will not be attended with danger like electricity, and it can be arranged so that even the remote country church or dancing-hall can have it, as well as the dwellers in the great cities. It can be placed in a lamp, arranged with clock-work movements to feed a ribbon of the metal regularly. It has a white vapor, oxide of magnesium, given off by the metal in burning, which will require a smoke-bell when burning indoors. It is said that a magnesium lamp of 1000-candle power throws enough light to distinguish a vessel nine miles distant. A wire of moderate size equals the light of 75 stearine candles. This would make the cost of magnesium little more than gas, even now, while no expensive works or street mains are required for its use, making its introduction for lighting towns and villages a very simple matter indeed. It has been predicted that within five years the magnesium light will be as familiar a sight in many places as the electric light is to-day.

**EYELESS ANIMALS.**—Experiments have been made by Graber which indicate that eyeless animals are sensible to light.



## ENGINEERING NOTES.

## A Petroleum Engine.

A new motor, which promises to prove a powerful rival to the gas engine, has recently been introduced into this country from Germany, where it is already in considerable use. This is Spiel's petroleum engine, the working of which was recently inspected, the example being a two-horse power engine, nominal, working up to three-horse. In general appearance the petroleum engine does not differ greatly from some horizontal types of gas engines, except that it carries a small reservoir above it for the oil. In the present instance this reservoir contains two gallons and a half of refined petroleum, which is equal to a five or six hours' supply. From the reservoir the petroleum is conducted by a pipe to a pump, by which small measured quantities are injected into the cylinder of the engine. The oil is supplied at the rate of about four drops per revolution of the engine (which runs at 120 revolutions per minute), and at a given point it is ignited by means of a small spirit lamp. The *modus operandi* may be briefly explained as follows: On its outstroke the piston draws in a charge of air and petroleum, and on the return stroke it compresses this mixture, which is exploded as the crank passes the back center. The combustion and expansion of the charge take place at the third stroke, the products of combustion being driven out at the fourth stroke. There is thus one acting stroke in every four, motion being continued during the other three by means of a fly-wheel. Vaporization of the petroleum previous to use does not take place, the engine using it in its fluid condition. In order to keep the cylinder cool it is water-jacketed. The petroleum engine presents many points of advantage, being entirely independent of any coal or gas supply. It can be set in motion in a few seconds, simply by lighting the lamp and turning the fly-wheel. The consumption of oil is automatically arranged according to the work required, and when the engine is at rest there is no expense going on, an important point where the work to be done is intermittent. This engine has been thoroughly tested by Mr. John Hopkinson, C. E., who reports upon it very favorably and places its working cost at 1½d per horse-power per hour for petroleum and about ¼d per horse-power per hour for lubricating, when developing its full power. Spiel's engine would seem to be capable of competing satisfactorily with gas engines, even where gas is available, but beyond this there is a wide and promising field for it where gas is not obtainable, and where the steam engine is inadmissible. The petroleum engine is being introduced by a company having offices at 1 Leadenhall street, E. C.—*London Grocer*.

**BRIDGING THE HUDSON RIVER.**—The final contract for the construction of a bridge across the Hudson, at Poughkeepsie, was signed on the 28th ult. with the Union Bridge Company, of New York. The bridge is to be completed by January 1, 1888. It will consist of five spans, each 525 feet long, three of which will be truss and two cantilever spans, the lower chord of the trusses to be 135 feet above high water, and the cantilevers to have a clear head-room of 165 feet. There will be a short span on the west shore and one-fourth mile of a viaduct on the east shore. The bridge will be built upon steel piers and the river spans will be also of steel. The track will be 200 feet above high water. It will be a good thing for commerce to have a bridge over the Hudson at this point, where convenient connections with railways on either side of the river can be established. It may lead to important changes in the channels of various descriptions of traffic, by greatly increasing the facilities for inland connections between coal regions and interior New England, and in other ways. The extent to which the Eastern States are still dependent upon water routes for some of their most important interstate movements is remarkable, and it would, presumably, be materially diminished by the construction of a bridge over the river, with proper railway connections.

**THE ELECTRICAL TRANSMISSION OF POWER.**—Careful experiments made at Creil, under the inspection of a commission of 38 men of science, have proven that it is possible now, with one generator and one receptor, to transport to a distance of about 35 miles a power capable of being used for industrial purposes of 52-horse power, with a yield of 45 per cent, without exceeding a current of 10 amperes. The report states that this high tension does not give rise to any danger, and that no accident has occurred during the past six months. The commission is of opinion that the transmitting wire may be left uncovered on poles, provided it be placed beyond the reach of the hand. It estimates at nearly \$20,000 the probable cost of the transmission of 50-horse power around a circular line of about 70 miles.

**THE HUDSON RIVER TUNNEL** is being pumped out after being filled with water for two years. The announced purpose is to exhibit the work to capitalists to interest them in the completion of the tunnel. Col. Haskins announces that the structure is uninjured.

**THE FIRST CITY IN EUROPE** where electricity has been entirely substituted for gas for street lighting is the town of Hernösand, in Sweden.

## USEFUL INFORMATION.

## A New Cement.

In an article on "Stuccos," in a recent number of a French contemporary, *Construction Moderne*, there is a description of a new cement. The inventor and manufacturer of this new cement is a M. Vallin, the director of a cement works in France, known under the name of "Gypserie de la Gare." The new material is stated to be at least equal, if not superior in quality, to the English article, while it can be sold at the rate of 60 cents to \$1.20 per hundred weight. This material, which is styled "Cement de Paris," or Paris cement, possesses, says the writer, durability and the cold appearance of marble, and a wall rendered, floated and set with it becomes impermeable to moisture. It can also be polished and made to present a beautiful appearance.

In describing the method of its manufacture, the writer observes that, in making cement, it has been generally found very difficult to obtain a thorough burning of every piece of clay or stone; sometimes the surface of it is burnt too much, and the center too little, or not at all. The result is that, after the clay or stone is crushed, it contains a considerable quantity of unburnt grains, which play the role of an inert material, and which people pay for as cement. In order to avoid this unequal burning, M. Vallin, instead of crushing the material after, does so before placing it in the kiln. A crushing mill breaks it into small pieces, which are automatically conveyed to a vertical cylinder mill, whence they issue ground to powder. This is in turn again automatically placed on sieves, which sift it into pans or kilns heated by gas. A series of inclined plates, having a gyratory motion, agitates the powder in each of the pans, and thus renders every particle of it amenable to the action of heat. Finally, a mechanical arrangement conveys it to sacks, which a man fills as the powder arrives. The whole operation is thus continuous and automatic, which of itself is a great advantage. But still more important and appreciable is the fact that all the particles of the cement are thoroughly burnt. M. Vallin estimates that his method enables him to effect a saving of about 30 per cent over those ordinarily adopted.

The writer concludes by stating that, besides the homogeneity of the particles, the other advantages of this cement, such as its great whiteness of color, durability, freedom from liability to unequal shrinkage (which causes fire cracks, etc.), are sure to secure for it the attention of contractors and builders.

**SOLDERING ALLOY.**—Glass, porcelain and other metals can be soldered by an alloy made as follows: Copper dust obtained by precipitation from a solution of the sulphate by means of zinc is put in a cast-iron or porcelain-lined mortar and mixed with strong sulphuric acid, specific gravity 1.85. From 20 to 30 or 36 parts of the dust are taken, according to the hardness desired. To the cake formed of acid and copper there is added, under constant stirring, 70 parts of mercury. When well mixed, the amalgam is carefully rinsed with warm water to remove all the acid, and then set aside to cool. In 10 or 12 hours it is hard enough to scratch tin. When required for use, it is to be heated so hot that when worked over and brayed in a mortar it becomes as soft as wax. In this ductile form it can be spread on any surface, to which it adheres with great tenacity when it gets cold and hard. It is intended for this alloy to be used to solder such articles as will not bear a high temperature.

**THE RISK OF CLEANING PICTURES.**—The question of picture-cleaning is one of the most complicated that can be, remarks the *New York Journal*. Suppose you leave a very dirty picture as it is, do you see, can you possibly see what the artist painted? Assuredly not. And why should decent people tolerate dirty pictures when they will not tolerate a dirty tablecloth? The answer is that if the picture could be cleaned as safely as the tablecloth it would be done without hesitation, but that cleaning may possibly remove light glazes and scrubblings along with the varnish, and that if these glazes, the finishing work of the artist, are once removed, no human being, except the artist who painted the picture, can replace them, says an acknowledged authority. But by the time a picture urgently wants cleaning, the painter has generally been for many years in his grave. Therefore, in having a picture cleaned you are risking that which cannot be replaced.

**PAPER ROOFING.**—A plan for rendering paper as tough as wood or leather has been recently introduced into Europe. It consists of mixing chloride of zinc with the pulp in the course of manufacture. It has been found that the greater the degree of concentration of the zinc solution, the greater will be the toughness of the paper. It can be used for making boxes, combs, for roofing and even for making boots.

**POWDERED ASBESTOS FOR COATING WALLS, ETC.**—Powdered asbestos can be used advantageously for making an enamel or coating for walls, pipes, etc. The powder is mixed with soluble salts, such as silicate of potash, and mineral or other colors which combine with silicate acid, so as to form a product which resists the action of oxygen, heat, cold or damp.

The coating furnishes a refractory glass which protects the material it is applied to, whether wood, gas or water pipes, and stone or brick buildings. When applied to masonry or wood, the surface of these is first washed with soap and water. In preparing the enamel the refuse asbestos only need be employed. It is also proposed to apply the coating to boilers, in order to protect the plates against a too intense fire.

**CINCHONAS IN CALIFORNIA.**—The *Stockton Independent* asks about the success of cinchona trees in California. Some interesting statements will be given, no doubt, in the forthcoming report of the College of Agriculture. The trees in the Garden of Economic Plants, in Berkeley, are growing well, but they are protected in winter. Young trees were sent out to various parts of the State where there was thought to be little or no frost, and probably some reports from the growers will be received in time for this year's report.

**THE BUSINESS COLLEGES** of the United States have within 20 years multiplied from a few institutions to several hundred, some of which have an annual registration of over 1000 students each. United States Commissioner Eaton reports a greater number of graduates from the business colleges than from the colleges of law, medicine and theology combined. Official reports show about 50,000 students during the past year.

**RAILWAY EXPANSION.**—In climates having a difference of 70 degrees in temperature between the hot and cold seasons, a railway track of 400 miles is 338 yards longer in summer than in winter. Of course the length of road remains the same, but expansion forces the metal closer together, making an aggregate closing up of space between the rails of nearly a yard in each mile.

**TO BRAZE IRON PIPES** first clean the split edges, covering with borax that has first been ground on a stone with water, and bind a piece of brass wire along the seam, with small iron wire wound around the pipe. Place the pipe in a charcoal fire, commencing at one end of the split, drawing the pipe through the fire as the brass melts.

**OLIVE OIL AS A LUBRICANT.**—Put pure olive oil into a clear glass bottle with strips of sheet lead and expose it to the sun for two or three weeks, then pour off the clear oil and the result is a lubricant which will neither gum nor corrode. It is used for watches and fine machinery of all kinds.

## GOOD HEALTH.

## Pure Air and Pure Water.

**EDITORS PRESS:**—For the last 8 or 10 years I have given the subject that heads this article a great deal of thought and study. I have read and studied with a great deal of interest every article that I have observed in such journals as the *Scientific American* and other valuable papers. I have often wondered why our leading papers do not publish more sanitary articles—more to enlighten the people on the subject of health, more in regard to the cause and cure of diseases. Comparatively how few of the people fully realize the importance of pure air to breathe and pure water to drink. The recent powerful microscopic lenses, in the hands of eminent scientists, both in this country and Europe, have led to some wonderful discoveries in regard to the causes of certain diseases. They have proven beyond a doubt that a certain order of bacilli does exist in certain diseases, for these same diseases have, by inoculation of the diseased blood into the blood of the lower order of animals, been produced. It is said, also, that these bacilli are found in the dust upon our walls, and that they exist most abundantly in filthy soils, foul air and bad water.

Years ago the prevailing theory was that the atmosphere became loaded with the miasmatic exhalations from some stagnant pool of water or the upturning of some hitherto uncultivated soil, and thus produced fever and ague. No doubt the air does become contaminated in this way, and persons in locating a residence should see that the prevailing winds do not lift this bad air into their dwellings. But equally important is to find out whether their well is furnishing pure, healthy water. How often is the well dug too near the privy vault or the cesspool, located in close proximity to the well, to save the expense of a few feet of sewer-pipe. Water to be good and wholesome should be thoroughly aerated. Hence, I should discard all bored or tubular wells. McAlpin, the greatest living water engineer, and perhaps the best authority in the world, says: "The smooth casing affords a most excellent conduit for surface water." I should prefer the old-fashioned dug well, walled up with brick or stone, imbedded in cement, and top open to admit the air, with a good tight curb resting on ground, well rounded up to prevent all surface water from running in.

Just here permit me to quote from the report of the New Hampshire Board of Health, "The History of a Rural Well."

"Let us examine one (or a thousand) of our grand old farm establishments of a hundred years' standing. Clustered on a few square rods of land are the farm buildings, the dwellings, the wood-shed, wash-house, horse-stable,

cow-barn, sheep-yard, swine-house, hen-house, corn-house, compost-heap, cesspool and privy. All these are arranged in a hollow square and in the midst is the farmer's well, with its curb, sweep and bucket, or its cover, pipe and pump. Around this center are concentrated all the activities of life upon a New England farm. Birth, life and death, bloom, fruit and decay of men and animals, of shrubs and trees, have transpired here for a century. All the waste has been dropped upon the surface, there to accumulate, decay and putrify. Then again, the bottom of the well, the very center of all these activities, must be at or below the level of the natural water basin in the immediate vicinity, and must rest upon or in clay, marl or rock impervious to water. The well is excavated through sand, gravel, drift or other earth pervious to water. All these conditions must exist or there can be no well. Let us picture the life upon these few square rods for 100 years.

"In and about these buildings live 300 creatures—men, beasts and birds. They are stabled here during winter, and yarded here during summer; here they take their daily food and drink, and discharge their daily waste. During 100 years there have been nearly 11,000,000 days of animal existence, all within draining and leaching distance of the source of water supply of the whole establishment. The amount of waste that cannot be removed by evaporation, drainage or absorption is enormous. The fact must be apparent to the most skeptical that the earth beneath farm buildings, stables, cesspools and privy vaults, and about wells near the same, is surcharged with animal and vegetable waste. This point must be conceded by all. It needs but a moment's attention to convince the dullest mind that every establishment with only the usual sanitary precautions is resting on and above a mass of most dangerous filth, and that this filth is being daily leached into the bottom of the well."

I quote again from the *Sanitary Era*. The typhoid fever epidemic at Waterford is attributed to the pollution of the water supplied to a public well, by the careless washing of the utensils of a sick-room near it. From this well 40 school children and others drank water, and soon showed symptoms of the dread disease. Physicians were called from Chicago, Milwaukee and other cities, but still the progress of the epidemic was not stayed. A genuine panic existed, and business was partially suspended. The State Board of Health has been investigating the situation.

The whole village of Plymouth, Penn., was poisoned, and many deaths occurred by drinking impure water.

The writer, when a young man, was living in Springfield, Ky., when the cholera suddenly made its appearance and many deaths occurred. The inhabitants fled to other localities. I well remember the bad quality of the water. The wells and springs were totally dried up in the daytime, and enough water would accumulate in the night to furnish a scanty supply during the day. No other town in the vicinity that had a good supply of wholesome water suffered from the epidemic. I have always attributed that scourge to bad water.

I have written the above that the readers of your valuable paper may have their attention directed to these two important factors that contribute to good health. One of our best physicians says when he is called to visit a case of typhoid fever or diphtheria he at once proceeds to investigate the surroundings, and he can generally trace the cause of the attack to a broken sewer-pipe underneath the house that vitiates the air, or to the cesspool too near the well that poisons the water. OCCASIONAL.

Santa Rosa, Sept. 20, 1886.

**AN ELECTRICAL CREMATORY.**—The latest novelty in cremation is an electrical crematory, in which, according to an American contemporary, the process of burning a corpse is carried out as follows: The body, being shrouded in sheets made of asbestos, is laid upon a frame consisting of fire-brick, while at the head and foot are large copper plates, to which the leads from specially constructed dynamos of high electro-motive force are attached. The body apparently occupies the position of the filament in an incandescent lamp, and, upon the current being passed through it, would be instantly carbonized; while, as the air would have free access to it, the process of destruction, or rather decomposition, would be immediate. The process appears to have the recommendation of great rapidity of action, and of freedom from many of the objections to cremation in the ordinary way.

**COURAGE IN DISEASE.**—Considering the physiological effects of courage, a prominent medical authority concludes that, contrary to a common notion, no effort of the will can check the development of hydrophobia. Courage is a powerful and not entirely understood remedial agent, but it cannot prevail against a germ disease that directly attacks the immediate vicinity of vital centers, the mere pin-pricking of which inevitably terminates in death.

**STUNG BY A SCORPION.**—V. H. Monday, a shepherd in Humboldt county, Nevada, the other day was stung by a scorpion on the back of his hand while in bed and asleep. The hand and arm swelled very badly and became quite painful. He went to Winnemucca, where he found medical attention, and is recovering.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**MOORE.**—Amador Ledger, Sept. 24: The prospects of this mine continue flattering. The north drift at the 500-foot level has encountered a splendid ore body. The ledge matter is said to be over 12 feet wide; some of it is of poor grade, but six feet of it is reported to be fine milling rock, and a streak of 18 inches wide is of high grade and shows abundance of free gold. We were shown a sample of this ore taken out last Monday. It is of a dark ribbon character and contains considerable free gold.

**MISCELLANEOUS.**—At the Kennedy the mill is being rushed along with surprising rapidity. It is expected to have it in running order by the first of October, and if this expectation is realized it will be the quickest instance of mill building that has been witnessed in Amador county. W. A. Nevills has purchased the claim of H. I. Bostwick, south of the Moore mine, for \$7000. The Zeile mill is expected to start up full blast about the first of next month. S. G. Spagnoli is negotiating for the erection of a five-stamp mill to operate a small quartz ledge at Clinton. The ore is apparently of a rebellious character, although it carries free gold visible to the naked eye.

**SUTTER CREEK.**—The work of cleaning up the old Eureka mill is being pushed ahead. The mortars are all out, and it is said there is a large amount of amalgam in the mortar blocks. The general opinion is that there will be in the neighborhood of from \$8000 to \$10,000 realized when the job is finished. At the Lincoln some inconvenience is experienced on account of the scarcity of water. During daytime 15 stamps are all that can be kept going. At night the water increases and they are enabled to run the mill to its full capacity.

**THE MCKAY MINE.**—Amador Dispatch, Sept. 24: The new company who have taken charge of the McKay or Etna mine near town are going ahead vigorously with their work, and evidently mean business. They have a shaft down now about 40 feet, and are putting up new hoisting works which will be run by water power. There can be but little doubt that this will prove to be a good mine when fully developed.

## El Dorado.

**DOGTOWN.**—Cor. El Dorado Republican, Sept. 23: J. M. Oxley has sold his claim to S. A. Lane and J. R. Fitzgerald for \$3000. Mr. Lane is an old resident of this county, and being a miner of experience and backed by Mr. Fitzgerald's ample capital, success is beyond a doubt. Jerry Kendall has got his claim in fine condition and is about ready for action. He can pan out enough for expenses while waiting for water. Oswald & Daveny have completed a fine ditch to their claim, and will open the eyes of the gold-dust buyers at their next cleanup. Alex. Marshall & Son are busy putting in flume and preparing for a winter's work. Henry Cox is fixing up for winter and is prospecting for a deposit of rich gravel believed by old miners to exist in the hill. He is so far encouraged that he intends now to start another tunnel lower down the hill for a siege. Wiley Sexton & Co. are repairing their ditch. They have some rich gravel on the dump. Jack Genini has found rich gravel on his stock ranch, for which he is offered a good price, but will not sell. Henson is busy repairing and making ditch, and has as good ground as any in the district. His ground adjoins the Oxley claim. We have the best placer-mining district in the county, as we are now about to prove. Several claims have been worked the past season and not one has failed to pay well.

## Mono.

**THE BULWER CON.**—Bodie Miner, Sept. 27: We cut the vein, mentioned in last week's letter as a new strike, and at this point there are two feet of ore assaying \$28. We have commenced the raise to connect with drift above. Most of the work done on the other levels during the past week has been in repairing and making preparations to get to the mill. Commenced taking ore to the mill yesterday, and will have everything in readiness to start the mill between Oct. 10th and 12th.

**THE STANDARD CON.**—Ore shipped to mill for week, 275 tons. Mill running steadily to full capacity of pans.

**THE BODIE.**—The upraise above the 700 is extended 9 feet. Have commenced to slope out ore preparatory to starting the mill. Have got some fair ore on the 800, but there is not enough work done as yet to say what it amounts to.

**THE MONO.**—We are taking out rich ore below the 700.

add Nev co

**HORSESHOE MINE.**—Grass Valley Union, Sept. 29: The shaft of the Horseshoe mine is down 180 feet, and the company is considering the propriety of letting another contract of 20 feet before commencing to drift. At present the ledge is four feet between walls, the quartz being of fine, lively appearance, and carries a good quality of sulphurets. With an increased depth the ledge is expected to be found more compact, as stringers going down give promise of that, and the drifting would then be carried on a strong vein and the backs would be more extensive. The stockholders in the Horseshoe feel greatly encouraged at the present appearance of the mine.

## Napa.

**HEAVY ORE SHIPMENT.**—Calistogan, Sept. 24: Grigsby & Johnson will soon commence shipping ore from their mine near Calistoga to the Selby Reduction Works, near Vallejo Junction. The first lot shipped will consist of 200 tons, which will very likely be followed by shipments of a much larger amount. The ore thus sent from the mine comprises that of the general dump, and not selected ore. We are told these shipments of ore do not indicate that the proprietors have abandoned the idea of erecting a quartz mill on their property. It was not the intention to send the ore away, and the proprietors of the mine would not now ship it if they did not receive very fair inducements at the Selby Works to do so, where the ore is now in demand.

## Nevada.

**MEADOW LAKE.**—Cor. Placer Herald, Sept. 25: Being interested to some extent in this district, I am here watching the developments now being made by Messrs. Arnold & Whittell upon the Excelsior mine, about three-fourths of a mile southwest of the town. The mine was selected from the fact that it was the best developed and had the best preserved portions of mill and machinery. If this proves valuable, there are doubtless scores of other veins in the district equally as good. Some time ago this mine was bonded for \$60,000, contingent upon the success of working the ore under a new process. A series of experiments were then entered into, which proved fully satisfactory. This season the old mill has been remodeled, and a large amount of new and expensive machinery attached. The work is far advanced. A force of about 20 men are engaged in the construction and in various employments about the mill. A large amount of ore is being mined and ready for crushing. A contract for several hundred cords of wood was let early in the season, and teams will arrive to-day to commence delivering both wood and ore to the mill. The expectation is to commence running in a week or so. The owners are here, seem to be practical men, are well satisfied, and are investing a large amount of money freely. From prospects obtained but a few days ago a new impulse was given to their faith, and they seem quite elated. I was told that so confident are they, that the money on the contract is ready. But there is no "boom" here whatever, though hundreds are waiting with feverish anxiety the result of this experiment; and should it be a success, another season will witness a lively scene. As near as can be ascertained, about 100 claims have been located, either by the parties interested themselves or by their hired agents, and there will be more yet, perhaps, this season. Within a few days I have taken some fine-looking ore from the Mohawk. Nearly all the mines that gave any promise of richness in the first place have been relocated. The season is too far advanced for any operations now, but should the attempt now being made to extract the gold prove a success, hundreds of claims will be worked next season, and sales will be made at high figures. Should the present attempt fail, there would be another setback to the mining industry here, and there are scores of claimants we should never hear of again. Yet the precious metal is surely here in immense bodies of ore, covering a district of many miles in extent, and science will surely be equal to the task of extracting it in a profitable way. Vast sums of money have been expended in the efforts to separate the base metal, which have failed. A pivotal point is again before us, and should the turn be on the negative side, the immense amount of mineral wealth stored here will doubtless remain unproductive for another period, whether brief or extended no one can tell. Yet, I repeat, there is no boom, no excitement here, save in the imagination of some enthusiasts outside; and there is no inducement to come here at present for business or employment, for there is none whatever.

**AN ALLEGED FAILURE.**—Transcript, Sept. 23: It is reported that the cleanup of the trial crushing recently made at the Boss quartz mine near San Juan, of which such great things have been printed and anticipated, was so small that it proved a severe disappointment to the stockholders. It is asserted that the amount of bullion realized did not pay for the extraction and milling of the ore. It is to be sincerely hoped that these statements are not well founded, and that the mine will prove a profitable investment for its owners; but if the rock does not carry enough gold to pay for mining it, now is the best time to ascertain the fact.

**MILL FOR THE NORTH STAR.**—Foothill Tidings, Sept. 21: A contract has been let by W. B. Bourn to the Risdon Iron Works of San Francisco, to construct for and at the North Star mine a 30-stamp mill, to build hoisting works and pumping machinery, to construct an iron pipe line which will convey water which will run all the machinery by water power at the North Star, the pipe to take the water from the Empire mine, a distance of about two miles. Every care has been taken to design the mill so that it will be economical to work. Several plans have been made and it is safe to say that the one finally decided upon will be superior to any design for a gold mill yet constructed in California. The mill will have a large ore chute above the main ore bins, and their combined capacity will be 2000 tons. The rooms for the battery and for the concentrators will be large enough to put in 10 more stamps. For the purpose of drying sulphurets, there will be a room about 40 feet square at one end of the concentrator room. There will be a room for cleaning-up purposes, and a large room for an air compressor, all in the one building with the mill. The ore will be run from the landing platform of the hoisting works across a bridge and into the mill, and the ore will be dumped on grizzlies, or screens, in such a manner that all the fine rock will go into the main bin, and the coarse rock will go to the rock-breakers, after which the rock will not have to be touched again. The battery iron work will be of a superior quality. The stamps will be 900 pounds each, and the mortars about 7000 pounds each. All the sluices will be of steel. There will be 12 Frue concentrators in the concentrator room. All the machinery will be driven by Pelton wheels. The building will be covered all over the sides with rustic, and the roof will be covered with No. 20 galvanized corrugated iron. It is expected that the mill and all the other machinery will be in operation by next Christmas. By the time all these improvements are made the expenditure involved will be about \$100,000, and the North Star will be one of the best equipped mines in the State. In the building (the house for the machinery) 350,000 feet of lumber will be used. The plans for this plant were drawn by Mr. W. B. C. Body and Mr. Connor, under the general direction of Mr. W. B. Bourn, with many valuable suggestions from Mr. John H. Hammond, the well-known mining engineer. The Risdon Iron Works owe their success in obtaining this large contract to the exertions of Mr. J. B. Pitchford, a mechanical engineer, who formerly resided in Grass Valley, and who is known all over the mining part of this coast as being in the front rank of his profession.

## Placer.

**DAMASCUS DISTRICT.**—Cor. Placer Republican, Sept. 24: This mining district is one of the oldest on the divide and is justly entitled to its reputation as one of the richest gold-bearing districts in the

county. The famous Mountain Gate mine, near the town of Damascus, has been a wonderful producer, over a million and a half of dollars having been taken out so far, and the recent rich strike in the east drift is additional and convincing proof of the hidden wealth which underlies this section of Placer county, awaiting only a judicious expenditure of capital and labor to develop it. A few miles north of Damascus, and on the opposite slope of the ridge at a place called Red Point, the French company have commenced work on their tunnel, which is now in over 400 feet, and is one of the best pieces of tunnel work to be seen in the State. They could not have picked out a better site for their camp than they have. Leaving the main road on the ridge, near the Forks house, you take the road built by the company, and descend by an easy grade to a level bench or shelf; here are located the company's office, boarding-house and engine-house. The hum of the machinery which drives the Burleigh drill, the merry ring of the blacksmith's hammer, and the bustle and activity of the different gangs of men, is a pleasant contrast to the solitude of the surrounding country. Work is continued night and day, and the tunnel is being driven forward at the rate of 75 to 85 feet a week; at this rate it will not be many months before the company reach the channel. William Jones has charge of the work, under the superintending engineer, C. H. Hoffman. The McIntire mine, owned by J. J. McIntire, is located about as far south of Damascus as the Red Point is to the north, and on the same divide. Their tunnel is also being driven in expectation of striking the same channel the Mountain Gate has, or one of its branches. Mr. McIntire started his first tunnel about a year ago, and ran in about 500 feet, when he struck rim gravel which would pay fair wages; passing through this for the more important channel ahead, he ran his tunnel about 200 feet further, and sunk on an incline 34 feet perpendicular, when they struck the blue gravel under five feet of clay, and got very fine prospects, which they were forced to abandon because the water drove them out. When they quit work in the upper tunnel, they were running east, the bedrock pitching in that direction, showing that they were on the west rim with the channel running north and south or nearly so. In July last, a new tunnel was commenced 82 feet lower than the first, which is now in about 200 feet, to which five feet is being added every 24 hours. It is estimated that a tunnel of 800 feet will bring them to the channel, to accomplish which every effort is being made. The gold found in the upper tunnel, a sample of which I was shown, is of high grade, and of similar character to that found in the Mountain Gate and other mines in the same district. There are other good mines in this district, such as the Sunny South, the Bob Lewis, and others which I did not have time to visit.

**GRAVEL.**—Cor. Placer Republican, Sept. 24: The Foss & Ballentine mine, near Iowa Hill, after running a bedrock tunnel of 400 feet, have struck a fine body of gravel which prospects well.

## San Diego.

**ERECTED THE MILL.**—Tucson Citizen, Sept. 23: Mr. J. Millar has returned from the Cargo Muchacho mining district, beyond Yuma, in San Diego county, where he has been for the past seven months putting up the mill for the Paymaster mine, of which Mr. Blaisdell is superintendent and manager. The mill is the old Esperanza mill from Oro Blanco, and it is now running its 10 stamps on ore that pays magnificently. The company runs two mines, the Paymaster and the Amelia. Shafts are down 200 feet on each, and a good body of fine ore is found in both. They are nearly 15 miles from the Colorado river, and the water is pumped this distance through a two-inch iron pipe laid on the top of the ground. The water coming through this pipe frequently reaches 142 degrees temperature, from the heat of the sun. The mill has been running for the past 30 days, and it turns out from \$15,000 to \$16,000 per month at a cost of not more than \$3500. The ore works to a higher percentage than samples of it went at San Francisco. The boss process is used and it works splendidly. The railroad station was formerly called Mesquite, and only a section-house had been built there. It is now called Glamis.

## Shasta.

**MILL RUNNING.**—Redding Free Press, Sept. 25: Hopping & Bell's mill at Old Diggings is now running smoothly on good rock. Day's mill in the same district is in full swing on very rich rock, and the entire concern will soon be out of debt. Prospects are decidedly bright for the entire district. Some very fine samples of coal have been brought into town recently by prospectors. A test was made one day last week by placing some of it in a clay pipe, then heating the pipe in a hot fire of chips. The gas escaping from the stem of the pipe was set afire and burned quite brightly. This coal was discovered near Mount Shasta on the line of the railroad.

## Sierra.

**YIELD.**—Mountain Messenger, Sept. 24: The American Hill quartz mine yielded \$8000 last month, and promises to do better this month. Mr. Lewis, of Forest City, has purchased the Leffel water-wheel, formerly used in the Good Hope mill, which was burned, and Harry Dickinson took it over to the quartz mine near the Cold Spring ranch, between Forest City and Pike City, this week.

**GOLD VALLEY.**—A few days ago I took a prospecting trip in the vicinity of Gold Valley, 12 or 14 miles northeast from Downieville. Mr. Helling's company has about 15 men fitting up and reopening the old mine, owned and patented by the Gray brothers, of San Francisco. The mine is now called the Empire. I found men putting up new buildings to replace those that were destroyed by fire some years ago, and the place seemed to be a lively camp. Men were in the woods getting out timbers, and wagons hauling lumber on the new road that has been constructed two miles in length to Van Slyke's sawmill. The miners were putting off blasts whose reports echoed out into the valley through the 70-foot air shaft which the miners have raised. They are making an effort to place the mine in working condition so that they will not be interrupted by the deep snow that falls in these regions. In this mine it is difficult to separate the gold in the ore from the base metals, but Mr. Helling is pretty sure, with the recent improvements, the great advance that has been made of late years in machinery, the discoveries in using chemicals, the cheapening of labor, provisions and material, together with the prospect ob-

tained from the ledge, that he can make it a thorough success, and he surely has the best wishes of all the enterprising men in the county. Mr. St. John is opening a ledge about a mile further up the valley in the west side of the mountain. He has built a large log cabin by the river and is making preparations to push the tunnel ahead during the winter. There has been a great deal of prospecting done in the vicinity of the valley during the past summer, and when a person thinks he has found a good place to try in, he is generally confronted by stakes and notices and the ground is claimed; but it shows that men are waking up to the possibilities of this part of Sierra county, and that something good may yet "come out of Nazareth." I think, in fact, that there is more quartz in sight in any direction around Downieville than here, and a better chance to prospect the ledges on account of a longer season and lower altitude; but in all my experience on gold fields, the chances always seem brighter to the miner the farther they are off.

**YOUNG AMERICA YIELDS.**—Sierra Tribune, Sept. 26: This dividend-paying property has produced during the last nine months as follows: January, \$14,645; February, \$30,174; March, \$29,129; April, \$27,395; May, \$22,722; June, \$22,856; July, \$38,568; August, \$34,400; total, \$229,489. The Young America, up to August, 1886, had paid eight dividends and have never levied an assessment. It recently completed a 40-stamp mill. Three new buildings are now in course of construction.

## Trinity.

**DEADWOOD.**—Cor. Trinity Journal, Sept. 24: I have just met Mr. Curt Blakemore passing through Deadwood on his way to San Francisco. From him we learn that the Venecia mine is blossoming out in good style, and that a lower tunnel calculated to be about 1100 feet in length is being run which will open their bonanza to a very reasonable depth. In reference to the mines on Deadwood I have nothing important to say. Every one appears to be happy and prosperous. Jos. Falan has opened on a vein about 200 feet from the old works which looks quite flattering. The ledge is about four feet in width, and ore recently worked paid \$50 per ton. Joe is now the "boss" of the mine condemned by other parties, and feels quite happy over the outlook. McDonald & Franck's new tunnel is in active progress under the management of Dick Roberts, who keeps everything neat as a pin. New sulphurets reduction works are being erected near the mouth of the south fork of Deadwood, and will be in operation in a few months.

## Tuolumne.

**STAR.**—Tuolumne Independent, Sept. 24: Geo. F. McPherson, of Calaveras, has disposed of his homestead property there for real estate in Oakland, and has located in Columbia. He will immediately proceed to develop the Star mine, on Rose creek, which was formerly very rich, \$200,000 having been taken out many years ago. Owing to litigation and other troubles, the mine has remained idle for years. Mr. McPherson hopes to bring the property up to its old reputation.

## NEVADA.

## Washoe District.

**CHOLLAR.**—Virginia Enterprise, Sept. 25: The increase of water coming in from Hale and Norcross has not interfered with work on the 3200 level. The main south lateral drift is being advanced, skirting along the east wall of the ore vein, and it is now 275 feet in length. The diamond drill hole, No. 8, being run by the Potosi Company, 550 feet south from the north Chollar line, has been discontinued for the present. The pumps in the Combination shaft have enough to do to keep the water down, including the extra amount tapped in the Hale and Norcross, and extra pumping facilities from the 3200 are being arranged.

**BEST AND BELCHER.**—On the 600 level crosscut No. 1 east, is in about 275 feet with its face in good-looking vein matter. The south lateral drift in the quartz vein east through by No. 1 west crosscut is progressing well, in good promising material. At the Osbiston shaft the old southwest drift is being cleaned out and repaired through the Gould and Curry to the Savage north line. The new three-compartment deep winze below the 2500 level is not yet decided upon or its location squarely defined as yet.

**HALE AND NORCROSS.**—On Wednesday morning a few inches increase of water was tapped in the north lateral drift on the 3200 level. It comes in from the roof and not the face of the drift, and may soon drain out. Meanwhile further advancement is suspended until pumping arrangements at the Combination shaft are completed for handling any further possible amount of water, which, however, is not feared nor anticipated.

**CROWN POINT AND BELCHER.**—About 200 tons per day of ore is being regularly extracted and shipped to the Santiago and Mexican mills on Carson river, for reduction. This production is likely to continue with the present and prospective stage of water in the river as motive power to the mills.

**SAVAGE.**—Ore is being hoisted from the extensive deposit developed on the 600 level, and further exploration work goes ahead at that point. The south drift on the 800 level, to intercept this vein, also goes ahead, but is not yet in far enough.

**ALTA.**—On the 700 level crosscutting has not been started, although it is intended to be within the next few days, at the north end in Lady Washington ground, in the west or Keystone ledge and in the main Alta ground.

**CON. CALIFORNIA AND VIRGINIA.**—Daily yield about the same—150 tons from the lower levels. Exploration and development work going ahead on the various levels as usual with no marked feature of improvement to report at present.

**SIERRA NEVADA.**—East crosscut No. 1, recently started on the 520 level near the face of the north lateral drift, is now in 121 feet. Face in a vein porphyry formation.

**KENTUCK.**—About 30 tons is the present daily yield, the reduced stage of water in the Carson river not admitting of more than that amount of ore being reduced at the Rock Point mill.

**GOULD AND CURRY.**—The crosscut from the upraise above the 450 level has been discontinued, and



a crosscut west, opposite to it, started. This is in very promising ground, with streaks of ore.

**OPHIR.**—On the 1300 level the north drift is progressing well in good working ground—total length, 432 feet.

**YELLOW JACKET.**—Daily yield continues to be about 100 tons, with prospect of increase, by reason of improved milling facilities.

**OCCIDENTAL.**—The upper and lower tunnels of the mine are being reopened, repaired and put in order for active ore extraction.

#### Garfield District.

**HEAVY MINING SALE.**—Lyon County Times, Sept. 23: Archie Farrington has sold his mines in Garfield District for \$575,000. He went through on last Saturday's train with the agent of the English company who bought the property. This sale does not include the interest Mr. Farrington has in the Lapanta mine.

#### Grantsville District.

**CHLORIDE ORE.**—Belmont Courier, Sept. 25: An extensive body of chloride ore has been struck in the upper workings of the Alexander mine, Grantsville. The ore is of a good grade and will be reduced in the mill under the direction of Thomas Mitchell, a millman better acquainted with the ores of that district than any one. Grantsville has now a good chance of seeing live times again, and as silver continues to advance John Phillips feels encouraged to push the work of development in various parts of the mine. This property is probably one of the largest mining propositions outside the Comstock in the State, and so far, nothing much outside of surface scratching has been done. The mines of Grantsville will produce millions on millions with proper management, and do it with profit to the owners.

#### Jefferson District.

**A RICH MINE.**—Belmont Courier, Sept. 25: Capitalists on the lookout for a good mining investment can find a rich mine in the Jefferson. All that is needed to make it a productive property is the judicious application of capital and labor. The Jefferson has paid dividends and will pay them again as soon as it is properly handled and opened. Ore that worked as high as \$5 a pound has been taken from this mine—and there is more of it left.

#### Ophir District.

**BULLION.**—Belmont Courier, Sept. 25: Work progresses steadily in the mine and mill at Ophir. The bullion output is regular and good.

#### Revelle District.

**NOT LIVELY.**—Belmont Courier, Sept. 25: Deputy District Attorney John Reynolds informs us that Revelle does not show its former lively appearance, such as it did when the mining industry was merely run for stock gambling. The Gila was well known all over the coast as a bullion and assessment producer. Times are different now, and the Gila is being worked for its mineral worth under the superintendence of Wm. Norris. There is a steady output of ore, principally from the upper levels; most of this ore is of a high grade. A deposit which is being worked at present is worth \$1000 per ton. That indefatigable worker, Geo. E. Clark, has a force of men at work preparing for the erection of a smelter for the reduction of ores from his base mine—the Cassius. Report says that the Cassius, which is situated at the south end of South Mountain, is capable of keeping the smelter at work on ore of sufficiently high grade in silver and lead to net a profit to the owner even at the present low price of silver.

#### Tuscarora District.

**BELLE ISLE.**—Tuscarora Times-Review, Sept. 25: Belle Isle and Navajo joint crosscut 150-foot level advanced 25 feet. The prospects are favorable for finding the May Queen vein at this point.

**NAVAJO.**—Commenced cutting out for winze between Nos. 4 and 5 crosscuts on the east vein, 350-foot level. At this point, on this level, we have a vein of rich ore that to all appearances will go down. A milling test, made on the last run, showed a value of \$308 per ton. Navajo and Belle Isle joint crosscut has been extended 25 feet in a very favorable formation.

**NORTH BELLE ISLE.**—Everything at the new shaft has been put in good running order. At the 150-foot level, the station has been completed and connected with the workings on that level. Work has been resumed at all points and some new work started since last report. Drift south on the vein from No. 1 crosscut has a width of about six feet, two of which will grade over \$300 per ton and the balance is of fair grade milling ore. On the 300-foot level everything will soon be ready for starting a couple of crosscuts. The force on the orehouse will be increased and it will be completed at as early a date as possible.

#### Union District.

**GOLD.**—Belmont Courier, Sept. 25: There are quite a number of gold prospects in Union Mining District that are worthy the attention of capitalists.

#### Wild Rose District.

**PARADISE VALLEY.**—Silver State, Sept. 28: For week ending Sept. 22d, milling ore produced 97 tons, 1800 pounds; shipping ore 13 tons, 1550 pounds. Total, 111 tons, 1350 pounds. Average assay value, per ton, 72.78 oz. silver, 0.39 oz. gold. Concentrations produced, 343 sacks, 29,720 pounds; par value \$6625.80. Mill run 192 hours; worked 144 tons. Number of men on payroll, 139. No. 2 level, north drift, face shows west wall and stringers of quartz, but no pay ore. We have connected south drift on No. 3 level with No. 1 winze, and are driving south from the winze. We will commence to sink engine shaft and open No. 4 tunnel as soon as possible. Everything is going along usually well and mill running steadily.

#### COLORADO.

**ORE.**—Georgetown Courier, Sept. 23: Solid ore has been opened up in the breast of the 600-foot adit on the Eclipse. The Coin lode is being worked by Dave Rockwell and sons with splendid results. A drift is being driven east on the Silver Cloud lode on a fair vein of ore, which mills from \$100 to \$250 a ton. The output of the Colorado Central mine for the month of August was 76 tons of ore, valued at \$20,517. Buckley & Powers, on the Chelsea Beach, have a very promising vein of ore which mills 200 ozs. silver per ton. Nichols & Co., on the Pelican

lode, have a very fair vein of ore, which, according to a recent millrun, returned 290 and 145 ozs. silver per ton, and 22 per cent lead. About 1000 tons of concentrating material from the Corry City mine is being treated at the Florence mill, and it is claimed with favorable results. M. Danison, lessee of the Schafter lode, in Hukill gulch, has opened up a streak of mineral, 20 inches wide, which yields 9 ozs. gold and 65 ozs. silver per ton, and 25 per cent lead. McKee & Co., lessees of the Lebanon tunnel property, have encountered a good streak of mineral in their workings. A recent millrun brought them about \$500.

#### DAKOTA.

**SILVER.**—Black Hills Tribune, Sept. 21: Four silver bricks came in from the Iron Hill yesterday, the weight of which aggregated 3750.90 ounces. A new strike of gold ore has lately been made on Two Bit. The West-Galena tunnel which is located on Two Bit is about to be extended another 100 feet. The new grappling machinery for the Black Hills Oil Company has arrived and will be sent out to the well at once. It is thought that the lost drill can quickly be recovered with the new machinery. Work is progressing on the Cheyenne mine. The mine was left in bad condition by the lessees, who gutted the richer chutes of ore, leaving the poorer though paying rock behind. Some men under the direction of Otto Grantz are now at work and are rapidly bringing something like system out of a badly mixed mess. The works were left in so bad a condition that a large run of surface rock fell in the cut, but the debris is now all removed, and a large body of good ore is now available. A very small force of men can now break down thousands of tons of good ore in a few days. Much galena has been found in the ore taken out in enlarging the cut and some of it carries bright grains of gold which are easily discerned by the unaided eye.

#### IDAHO.

**MINNIE MOORE.**—Bellevue Herald, Sept. 21: This mine, during the past six or eight months, has made a reputation for itself and the Wood River country that has, in one sense of the word, really redeemed Altares county, and the present prospects are sufficient to warrant the assertion that the mine has not yet been half uncovered.

**THE NEW STRIKE.**—Much excitement has been created in Bellevue the last few days by the reported strike of a large body of ore in the prospect owned and worked by the McWade brothers and Hugh Marwick, on the second mountain, just east of town, and only a mile and a half distant. A large number of visitors have been up to see the strike, and are very enthusiastic over its appearance. It is told that a gentleman here in the interests of Salt Lake parties made the owners an offer of \$5000 for the claim, but they refused, asking a higher price. This find proves of unusual interest to those in this vicinity, as much prospecting has been done on this side of the river in vain, and if the present find only proves permanent, it will set many a man to work on what are now idle claims.

**GALENA AND VICINITY.**—Ketchum Keystone, Sept. 25: Since November last, in the Senate mine, at Galena, a tunnel on the 400-foot level has been run 550 feet, with an upraise and shaft connecting the 750-foot level. This upraise and shaft are about 190 feet in all, making 740 feet development work in ten months. Fourteen men are now working for the company, and ore is rapidly being extracted. Waste dirt is carried down a chute for this distance of 190 feet, instead of being hoisted 85 feet, as formerly. Large reserves of stoping ground are now available, and the Senate is becoming a steady producer. The high-grade ore runs about \$150 per ton, and the low-grade about 30 to 50 ozs. silver, and 25 to 40 per cent lead. The smelter building is being altered into a concentrator, and this change will enable the company to profitably handle their low-grade ores, of which there are large amounts in the mine.

**ROCKY BAR.**—Keystone, Sept. 25: J. G. Kemp, VanEe, a London gentleman, representing the interests of the stockholders in the Alturas Gold Co., has been visiting the "Bar," and speaks highly both of the future of the company and the management of its mines by Superintendent Anthony. The building of the new 50-stamp mill is progressing as rapidly as possible, the hauling of machinery from Mountain Home taking up considerable time. Another 50-stamp mill is also contemplated, as the ore in sight in the Elmore is in such quantity as to necessitate at least 100 stamps being kept constantly at work. The company is also securing title to adjacent mines, and proposes to engage in mining on a scale unknown in the history of Rocky Bar.

**THE JOSEPHUS.** lying about five miles west of the Baldwin mountain, is owned by I. N. Daily, Sam Robinson, A. W. Wilson and W. M. Oster, and is the great find of the season as far as we are now advised. From the top showings this is really wonderful. It, like the other veins of this country, carries sulphurates and chlorides and lies in the formation usual to this part of Custer county. It has an immense body of float lying in exact line covering a space of about 20 feet in width and extending boldly nearly 1000 feet in length. Assays of the rock run 400 to 700 ounces.

**ATLANTA DISTRICT.**—J. P. Einsfeld, President of the Buffalo and Idaho Company, has been visiting its property during the past two weeks, and left Ketchum on Thursday for home. He is evidently well pleased with the outlook, and thinks the mines of his company can be made to pay very handsomely. At present the property is under bond to other parties, but should no sale be effected the company will take hold of the mines and begin active operations early next spring.

#### MONTANA.

**ANACONDA.**—Cor. Butte Inter-Mountain, Sept. 25: At present Anaconda is comparatively quiet, but the outlook is flattering for the near future, the people being assured that the works will start up by the middle of October. Our mines just west of this place are looking fine, and new prospects are being opened every day. Messrs. Sawtelle & Millen have been shipping ore from their mine at Foster gulch, that mills from \$350 to \$750 in silver per ton. This is one of the most substantial properties in Montana,

while a number of others bid fair to be equally as good.

**GRANITE DISTRICT.**—Helena Independent, Sept. 23: The Granite Mountain Co. has lately struck a new bonanza in level No. 5. This level worked through the original bonanza and worked for some time in barren ground. Now, however, a new body of ore has been struck that assays high and is of great extent. It has been crosscut in one place 18 feet wide and its limits have not yet been nearly defined. The Granite bonanza seems inexhaustible. The Revenue mine, at Richmond flat, Madison county, the sale of which was mentioned in these columns some days ago, is said to have been purchased by Eastern men at \$200,000. It is probable that another Helena company will be formed to operate in the Granite district. It is likely to be called the North Granite and the property supposed to be operated adjoins the Granite mountain.

#### NEW MEXICO.

**RUBY CAMP.**—Socorro Bulletin, Sept. 25: The Ruby mine continues to be worked under the management of J. S. Sniffen with satisfactory results. The Silver Gem makes a fine show of high-grade silver ore on the dump, in which occasionally appears free gold. Gen. Cook's sulphuret is showing up splendidly under the present development. Bryson is raising good mineral out of his claim north of the Ruby. Charley Adelman is delving energetically in his claim near the Bullion. The Oro Fino, south of the Ruby, is turning out shot gold and small nuggets. The Iron Mask continues to show gold in its two and a half foot quartz vein.

#### OREGON.

**QUARTZ AND PLACER.**—Jacksonville Times, Sept. 24: There is some talk of putting up a quartz mill in the vicinity of Gold Hill station. The work of cleaning out the Sterling Co.'s ditch and putting in new flumes is nearly completed. The quartz mill on the Hope ledge, in the Wagner creek district, is still busily at work on paying ore. L. D. Brown has several men engaged in putting his new quartz mill in position near the Swinden ledge. A number of residents of Ashland are on Cottonwood creek, Cal., prospecting for gold in the placer mines there. We learn that Patton & Co., who have a promising ledge on Wagner creek, intend putting up a quartz mill there soon. Bybee & Hall, of Canyon creek, have nearly finished their ditch, and will soon be prepared to make an extensive run. Miners are generally getting ready for the coming season. It seems as if more mining than ever will be done next winter. Messrs. Brown and Russ are opening a placer mine on Canyon creek, Josephine county, and will put hydraulic pipe and a giant on it before long. Naucke, Bybee & Co., who are inaugurating an extensive mining enterprise in Josephine county, will receive a lot of hydraulic pipe and a giant before long. Klippel, Baume & Co.'s new engine will soon be in position, as also the balance of their machinery. E. Ball, a scientific miner and machinist, is in charge of the work. We are informed that the California company, who are digging a ditch between Sucker creek and Illinois river, in Josephine county, have 30 men at work and are making rapid progress. They propose opening a large placer mine as soon as possible. Jas. Brown informs us that the Chinese company having failed to pay for Desselles & Connell's mine on Scotch gulch at the appointed time, those gentlemen have ejected them and sold their property to a company composed of Geo. Simmons, Chas. Decker, Thos. T. Gilmore and Peter Payne. Twenty thousand dollars was the consideration, which may be considered cheap, as it is one of the best placer claims in the State. A correspondent of the Times, writing from Glendale, says: "There has been an exceedingly rich strike made in the Green mountain ledge near here, at a distance in the tunnel of 125 feet. I saw 12 pounds of the ore, which was estimated to contain from \$1300 to \$1500, with 6000 or 8000 more lying in the tunnel. Besides, there is almost 200 tons of good milling ore on the dump. I have no doubt that is the best strike since Gold Hill on Rogue river. The people in this country don't seem to realize the richness of the mine."

#### UTAH.

**REVIEW.**—Salt Lake Tribune, Sept. 24: The week has been a heavy one in the shipment of ores, and the activity has been marked in our mining regions generally, the advance in silver having given great relief, though this advance is by no means what it ought to be; but it has given renewed hopes of yet further relief in the same line. The receipts of ore for the week ending Sept. 22d, inclusive, were of the value of \$97,737.62—an unusually heavy quantity. Since the shipments out were not heavy, it follows that the smelters must be absorbing very largely. The receipts of bullion for the same week were \$106,430.33. For the previous week the total receipts were \$160,235.14, of which \$114,793.56 was in bullion and \$15,441.58 was in ore. The Ontario product for the week was 12,694.57 ounces of fine bullion and \$23,669.62 from three lots of ore sold, a total, approximately, of \$36,364.19. One hundred shares of Ontario stock sold in New York on the 11th at \$25. The Daly product for the week was seven tons of fine bullion, 9473.88 ounces; no ore sales. There were received here during the week \$13,500 in gold bars; \$27,143.12 in fine silver bars, and \$19,800 in base bullion. The Stormont shipped up \$6690 in fine silver bars. The Hanauer smelter produced during the week \$23,061 in base bullion; the Germania, one ear, \$1702.99. There is nothing to report of the Horn Silver. Its operations (if it has any) are veiled in a dark cloud of secrecy. Ore receipts were \$45,342.19 by Wells, Fargo & Co.; \$40,552 (including \$4495 Queen of the Hills, \$3660 Overland, and \$8200 Crescent) by Wells, Fargo & Co.; and \$11,843.43 by T. R. Jones & Co.

**DETROIT DISTRICT.**—Cor. Salt Lake Tribune, Sept. 24: Detroit Mining District, Millard county, Utah, is 35 miles from Oasis, a station on the line of the Utah Central Railroad. Though the district is older, gold was not discovered here until about three years ago. Previous to that time the work done was on copper indications, trying to find silver mines, ignoring entirely and not testing the large veins of apparently barren quartz, because it had no copper stain. The veins are true fissures, large, and crop out boldly, thousands of tons of quartz lying on the surface, assaying from \$10 to \$30 in gold per

ton, and even more. The average value in gold of the ores of said district can safely be placed at \$15 per ton. The gold is free, and the ores, so far as examined, carry but a trifling amount of sulphurets. A few of the more prominent mines are the Marette, Cave, Golden Carrier, Ibex, Juno and Jupiter. The Marette is developed by one shaft to a depth of over 100 feet, and by several other openings not so deep. It is a very promising piece of property, and has produced some very fine ore averaging \$25 gold per ton. There is a large dump now on hand assaying over \$15 per ton. The gold here is free but very fine. The Cave is opened to a depth of 160 feet or more, and it is hard to place an estimate on the ore now in sight in this mine. The ore of this mine is softer than that of the former, and the gold in it is coarser, quite bright and free. The Golden Carrier is best described by saying it is a mountain of quartz. There is a large, bold vein of iron-stained quartz, and a sample taken across 25 feet or more lately tested, assayed over \$18 gold per ton. The Jupiter also is a very large vein and pans very nicely. The few claims here mentioned (and there are many more as good, if not better) have enough ore that can be quarried to run 50 stamps, or even 100 stamps, for years. Here are fortunes lying on top of the ground, awaiting the advent of capital and energy. Having stated the bright side, it is but fair to name the drawbacks. The camp has one serious drawback—that is, the absence of water. There is no water in the immediate vicinity of the mines. There is quite a large spring five miles in a north-westerly direction from the mines, but this water would hardly do for milling purposes on account of the sulphur contained therein. But, the same distance away from the mines, in a northeasterly direction, there is a depression on a little valley where I feel confident artesian water can be obtained at not more than 150 feet from the surface. Taking everything into consideration, it seems strange that capital has not found its way down there before now. Perhaps the district is too near home. The Marette Company are, so far, the only ones who have gone to work seriously. Thirteen miles west from the mines, where they own a large spring of crystal water, they have built a five-stamp gold mill of the free-milling pattern. It is their intention to work ores from the Marette and Cave mines, which mines contain quantities of ore that will assay over \$50 per ton. They deserve to make a grand success of their undertaking. The mill was running nicely when last seen. The mortar, stamps, engine and boiler are first-class, and were furnished by the Utah & Montana Machinery Company. The gold in some of the mines is, as stated above, very fine, and cannot be saved to advantage through the simple battery process and running the ore over copper plates, nor do I think that any of the patent arrangements would answer the purpose. Pans and settlers would answer were it not for the increased first cost of a plant and the heavy expense of running them.

**ALTA.**—Cor. Salt Lake Tribune, Sept. 25: Active overhauling the machinery of the New Emma mine is going on pending the arrival of the fine new pump from the East, which is expected here daily. Time, however, is not lost by shutting down the mine for the present, as the repairing and close looking after the steam pipes which is now going on is very necessary work, and will doubtless save the stoppage of operations hereafter. Operations at the Highland Chief have been actively carried on and a large quantity of high-grade ore has been extracted and got ready for shipment. The work in the Equitable mine is progressing rapidly. A good vein of ore was developed in that mine a few days since by the contractors. C. S. Harker, the manager of the McKay and Revolution Mining Company and Smelter, arrived yesterday for the purpose of looking after the property of the company here and to make arrangements for buying ore in order to start the smelter immediately. Superintendent Moses Hirschman has made all the necessary arrangements for soon starting the Eclipse mine. The work will be for the development of that on a larger scale. Work in the Flagstaff mine is being pressed forward with the greatest energy, and the rumor is current that a somewhat important strike of ore was made there last Saturday.

**PARK SHIPMENTS.**—Record, Sept. 27: For the week just ended the Mackintosh sampler received 444,530 pounds of Ontario ore, 27,740 pounds of Daly, and 25,510 pounds of Sampson ore; total, 497,780 pounds. During the week the Crescent shipped 158,700 pounds of concentrates. The Daly bullion product from the Marsac mill was 7 bars, on the 18th, containing 7504 fine ounces of silver, and on the 24th (yesterday) 7 bars containing 7656 fine silver ounces. On the 20th inst. the Ontario shipped 22 bars of bullion, containing 11,425 fine ounces of silver, and to-day the shipment was 27 bars, containing 14,579 fine ounces of silver.

**PARK CITY.**—Cor. Salt Lake Tribune, Sept. 18: Received at the McIntosh sampler for the week ending September 16th: Ontario ore, 460,180 lbs.; Daly ore, 49,020 lbs.; Sampson ore, 175,570 lbs. Bullion shipments: September 13th, Daly, seven bars, 7593 ounces. The Crescent concentrator is doing excellent work since the improvements have been made. They are turning out daily about 125 tons of ore. The tramway is bringing down about the same amount per day. The Marsac mill closed down on Wednesday for repairs, and it is expected it will start again in a few days. The mill has had a most successful run since it started, having turned out, up to this date, 269 bars of bullion.

**EUREKA DISTRICT.**—Cor. Salt Lake Tribune, Sept. 18: Eureka, which has been the scene of so much activity the past few months, is comparatively quiet just now. The two companies—Eureka and Beck—have done a large amount of work since they got into court. The mines have been developed faster than ever before, and the output has been larger. Both were taking out ore as fast as possible for a time, but when the court decided adverse to Beck, men were discharged and the output reduced. When Beck promised his hands last week to take the case to the highest court, it put a stop to the Eureka taking ore from disputed ground, if they had been doing so. It was only last week that some 70 men were discharged, but since then some of them have been put to work again, while the force at Beck's has also been lately increased. The Beck is down 420 feet, half of which is the work of the past ten months. From 80 to 100 men were employed up to one month ago, when the number was reduced to about 20; but they propose to soon have 70 men.



## Dewey & Co., American and Foreign Patent Agents.

PATENTS obtained promptly; Caveat filed expeditiously; Patent Reissues taken out; Assignments made and recorded in legal form; Copies of Patents and Assignments procured; Examinations of Patents made here and at Washington; Examinations made of Assignments recorded in Washington; Examinations ordered and reported by Telegraph; Rejected cases taken up and Patents obtained; Interferences Prosecuted; Opinions rendered regarding the validity of Patents and Assignments; Every legitimate branch of Patent Soliciting promptly and thoroughly conducted.

Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons; and our success and business are constantly increasing.

The shrewdest and most experienced Inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

### Foreign Patents.

In addition to American Patents, we secure with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and thoroughly established.

Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) SOONER than other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of most inventions discovered here than any other agents.

Situated so remote from the seat of Government,

delays are even more dangerous to the inventors of the Pacific Coast than to applicants in the Eastern States. Valuable patents may be lost by extra time consumed in transmitting specifications from Eastern agencies back to this coast for the signature of the inventor.

### Confidential.

We take great pains to preserve secrecy in all confidential matters, and applicants for patents can rest assured that their communications and business transactions will be held strictly confidential by us. Circulars of information to inventors, free.

### Home Counsel.

Our long experience in obtaining patents for Inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees intrusted to our agency.

### Engravings.

We have superior artists in our employ, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

### DEWEY & CO.,

United States and Foreign Patent Agents, publishers Mining and Scientific Press and Pacific Rural Press, 252 Market Street. Elevator, 12 Front St., S. F.

### San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice

TUBBS & CO.

611 and 613 Front St., San Francisco

### Engraving

Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.

## JOHN A. ROEBLING'S SONS CO.

# WIRE ROPE

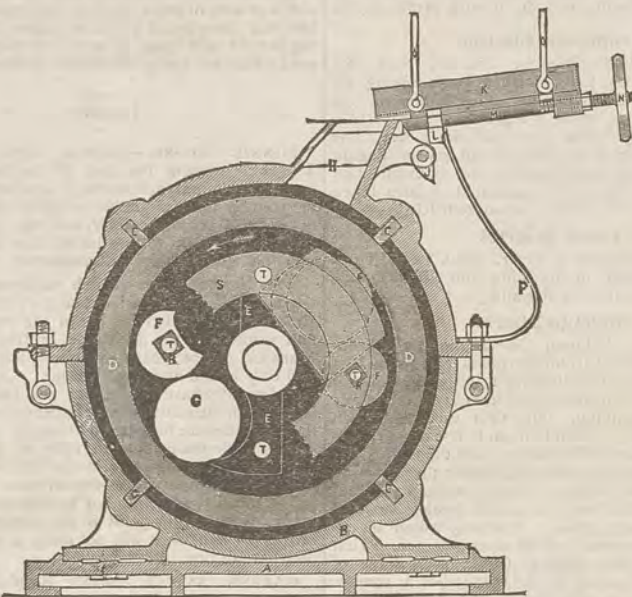
GALVANIZED SHIP RIGGING, MINING, TILLER, ELEVATOR, TINNED & COPPER ROPE, SASH CORDS. LARGEST WIRE ROPE WORKS IN THE WORLD.

## IRON & STEEL WIRE OF EVERY KIND.

TELEGRAPH WIRE, HARD & SOFT COPPER WIRE INSULATED FOR ELECTRIC USE. WIRES OF IRON & COPPER. FENCE WIRE, SWEDISH IRON WIRE, CRUCIBLE STEEL WIRE.

TRENTON, N. J. & 14 DRUMM ST. SAN FRANCISCO, CAL.

## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

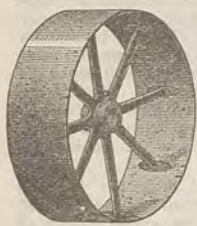
—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied. At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet. All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco. Certificates as to performance of the Mills, and any information required, furnished on application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 & 106 Washington St., NEW YORK. OR PACIFIC IRON WORKS, SAN FRANCISCO.



## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEISE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

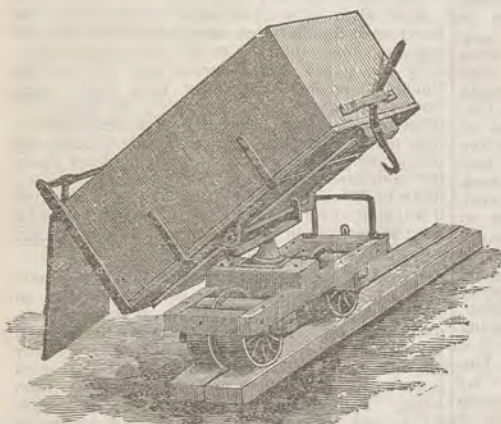
SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 & 131 Fremont Street,

San Francisco, Cal.

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.



JAMES' PATENT ORE CAR.

## TATUM & BOWEN,

34 & 36 FREMONT ST., Donahue Block, SAN FRANCISCO.

91 & 93 FRONT ST., PORTLAND, OREGON.

Ore Car, . . .	\$ 40.00
Rock Breaker, . . .	100.00
Quartz Mill, . . .	350.00

## THE JAMES QUARTZ MILL

Saves a Higher Percentage than any other machine.

Its action is a reciprocating motion of four separate and distinct Dies attached to a heavy casting in such a way that the **WHOLE WEIGHT** and **FORCE OF BLOW** ACTS ALTERNATELY ON EACH DIE. In this respect it resembles the Stamp Mill, and in point of amalgamation is superior to any machine in use. There is no wear, except on Shoes and Dies, and there is no expense for setting. Weight, 3000 pounds. Capacity, 6 Tons in 24 hours through No. 40 Screen. Requires 4 H. P.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



Huntington Centrifugal

QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,

JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

UTAH OFFICE—SALT LAKE CITY, UTAH.

## Metallurgy and Ores.

**SELBY  
SMELTING and LEAD CO.,**  
416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY  
And Assay Office.**

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

**BLUESTONE,  
LEAD PIPE,  
SHEET LEAD,  
SHOT, Etc., Etc.**

ALSO MANUFACTURERS OF

**Standard Shot-Gun Cartridges,**  
Under Chamberlin Patent.

**WM. D. JOHNSTON,  
ASSAYER AND ANALYTICAL CHEMIST.**  
514 Kearny Street,  
SAN FRANCISCO, CALIFORNIA  
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

**JOHN TAYLOR & CO.,**

IMPORTERS AND DEALERS IN

**ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,**

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. C. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

**Nevada Metallurgical Works.**

NO. 28 STEVENSON STREET,  
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869

Ores worked by any Process.  
Ores Sampled.  
Assaying in all its Branches.  
Analyses of Ores, Minerals, Waters, etc.  
Working Tests (practical) Made.  
Plans and Specifications furnished for the most suitable Process for Working Ores.  
Special attention paid to Examinations of Mines; Plans and Reports furnished.  
C. A. LUCKHARDT & CO.,  
(Formerly Huhn & Luckhardt, )  
Mining Engineers and Metallurgists.

J. KUSTEL. H. KUSTEL.

**METALLURGICAL WORKS,**

318 Pine St. (Basement,  
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.  
Assaying and Analysis of Ores, Minerals and Waters.  
Mines Examined and Reported on.  
Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,  
Mining Engineers and Metallurgists.

**C. H. AARON,  
ASSAYER AND METALLURGIST,**  
NOGALES, ARIZONA,  
Will attend to business in connection with mines in Sonora or Arizona.



The California  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

**FLOUR AND OTHER MILLS.**  
Quartz Mill Screens a Specialty.  
147 Beale Street, San Francisco.



**H.H.H. HORSE LINIMENT.**  
FOR  
MAN OR BEAST.  
D.D.T. 1868.

THE H. H. H. Horse Liniment puts new life into the Antiquated Horse! For the last 14 years the H. H. H. Horse Liniment has been the leading remedy among Farmers and Stockmen for the cure of Sprains, Bruises, Stiff Joints, Spavins, Windgalls, Sore Shoulders, etc., and for Family Use is without an equal for Rheumatism, Neuralgia, Aches, Pains, Bruises, Cuts and Sprains of all characters. The H. H. H. Liniment has many imitations, and we caution the Public to see that the Trade Mark "H. H. H." is on every Bottle before purchasing. For sale everywhere for 50 cents and \$1.00 per Bottle.

For Sale Everywhere.

## THE GOLDEN GATE PLUG CLOSET.



The only secure-locking device to keep sewer gas entirely away from dwelling houses.

JOSEPH BUDDE, Manufacturer, 43 Fremont Street,  
All kinds of Water Closets, Slop and Waste Hoppers Always on hand. Write for information

**American Exchange Hotel,**  
SANSOME STREET.

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50  
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

**HEALD'S BUSINESS  
COLLEGE,**  
24 Post St. S. F.  
Send for Circular.

## H. P. GREGORY & CO.

Nos. 2 and 4 California St., - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

# MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING  
MACHINERY.

FRANK & CO.'S WOODWORKING  
MACHINERY.

NEW HAVEN MANUF'G CO.'S MACHINISTS' TOOLS.

BEMENT & SON'S MACHINISTS  
TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM  
PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND  
EXHAUSTS.

SHIMER MATCHER HEADS.

BRAINARD MILLING MACHINES.

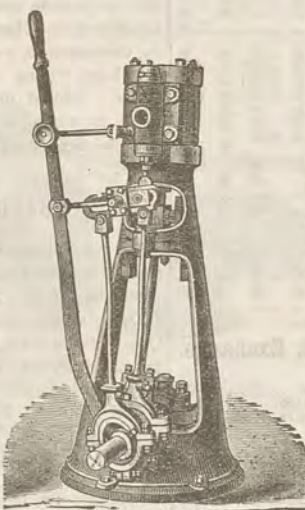
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISHERS.



YACHT ENGINES.

WILLIAMSON BROS' HOISTING  
ENGINES.

ATLAS ENGINE WORKS ENGINES  
AND BOILERS.

PAYNE'S VERTICAL AND HORIZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS  
AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECTORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

**THOMAS PRICE'S ASSAY OFFICE,**

CHEMICAL LABORATORY,

**BULLION ROOMS and ORE FLOORS,**

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.  
WORKING TESTS OF ORES BY ALL PROCESSES.  
SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.



## Foundry Notes.

The Pacific Rolling Mills are now quite busy and have about 500 men at work. They are just completing the Ninth street cable railroad, among other work on hand.

The Fulton Iron Works, Hinckley, Spiers & Hayes, is at work on engines and machinery for the new ferry steamer for the South Pacific Coast R. R. Co. The steamer itself will be built by the company. The engine is a "walking-beam," one of large size, and the boat will be about the same capacity as the *Bay City*. These works also built the machinery for the new Government dredger, just completed, for use on California rivers. We described this in detail at the time the contract was awarded. The hull of this dredger—70 feet long, 36 feet wide, and 8 feet deep—was built by Alexander Hay at the foot of Sixth street. The machinery was made at the Fulton. There are two 12x12 engines and two large boilers. The capacity of this dredge is supposed to be 2000 cubic yards per day. It is built in a most substantial manner, at a cost of about \$50,000.

There is no material change in the situation at the Pacific Nail Works in Oakland, the company still refusing to concede to the demands of the nailers. Labor organizations all over the State have adopted resolutions encouraging the strike.

The Union Iron Works has received plans of the five cruisers the Government is to build, and will bid upon them. It is greatly to be hoped that this firm will obtain a contract in this connection. They now have a plant suitable for work of this character, and with a few additions will have it complete in all details. We have had very little of the Government work to do on this coast—far less than we should have had. Vessels are built East and sent here at greatly enhanced expense. Now, however, that we have equal facilities for building, improved tools and all necessary appliances, we should be very glad to see our home industries encouraged by the Government. The Union Works have just made their first shipment of castings for the great dome of the Lick Observatory, which they are building.

The Wainwright Manufacturing Co., 65 and 67 Oliver street, Boston, Mass., and 98 Liberty street, N. Y. City, manufacturers of feed-water heaters, filters, expansion-joints, radiators and corrugated mining, have been forced, by their numerous orders, to enlarge their plant, and are erecting an addition to their factory at Medford, Mass., of four stories, 31x78 feet, which will contain machine shop and corrugating and radiator departments. Their former building has been utilized as a machine shop, having been moved to another site. By this change they will be enabled to increase their product some three or four times, and meet the demands of their business.

## Rural Health Retreat.

We take pleasure in again calling the attention of our readers to this popular resort and sanitarium. The original building has recently been thoroughly refitted, and the extensive additions are now complete. The rooms are well-furnished, ample and sunny, the gymnasium abundantly supplied with the most approved modern appliances for calisthenic exercises, and the bath-rooms are commodious, convenient and under competent management. The elegant and cosy cottages are admirably adapted to family use. Two thoroughly studied and well-experienced physicians, with two lady assistants, have charge of the medical and surgical departments. This retreat is kept open the year round, and its pure water, salubrious mountain air, fine walks and campus, and picturesque surroundings will ever make it a pleasant and inviting home, not only for invalids but for all who are in need of a few weeks' rest and recreation and surcease from toil.

The autumn season is one of rare beauty and enjoyment to the visitor and sojourner in the foothills of Napa valley. Its fine fruits, genial atmosphere and changing foliage add to its usual charms. There is no better season to induce the health and pleasure-seeker to tarry at this desirable resort.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

From 1865 to 1882 our production of pig iron increased from 931,582 tons to 5,178,122 tons.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.									
COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Andes S M Co.	Nevada.	30.	25.	Sept 15.	Oct 21.	Nov 10.	B. Burris.	309 Montgomery St	
Bodie Con M Co.	California.	5.	50.	June 21.	Aug 23.	Oct 18.	G. W. Sessions.	309 Montgomery St	
Bullion M Co.	Nevada.	31.	30.	Aug 31.	Oct 5.	Oct 26.	R. R. G. Gason.	357 Pine St	
Bedrock M Co.	California.	12.	10.	Sept 13.	Oct 15.	Nov 8.	J. L. Hunt.	308 Montgomery St	
Baker Divide M Co.	California.	12.	25.	Sept 24.	Oct 25.	Nov 17.	D. M. Kent.	330 Pine St	
Best & Belcher M Co.	Nevada.	35.	50.	Sept 29.	Nov 4.	Nov 24.	W. Willis.	309 Montgomery St	
Champion M Co.	California.	22.	40.	Aug 31.	Oct 5.	Oct 21.	T. Wetzel.	522 Montgomery St	
Chollar M Co.	Nevada.	21.	60.	Aug 24.	Sept 29.	Oct 20.	C. E. Elmer.	309 Montgomery St	
Golden Jacket M Co.	Nevada.	2.	10.	Sept 1.	Oct 14.	Nov 4.	R. G. McClellan.	331 Montgomery St	
Gould & Curry M Co.	Nevada.	54.	50.	Sept 28.	Nov 3.	Nov 24.	A. K. Durbin.	309 Montgomery St	
Golden Fleece M Co.	California.	54.	15.	Oct 13.	Oct 25.	Nov 13.	W. J. Gleason.	312 Phelan Block	
Liberty Hill Con M Co.	California.	15.	15.	Sept 1.	Oct 1.	Oct 28.	F. E. Lutz.	330 Pine St	
Live Oak Drift M Co.	California.	2.	05.	Aug 9.	Sept 15.	Oct 4.	T. Wetzel.	522 Montgomery St	
Mount Gory M Co.	Nevada.	1.	1.00.	Aug 25.	Oct 2.	Oct 23.	G. Frier.	309 Montgomery St	
Mayflower Gravel M Co.	California.	32.	25.	Sept 6.	Oct 15.	Nov 12.	J. Morizio.	328 Montgomery St	
Nevada M & M Co.	Nevada.	1.	1.00.	Aug 25.	Oct 2.	Oct 23.	G. L. Brander.	309 Montgomery St	
Occidental M Co.	Nevada.	7.	30.	Aug 9.	Sept 13.	Oct 4.	A. K. Durbin.	309 Montgomery St	
Pacific M Co.	California.	6.	01.	Aug 7.	Sept 17.	Oct 16.	A. Hakey.	328 Montgomery St	
Potosi M Co.	Nevada.	10.	30.	Aug 31.	Oct 5.	Oct 26.	C. E. Elmer.	309 Montgomery St	
Silver Lining M Co.	Nevada.	2.	10.	Sept 14.	Oct 18.	Nov 5.	A. H. Clough.	431 California St	
Sierra Nevada S M Co.	Nevada.	36.	25.	Sept 11.	Oct 13.	Nov 1.	E. L. Parker.	309 Montgomery St	
Utah M Co.	Nevada.	53.	50.	Aug 24.	Sept 28.	Oct 18.	A. H. Fish.	309 Montgomery St	

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Eureka Con M Co.	Nevada.	E. H. Wilson.	378 Montgomery St.	Annual.	Oct 18
Jupiter M Co.	California.	Edward Land.	309 Montgomery St.	Annual.	Oct 6
Mayflower G M Co.	California.	J. Morizio.	328 Montgomery St.	Annual.	Oct 13
Plumas Con M Co.	California.	J. L. Fields.	328 Montgomery St.	Annual.	Oct 11

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	20.	Sept 30
Young King M Co.	California.	J. Nash.	328 Montgomery St.	25.	Aug 16
Young America M Co.	California.	J. Nash.	328 Montgomery St.	40.	May 20

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Sept. 9.	WEEK ENDING Sept. 16.	WEEK ENDING Sept. 23.	WEEK ENDING Sept. 30.
Alpha.	.55	.60	.65	.70
Alta.	.90	.95	1.05	1.25
Andes.	.15	.25	.35	.40
Argenta.	.15	.25	.35	.40
Belcher.	.15	.25	.35	.40
Belling.	1.05	1.10	1.15	1.20
Best & Belcher.	.15	.25	.35	.40
Bullion.	1.05	1.10	1.15	1.20
Bonanza King.	.15	.25	.35	.40
Belle Isle.	.30	.35	.40	.45
Bodie Con.	2.40	2.50	2.60	2.70
Benton.	.20	.25	.30	.35
Bodie Tunnel.	.50	.55	.60	.65
Bulwer.	1.50	1.60	1.70	1.80
California.	1.15	1.25	1.35	1.45
Challenge.	.20	.25	.30	.35
Champion.	.60	.70	.80	.90
Chollar.	.60	.70	.80	.90
Confidence.	2.50	2.60	2.70	2.80
Con. Imperial.	.05	.10	.15	.20
Con. Virginia.	2.15	2.25	2.35	2.45
Con. Pacific.	.65	.70	.75	.80
Crown Point.	.65	.70	.75	.80
Day.	.30	.35	.40	.45
Eureka Con.	3.20	3.30	3.40	3.50
Eureka Tunnel.	.10	.15	.20	.25
Exchequer.	.10	.15	.20	.25
Grand Prize.	.75	.80	.85	.90
Gould & Curry.	.75	.80	.85	.90
Goodshaw.	.15	.20	.25	.30
Hale & Norcross.	1.15	1.25	1.35	1.45
Holmes.	1.40	1.50	1.60	1.70
Independence.	.15	.20	.25	.30
Julia.	.45	.50	.55	.60
Justice.	.45	.50	.55	.60
Martin White.	2.40	2.50	2.60	2.70
Mono.	.60	.70	.80	.90
Mexican.	.60	.70	.80	.90
Mt. Diablo.	.70	.80	.90	1.00
Northern Belle.	.70	.80	.90	1.00
Navajo.	.70	.80	.90	1.00
North Belle Isle.	1.05	1.10	1.15	1.20
Occidental.	.80	.90	1.00	1.10
Ophir.	.55	.60	.65	.70
Oregon.	.30	.35	.40	.45
Oreman.	.35	.40	.45	.50
Potosi.	.35	.40	.45	.50
Pinal Con.	2.30	2.40	2.50	2.60
Savage.	2.30	2.40	2.50	2.60
Seg. Belcher.	.50	.55	.60	.65
Sierra Nevada.	.50	.55	.60	.65
Silver Hill.	.15	.20	.25	.30
Silver King.	.15	.20	.25	.30
Scorpion.	.15	.20	.25	.30
Syndicate.	.15	.20	.25	.30
Toga.	.15	.20	.25	.30
Union Con.	.45	.50	.55	.60
Utah.	.65	.70	.75	.80
Yellow Jacket.	.70	.80	.90	1.00

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., Sept. 30.	650 Mexican.	35c
1000 Alta.	80 Mt. Diablo.	2.50
200 B. & Belcher.	900 N. Belle Is.	2.45@2.50
100 Bulwer.	100 Navajo.	.70c
200 Benton Con.	700 Ophir.	.90c
400 Belle Isle.	200 Occidental.	1.05
100 Bodie Tun.	400 Potosi.	.20c
250 Chollar.	340 Savage.	1.85@1.90
850 Con Va & Cal.	100 Sierra Nevada.	.30c
100 Crown Point.	200 Utah.	.70@.75c
500 Gould & Curry.	100 Union Con.	.30c
300 Mono.	250 Yellow Jacket.	.90c

## San Francisco Metal Market.

[WHOLESALE.]		THURSDAY, Sept. 30, 1886.
ANTIMONY—French Star.	91 @	8
BORAX—San Bernardino.	— @	82
Amagosa.	— @	50
IRON—Glengarnock ton.	— @	22 50
Eglinton, ton.	— @	21 50
American Soft, No. 1, ton.	— @	24 00
Oregon Pig, ton.	— @	23 00
Clippert Gap, Nos. 1 & 4.	— @	23 50
Clay Lane White.	— @	21 50
Shoals, No. 1.	— @	23 50
STEEL—English, lb.	10 @	15
Black Diamond, ordinary sizes.	10 @	15
Pow.	4 @	5
Machinery.	5 @	6
Sanderson Bros.	10 @	—
COPPER—		
Brassier's sizes.	30 @	—
Bolt.	10 @	—
Sheeting.	30 @	—
Ingot.	12 @	13
LEAD—Pig.	4 75 @	—
Bar.	5 25 @	5 50
Pipe.	8 @	—
Sheet.	8 @	—
Shot, discount 10% on 500 bag.	Drop, 7 bag.	1 05 @
Buck, 7 bag.	2 05 @	—
Chilled, do.	2 05 @	—
ZINC—German.	9 @	10
Sheet, 7x3 ft, 7 to 10 lb. less the cask.	7 10 @	—
Shot, discount 10% on 500 bag.	Drop, 7 bag.	1 05 @
Flasks, new.	1 05 @	—
Flasks, old.	85 @	—
TINPLATE—Coke.	6 00 @	6 50
Charcoal.	6 00 @	6 50

CAMPO SECO, Calaveras county, presents a lively appearance on Saturday nights and Sundays, since work on the copper mines has commenced in earnest. The people in general in that vicinity are hopeful of better times.

## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING SEPT. 21, 1886.

- 349,295.—SASH-FASTENER—E. H. Alvord, Seattle, W. T.
- 349,299.—SAFETY AIR CLUTCH FOR ELEVATORS—H. W. Bracken, S. F.
- 349,479.—CABLE GRIP—H. Casebolt, S. F.
- 349,632.—TRACE HOOK—Chas. Dudley, Stockton, Cal.
- 349,489.—GAS METER—A. F. Fisher, Chico, Cal.
- 349,586.—CHECK VALVE—A. D. Glace, Rocklin, Cal.
- 349,498.—TRUSS—J. G. Henderson, Grizzly Flat, Cal.
- 349,650.—ELECTRIC SYNCHRONIZER FOR CLOCKS—M. E. Hunter, Oakland, Cal.
- 349,512.—ENGINE VALVE-GEAR—R. A. McLellan, S. F.
- 349,450.—FRUIT EVAPORATOR—A. C. Penniman, San Jose, Cal.
- 349,404.—MOLD-BOARD FOR PLOWS—J. W. Peters, John Adams, Cal.
- 349,459.—ADDING MACHINE—Shattuck & Thorn, Jr., S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

AMERICAN NEWSPAPER ANNUAL.—N. W. Ayer & Son, of Philadelphia, have favored us with a copy of their "American Newspaper Annual" for 1886. It contains a carefully prepared list of all journals and periodicals published in the United States and Canada, corrected up to last July, giving their names, times of issue, general character (as political, agricultural, medical, etc.), age, size, circulation and advertising rates. These are arranged by States in alphabetical order, with a deal of other valuable information, compiled in handy form, and all made easy to refer to by table of contents and index. It makes a handsome octavo volume of over 1000 pages, and is altogether too convenient for editors and advertisers to be without.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
G. W. INGALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
R. G. HUSTON—Montana.  
FRANK W. SMITH—Utah and Colorado.  
M. S. PRIME—Marin Co.  
W. J. TULLIS—Humboldt Co.  
Geo. McDOWELL—Fresno and Tulare Cos.  
O. F. BERGMAN—Tehama and Colusa Cos.  
S. S. LANTON—Nevada, Sierra and Plumas Cos.  
JEANNETTE HOUGHTON—San Mateo Co.

PROF. A. VAN DER NAILLEN, who has been sojourning at that delightful resort and sanitarium, the Rural Health Retreat, near St. Helena, in a brief letter, says: "Here I am and well contented. It is about the calmest and healthiest place I ever saw—Switzerland and Italy notwithstanding. They have a kind remembrance of you here, and of Dr. McKaig."

TACOMA, the western terminus of the Northern Pacific R. R., which in 1880 had a census population of 1098, now claims 9000 inhabitants.

## Mining and Scientific Press.

THE BEST PRACTICAL MINING JOURNAL IN THE WORLD.

Established in 1860, this paper has been eminently successful as a popular and useful mining and mechanical journal. Relative to precious metals especially, it is the leading mining paper of the world.

It is largely patronized by the leading Miners, Mine Owners, Superintendents, Engineers, Metallurgists, Chemists, Manufacturers, Mechanics, Scientific, Professional and Industrial "Men of Progress" on the Pacific Coast and many leading Mining Men throughout the mining fields of the world.

It is by far the best advertising medium in the Pacific States and Territories for Mining, Mechanical, Engineering, Building and Manufacturing Tools and Implements Goods, Supplies, etc.

Being thoroughly able and reliable in its editorial and business management, and long established in the most progressive industrial portion of the Union, at present, its power as an advertising medium is unsurpassed.

Subscription, \$3 a year. Advertising rates, moderate. Send for samples and further information.

DEWEY & CO., Publishers,  
252 Market Street, San Francisco.



## Testing and Working Silver Ores

An illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patschen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Krochuk's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quick-silver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

Price, post free, \$2.00. Sold by DEWEY & CO., Publishers, 252 Market St.

## Acid-Proof Paint.

Among the meritorious exhibits at the Mechanics' Fair, to which was awarded a Silver Medal, is the display by the Paraffine Paint Company, whose main office is at 310 California street. The property which this paint possesses of resisting acids and chlorine gas, as well as defying the effect of long submersion in water, makes it of particular value in gold mills using the chlorine gas process, the tanks containing the solution being rendered watertight and impervious to the acid by its use. It has been adopted, among other places, at the Amador Reduction Works at Sutter Creek, and the Phoenix works at Drytown, Cal., where a variety of substances had been used without success. This paint is also used extensively in woolen mills for coating tanks and iron pipes in contact with acids.

FROM October 1, 1884, to July 1, 1886, the Tombstone mine yielded 27,875 tons ore, from which \$1,073,872 was extracted. The expenses were correspondingly large, so there was nothing left for stockholders.

## LUBRICATION.

Our readers can procure of CHARLES J. WOODBURY Manufacturer of Oils, 123 California St., San Francisco, a fine Lard Engine Oil, unsurpassed by any other Oil for general use, and which will flow through any feeder at all temperatures. Also, Cylinder Oils, Refined Cylinder Tallow, Lubric Compound, Farm, Machine, and strictly pure Lard Oil. The Woodbury Oils are in use on the Central, Southern, and Northern Pacific Railways, and nearly every Railroad and Steamship line on the coast.

## DIVIDEND NOTICE.

OFFICE OF THE

## Paradise Valley Mining Company

San Francisco, California.

At a meeting of the Board of Directors of the above-named company, held September 29, 1886, Dividend No. 9, of Twenty Cents (20c.) per share, was declared, payable on Thursday, the 30th day of September, 1886, at the office of the company.

W. LETTS OLIVER, Secretary.

OFFICE—No. 328 Montgomery Street, San Francisco, California.

## WANTED!

Man of Capital and Mining Experience to buy a number of claims, all in the hands of prospectors. Three Locations on same vein, 10-25 feet; formation, slate hanging, granite footwall; assays from \$10 to \$90 per ton in gold and silver, with a little copper in it. Can be opened and worked with tunnels to a depth from 400 to 2000 feet. Plenty of water and densely timbered. Title perfect. About 20 miles from N. P. R., Montana. No Reduction Works in the vicinity. Will bear close investigation. Great chance for practical mining men of some means. Price, \$30,000. For further particulars, address

J. W. LIND,

Marysville, Lewis &amp; Clarke Co., Montana.

## Practical Treatise on Hydraulic Mining.

By AUG. J. BOWIE, Jr.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by DEWEY & CO., Publishers, 252 Market St., San Francisco.

## Rural Health Retreat (Crystal Springs,) St. Helena, Cal.



Among the many delightful places for rest, recreation and restoration of mind and frame in California, is the "Crystal Springs Rural Health Retreat," shown in above engraving on this page. The Retreat is situated on the slope of Howell mountain, 1200 feet above tide level, 500 above and overlooking Napa valley, and two and a half miles from St. Helena, in Napa county. Among the natural advantages are stated: "Pure water, dry atmosphere, balmy sunshine, even temperature, mild breezes and the absence of high winds. Across the valley lies the Sonoma mountain range, breaking the sea breeze and shielding the Retreat from the chilling atmosphere of the coast, and presenting a safeguard against catarrh and lung diseases. The grandeur of its mountain ranges, with shrubby canyons lying in beauty at their feet, the famous Mt. St. Helena rearing its lofty head to the clouds, the grassy plain lying beneath, reflecting the sunbeams like a grand mirror before the Retreat, all perfumed with a variety of wild flowers, lend an enchantment to the scene. There are no stagnant pools or marshes within range; rainfall is plenteous, rendering irrigation unnecessary, and malaria is a stranger at the Retreat, and in all this beautiful valley. In fact, the purity of the air on this hillside and in the upper valley is a

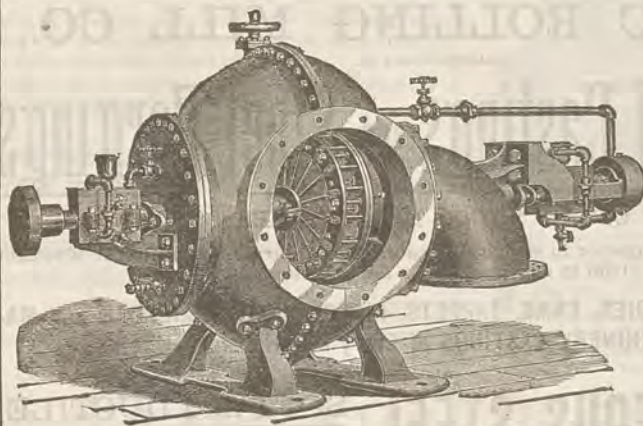
specific for malaria, and all diseases affecting the head, throat and lungs, producing a healthy circulation through the mucous passages generally."

The Rural Health Retreat is twofold in its character. In the first place it undertakes to do direct work in the cure of diseases by hygienic and rational practice, by thoroughly competent physicians resident in the Retreat. While a radical table is furnished for invalids, and proper diet prescribed for each individual case, no one is confined to a starvation diet, and better and more ample variety is furnished at meals than is usually found upon invalid tables elsewhere. The managers have the services of two thoroughly competent physicians from Eastern cities of many years' experience in practice. They are assisted by two lady attendants having a two-years' course at one of the largest hygienic and surgical sanitariums in the world, with five years' subsequent practice.

The Retreat is also a summer and winter resort to all who desire to spend a few weeks or months in recreation, and receive the benefit from rest and breathing this mountain air, whose healthfulness and purity is unsurpassed. For such, a liberal table is especially provided. While the chief object of this institution is to afford a sanitarium for those in need of hygienic and surgical treatment, ample means are afforded for recreation, and entertainment is

provided for all boarders and pleasure-seekers who love decency and good order. Winding and picturesque roads, walls of blasted rock terracing the side-hills about the main building, cottages and driveways, a fine campus, spacious woods, shady groves, arched seats, swings, swinging rings, swinging chairs, will be furnished; dumb-bell and Indian club exercises given to such as may desire them. Calisthenic exercises will also be led by a competent leader. To accommodate their increasing patronage the proprietors have been enlarging and building quite extensively, and in many ways improving their facilities for making the Retreat yet more comfortable for their guests.

It is certainly one of the best sanitariums, all things considered, in the United States. We feel an especial interest in the Rural Health Retreat, because one of the proprietors of this paper, with his family, has greatly enjoyed a recreation season there. They assure us that they are exceedingly well pleased with the Retreat for its natural and added beauties and comforts, and for the pure moral tone, the kindness and cordiality which prevail in the management. The accessibility of the Retreat should also contribute to its desirability, both to the invalid and the pleasure-seeker. We advise health and pleasure-seekers to send for printed reports and further information.

JAMES LEFFEL'S  
Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL &amp; CO.,

Springfield, Ohio,

or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents,  
Chicago, Ill., and Denver, Col.

PARKE &amp; LACY, General Agents, San Francisco, Cal.

## DEWEY &amp; CO.'S

Scientific Press



Patent Agency.

ESTABLISHED 1863.

Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

A. T. DEWEY.

W. B. EWER.

GEO. H. STRONG.

## A Good Opportunity for a Machinist.

A variety of good Tools, Patterns, etc., with business for sale cheap by a party retiring from business. A splendid opportunity for an enterprising mechanic.

Address A. B. O., care of this paper.

## WANTED.

To exchange one-half interest in three mining claims, in Montezuma District, Sonora, for a reasonable amount of money, to be used in developing said claims. One claim has paid a fair profit for over a year. The capture of Geronimo and band by Gen. Miles makes this the safest investment on this coast. For further particulars, address

J. E. BICKERTON,  
1069 Grove St., Oakland, Cal.

## REGISTRATION

—FOR THE—

## General Election.

All electors desiring to vote at the General Election, to be held November 2, 1886, must be registered regardless of any previous registration.

Registration for the General Election to be held November 2, 1886, will commence at the office of the Registrar of Voters, in the basement of New City Hall, on WEDNESDAY, August 4th, and will continue until MONDAY, October 11th, inclusive. Office hours, 9 o'clock A. M. to 5 P. M.

By order of the Board of Election Commissioners.

P. F. WALSH, Registrar.

August 1, 1886.

H. M. RAYNOR,  
No. 25 Bond St.,  
NEW YORK.ESTABLISHED  
1858.

FOR ALL

Laboratory

Manufacturing Purposes.

Wholesale and Retail.

Native Platinum and Scrap purchased.

BACK FILES of the MINING AND SCIENTIFIC PRESS (unbound) can be had for 38¢ per volume of six months. Per year (two volumes) \$5. Inserted in Dewey's patent binder, 50 cents additional per volume.



NOTICE TO  
**MINING MEN,**  
**ENGINEERS, CONTRACTORS,**  
 and others interested in  
**TUNNELING, SHAFT-SINKING, ETC.**

**Engineers' Tables of Progress**

WITH MAPS, ILLUSTRATIONS  
 AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
 SENT FREE ON APPLICATION.

For Catalogues, Estimate address:

**INGERSOLL ROCK DRILL CO.,**

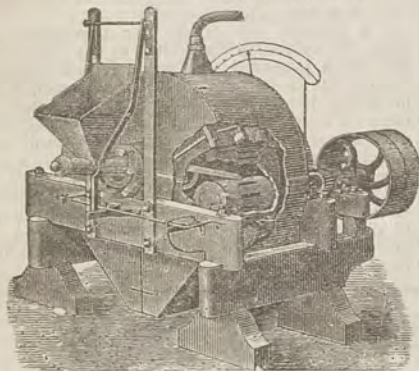
REPRESENTED BY

**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
 SAN FRANCISCO, CAL.

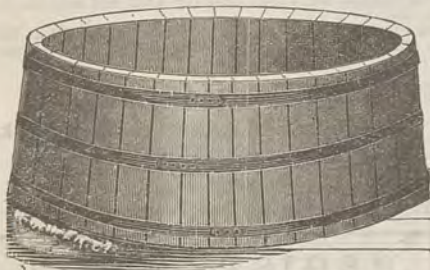
**Tustin's Pulverizer**  
**WORKS ORE WET OR DRY**  
 FULTON IRON WORKS, S. F.



MANUFACTURED BY

**HINCKLEY, SPIERS & HAYES,**

**Mining Vats and Tanks.**



**LEACHING VATS with FALSE BOTTOMS.**

**PRECIPITATING VATS,**

**SOLUTION and WATER TANKS**  
 For Mining Purposes.

**WELLS, RUSSELL & CO.,**  
 Mechanics' Mills, San Francisco.

**N. W. SPAULDING**  
**SAW COMPANY**

Manufacturers of

SPAULDING'S

**Inserted Tooth**

AND

**CHISEL BIT**

CIRCULAR

**Saws.**

**SAW MILLS AND MACHINERY**  
 Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake. The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**  
 316 California St., San Francisco.

## FULTON IRON WORKS,

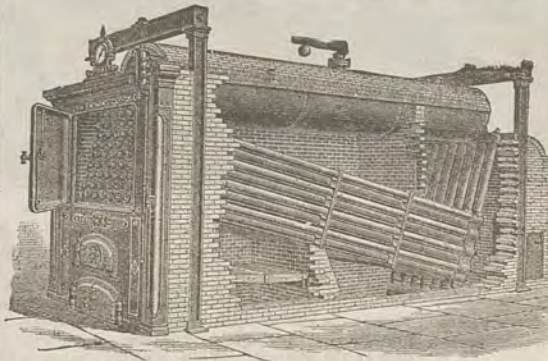
HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

**MARINE ENGINES AND BOILERS**—Propeller Engines, either High Pressure or Compound, Stern or Side-wheel Engines.

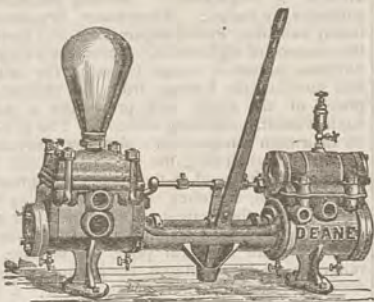
**MINING MACHINERY**—Hoisting Engines and Works, Cages, Ore Buckets, Ore Cars, Pumping Engines and Pumps, Water Buckets, Pump Columns, Air Compressors, Air Receivers, Air Pipes.

**MILL MACHINERY**—Batteries for Dry or Wet Crushing, Amalgamating Pans, Settlers, Furnaces, Retorts, Concentrators, Ore Feeders, Rock Breakers, Furnaces for Reducing Ores, Water Jackets, etc.

**BABCOCK AND WILCOX BOILERS.**

**ICE AND REFRIGERATING MACHINERY.**

**MISCELLANEOUS MACHINERY**—Flour Mill Machinery, Saw Mill Engines and Boilers, Dredging Machinery, Powder Mill Machinery, Water Wheels.



DEANE STEAM PUMP.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

**Water Pipe, Pump or Air Columns, Fish Tanks for Salmon Canneries**

OF EVERY DESCRIPTION.

Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers, Tustin Ore Pulverizers.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

**GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.**

— ALSO —

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

**LOCOMOTIVE AND MARINE FORGINGS.**

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. **STEEL RAILS** from 12 to 45 pounds per yard. ALSO, **Railroad and Merchant Iron**, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**

## FRASER & CHALMERS.

CHICAGO, ILL.

U. S. A.

General Office:  
 Fulton and Union Sts.  
 CHICAGO, ILL.

**PERFORATED METALS FOR**

**REVOLVING and SHAKING-SCREENS,**

**JIGS & STAMP BATTERIES.**

DENVER OFFICE:  
 No. 248  
 18th Street,  
 Denver,  
 Colo.

UTAH OFFICE—SALT LAKE CITY, UTAH.

## Iron and Machine Works.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

— BUILDER OF —

Steam Engines, Flour Mill,  
 Mining, Saw Mill and  
 Dredging Machines

Brodie Rock Crushers,  
 Steam Power, Hydraulic,  
 Side Walk and Hand-Power

ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. **ESTD ORDERS SOLICITED.**

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

**Mold-Board AMALGAMATORS,**

**Golden State Pressure Blowers.**

First St., between Howard & Folsom, Sta.

THOMAS THOMPSON

THORNTON THOMPSON

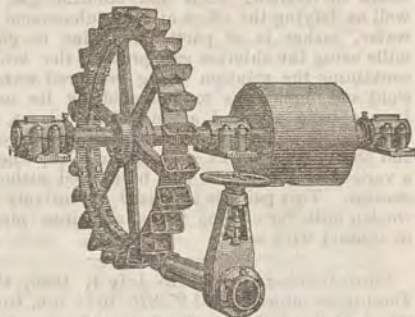
**THOMPSON BROTHERS,**

**EUREKA FOUNDRY,**

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

## PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90.2 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

**RICHARD C. REMMEY, Agent,**

**Philadelphia Chemical Stoneware Manufactory,**

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of

all kinds of

Chemical Stoneware

— FOR —

Manufacturing

Chemists.

Also Chemical Brick for Glover Tower.

**NATIONAL ASSURANCE CO.,**  
 OF IRELAND.

**ATLAS ASSURANCE COMP'Y,**  
 OF LONDON.

**BOYLSTON INSURANCE COMPANY,**  
 OF BOSTON, MASS.

**H. M. NEWHALL & CO.,**

GENERAL AGENTS,

309 & 311 Sansome St., San Francisco, Cal.

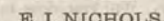
## QUARTZ BREAKERS!

— AND —

**Pulverizers Combined.**

To Run by Hand or Power.

Mining Machinery of Every Description; Drawings, Plans and Specifications.



E. I. NICHOLS, 316 Mission Street, S. F.

## THE RUSSELL PROCESS COMP'Y.

**C. A. STETEFELDT, President.**

NEW YORK OFFICE, 18 BROADWAY  
 Room 709.

**INVENTORS, TAKE NOTICE**

**L. PETERSON, MODEL MAKER,**

258 Market St., N. E. cor. Front (up stairs), San Francisco. Experimental machinery and all kinds of metal, tin, and Brasswork.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



Putnam Planer.

# PARKE & LACY.

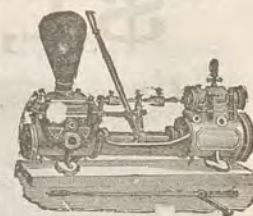
.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.

Knowles Steam Pump  
The Standard.GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.  
J. O'B. GUNN, Secretary.

### UNION IRON WORKS,

Office, Cor. Market &amp; Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT &amp; CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

### CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and

## HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street

San Francisco, Cal.

THE CONSUMERS' COMPANY.

### VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.

218 California Street, San Francisco, Cal.



### THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,  
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

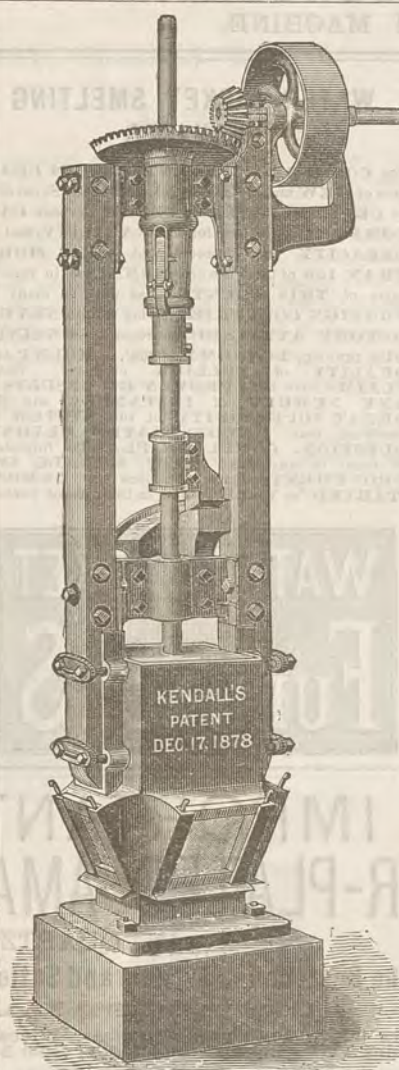
JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN &amp; CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

KENDALL'S  
PATENT  
DEC. 17, 1878

L. C. MARSHUTZ.

G. T. CANTRELL.

### NATIONAL IRON WORKS,

N. W. Cor. Main and Howard Sts.,  
San Francisco,

....MANUFACTURERS OF....

Stationary and Compound  
Engines,FLOUR, SUGAR, SAW and QUARTZ  
MILL MACHINERY.

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

....SOLE MANUFACTURERS OF....

KENDALL'S PATENT  
QUARTZ MILLS.

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past seven years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that is claimed for it and give entire satisfaction.

MARSHUTZ &amp; CANTRELL.

Send for Circulars and Price List.

### CINCINNATI CORRUGATING COMPANY.

JOHN F. HAZEN, Prest.

JAMES HICKS, Treas.

J. G. BATTELLE, Sec'y.

## Over 1500 Tons Iron in Stock!

FOUR WIDTHS OF CORRUGATIONS MADE!  
STANDING SEAM PLAIN ROOFING!  
All Paint Re-ground in Pure Linseed Oil!

Chicago Prices Beaten!

ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 &amp; 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens. Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (line).  
Orders Promptly Executed

### CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

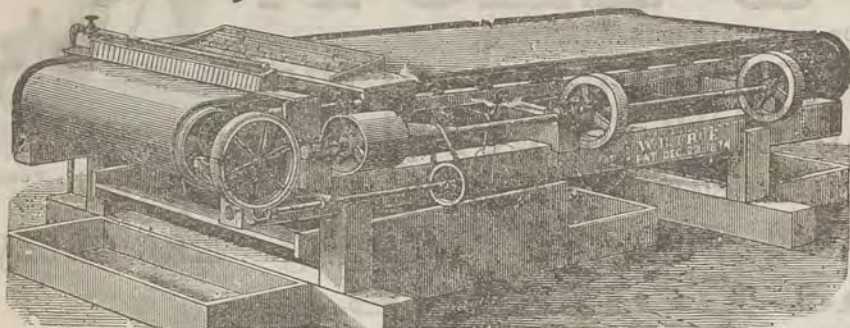
STEIGER &amp; KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS  
(\$575.00) F. O. B.**

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

Protected by patents May 4, 1889; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

**ADAMS & CARTER, Agents Frue Vanning Machine Co.,**

Room 7, No. 109 California Street,

**SAN FRANCISCO, CAL.**



1850. 1885.  
**RANKIN, BRAYTON & CO.,**  
BUILDERS OF  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

## WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



## BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700 pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE of CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed. BEST SOFT LAKE SUPERIOR COPPER USED.

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.**  
**E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

## F. A. HUNTINGTON,

MANUFACTURER OF

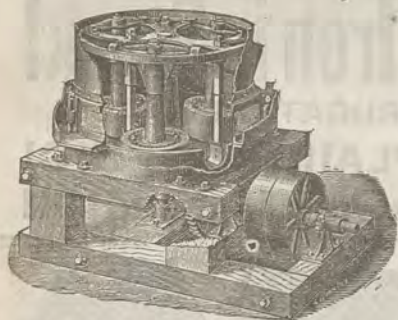
**Centrifugal Roller Quartz Mills,  
CONCENTRATORS AND ORE CRUSHERS,**

Mining Machinery of Every Description,

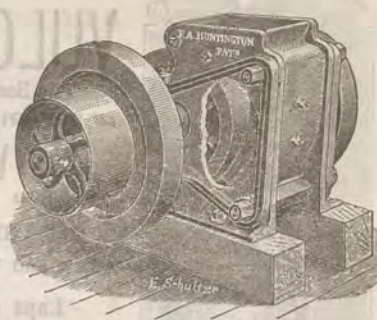
**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



Centrifugal Roller Quartz Mill.



ORE CRUSHER.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent

L. R. MEAD, Secretary.

## THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
AIR COMPRESSORS—Rope Power Transmission.  
HYDRAULIC PUMPING and Hoisting Machinery.  
WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch pipe of 1-inch iron for Spring Valley Water Works Company, San Francisco.  
SAW-MILL MACHINERY of all kinds.  
STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.  
MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company

Send for Circular and Price Lists.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, OCTOBER 9, 1886.

VOLUME LIII.  
Number 15.

## The Copper-Lined Furnace.

The first thing to displace the old adobe furnace for copper ores in the Clifton district, Ar., was the copper-lined furnace introduced in 1871. As might have been expected, the intense heat generated by the burning of coke in the copper-plate furnace proved too great for the copper plates, which were rapidly burned out, and this eventually led to the abandonment of the furnace and the substitution of the well-known type of copper water-jacket furnace now so extensively used. As a matter of interest, however, to copper smelters, we reproduce engravings of this copper-lined furnace, with a description which was read before the American Institute of Mining Engineers by A. F. Wendt.

In stopping up the holes burned by the corroding slag in the adobe lining of the small Mexican furnaces, a piece of copper was once accidentally used. It was noticed that instead of this copper melting, as was expected, it remained intact, the cooling action of the air being such that, notwithstanding the smelting going on at the face of the bar of copper, the bar itself did not melt. This led to the building of one of these small furnaces with copper-plate sides or walls, with the striking result that these plates, although reaching a red heat, failed to melt, and answered every purpose of a refractory furnace lining. Long campaigns could thereafter be made without trouble. If a plate of copper did melt out, it was simply charged into the furnace and run out as copper bullion, and the plates themselves were cast on the spot. Gradually the size of these copper-lined furnaces was increased, and a further improvement was made by building the bottom of crushed quartz, until the invention resulted in a furnace having a smelting capacity of 30 tons of ore per day.

This is shown in Figs. 1, 2 and 3, in which A is the body of the furnace, built of common red brick, and resting on two brick pillars at the rear, and two pillars, D, made of three short columns of cast copper, in front. The crucible of the furnace is built of an outer and an inner wall, B, of brick, between which clay is stamped. The bottom of the crucible is of crushed quartz stamped in place. On the inner brick wall rest the copper plates, C, which, as shown in the drawing, are made in sections and flanges, resting one upon the other. There are four tuyeres at the back of the furnace, supplied by blast from the blast-pipe, G. Canvas boots, E, connect the tuyeres with the nozzles of the blast-pipe. The front of the crucible is closed by an iron or copper plate, F, with a slag-lip and tapping-hole cut in it. The copper plates, C, if found to sag from the melting away of the lowest plate, were supported from the outside by bars of iron; and the bottom-plate, covering the front of the furnace directly over the cinder-notch, was cast in the shape of a box as shown in Fig. 3, and kept full of water. If there was a tendency of one side of the furnace to run too hot, a spray of water was thrown against that side, and it was rapidly cooled and brought to a normal condition. In running the furnace, the fuel was charged against the back wall and the ore to the front, and smelting was carried on with "noses." Charcoal was used for fuel, before the introduction of coke, and when coke was used the furnace burned out too quickly.

In Humboldt district, Arizona, chlorides are taking out a great deal of rich silver ore,

## Arizona Mines.

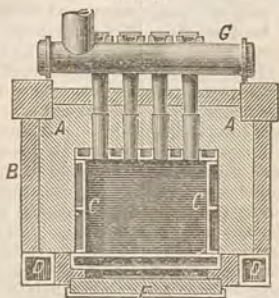
The first result, from a mining point of view, of the capture of the Apaches in Arizona is the preparation of plans for a new 160-stamp mill in this city for shipment to Arizona. For many years the advance of this Territory has been retarded by the Indian troubles, and for the past few years particularly the miners there have had hard times. Men with good "prospects" or good mines have been unable to work or sell them. Capitalists would not venture to put their money into mining schemes in a region where there was more or less danger to life and property. While the Indian difficulties by no

## Manganese.

Although several deposits of manganese ore are known on this coast, and a few have been worked in a desultory sort of manner, there is very little encouragement in this class of mining. A gentleman of this city, owning a deposit near the railroad line, recently went to work and got out 75 tons or more of this material, but when he had marketed it he found there was no profit to be made out of manganese ventures. And this is the experience of others also in this line.

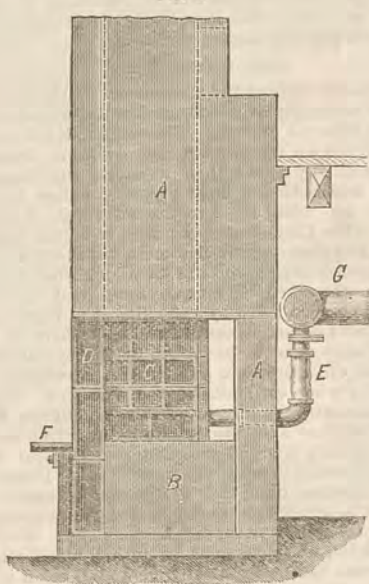
It may be of interest to our readers to know that from an official report, lately issued, it ap-

FIG. 3.



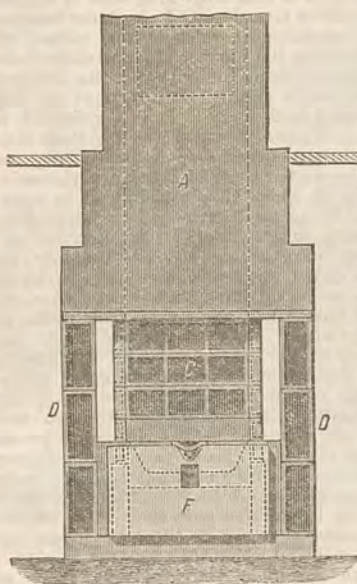
Plan.

FIG. 1.



Side-view.

FIG. 2.



Front-view.

COPPER-LINED FURNACE.

means prevailed all over Arizona, outside people believed that they did, so the result was the same. The different camps have all felt the influence of this matter. The mining regions of Arizona are very extensive and rich, and in the future will attract much more attention than formerly. There is no reason, the Indian question being settled, why rapid development should not go on in all directions. There are plenty of opportunities to get good mines there. The miners themselves can now go to work with some sort of surety of making money.

Work has been discontinued in the Marysville Tunnel and Quartz Mining Company's mine at Timbuctoo, and will not be resumed until the arrival of machinery for crushing.

The Chicago M. & R. Co., at Ophir, are putting up a concentrator. This will enable them to work all of their low-grade ore, of which they have an almost inexhaustible supply.

pears that the production of manganese in Russia is steadily increasing. The exports for the first four months of this year amounted to 9000 tons, as against 4500 tons for the corresponding period of 1885. This is shipped principally from Poti, where it is conveyed by the Transcaucasian railway from the mines, in order not to interfere with the petroleum trade of the neighboring port of Batoum. Owing to the bad condition of the conveyance used in transporting it from the mines at Tchiatour to the Transcaucasian railway, large lumps of ore only can be carried, the result being that the smaller pieces, which are equal to two-thirds of the total quantity extracted, are wasted, although equal in quality to that exported.

Gold nuggets, varying from \$1 to \$10 in value, are alleged to have been recently panned out by a prospector from gravel obtained near the summit of "Old Baldy," a mountain peak near Pasadena, Los Angeles Co., Cal.

## The Mud and the Straw.

We have on our list of exchanges a great many newspapers, the most of them published in the mining regions of this coast, principally in California. In a majority of cases these papers are large, handsome sheets, neatly printed and ably edited, being filled with carefully written leaders, spicy news items and such other original matter as ought to find place in an enterprising and well-conducted journal.

But with all their excellences, many of these papers, we are constrained to say, are at times sadly deficient in mining news. Though published in the mineral regions, where their conductors have the best of opportunities for collecting full and reliable information in regard to the condition of the mines and for noting what is going on there, these papers come to us often with hardly an item pertaining to matters of this kind; not a word is said on the subject, or it is dismissed with a few brief paragraphs, as if it were of no importance to any class of their readers. Such is the dearth of mining intelligence in these, our exchanges, that in making up our weekly summary we have to glean over several hundred papers or more to fill the two pages of which this department consists.

We have before alluded to this subject in the columns of the Press, and now recur to it in the hope that our brethren in the mining districts, giving more heed to this our plaint, will see that there be less cause for it hereafter. That they should decline to write up worthless mines, or unduly magnify discoveries reported in their neighborhood, is much to be commended, and we hope to see no departure from this policy in the future. But, avoiding these mistakes, there is always enough of general concernment to be said about the mines and the various operations in every district, and which, appearing in the columns of the local paper, would interest readers both at home and abroad. Everybody likes information of this kind, it being highly acceptable to journals like the Press, that make mining a specialty.

Then the local editor should consider the benefits that may be expected to accrue to his constituency by having their mining properties noticed in a paper having such a wide distribution as ours. We issue a large edition of the Press, which circulates over a wide extent of territory, reaching capitalists and business men of all classes, not only in this, but to some extent also in foreign countries. But to obtain such notice we must ourselves be advised of the existence of such property through some trustworthy channel.

In writing on this subject on a former occasion, we likened our condition to that of the Hebrews in Egypt, who, when reminded that there was need for more building material, replied: "How shall we make bricks without straw?" We are in much the same fix as regards a constant want of matter for making up current mining news. If our mountain contemporaries will supply us with the needed information, we will undertake to produce, if not a first-class brick, at least a fair article of adobe. We will furnish the mud if they will furnish the straw.

DURING the month of September the Cortez mine shipped through Wells, Fargo & Co.'s office at Beowawe to San Francisco 25 bars of bullion, weighing 2631 pounds, valued at \$24,000.



### The Miners and Trees.

The San Francisco *Chronicle* advocates the renewal of the cultivation of forest trees, and favors an arbor day. It goes without saying, says the *Foothill Tidings*, that the *Chronicle* is able and practical generally in whatever it favors. But in one aspect of this tree business it has somehow become entirely wrong; and in this: the *Chronicle* wants a law passed to prevent the miners, among others named, from destroying timber, as if the miners wantonly caused or made that destruction. Our distinguished cotemporary ought to know that miners are tree planters and are very jealous of tree destruction. Grass Valley, for instance, is the largest gold-mining town in California, and perhaps in all the world. This town is filled with trees and all around in the vicinity are trees. The most of these are fruit trees, but there are a vast amount of timber and shade trees that are growing and that were planted and cultivated by men more or less interested in mining. Every miner here has his trees. In the matter of the young pines that grow up, the miner tries to guard them from destruction by fires. It is true that the miners use timbers to prop up the rocks so as to prevent caves that would kill men who are working underground, and who are taking out wealth for the world; but there is nothing wanton or wasteful in that use. The miners do not crowd wood into the mines merely for the sake of getting the trees off of the surface. On the contrary, the interest of the miners is to have trees grow. And in the mining belt of the Sierra Nevada the destruction of forests is not going on. It is above that belt where the sawmills are eating up the trees. This is done to get lumber for fencing the fields of the treeless wheat-growing plains and to supply boards for the making of packing boxes for fruits and other merchandise. The box-manufacturing mills at Truckee use more lumber in a month than do the mines of Grass Valley in a year. And the cities get some of the lumber of the Sierra Nevada. We do not doubt but that Mr. De Young's beautiful theater, the Alcazar, and his residence, both in San Francisco, have in them lumber made from the sugar pines of these mountains.

The miner has to have lumber for his house and wood for his warming fuel and to cook with, and he has to have timber to prevent his mine from collapsing; but all these wants need for their supply not a tithe of the lumber used by the farmers.

But it is a habit of late years for the San Francisco press to lay all disasters and wrongs on the miners. Probably the idea is, that the valley farmers are placated by blaming miners. That is quite a mistake. Neither farmers of the valleys nor business men of the cities want to see the great industry of mining stopped.

### Prospecting in Death Valley.

David L. Handley, for years a Nevada prospector, and one of the discoverers of some of the richest of the mines of the famous Comstock in that State, has arrived in Los Angeles from an extended prospecting trip to Death valley and the Panamint country.

Requested by a Los Angeles *Express* reporter to recite some of the results and incidents of his trip, Handley commenced by stating that during his journey in search of gold he had traversed the country east by north from Mojave to the borders of Panamint desert, which he crossed nearly two months ago. He prospected the desert from the northern to the southern border, and, as far as he could ascertain, half-way across. Unsuccessful on this search, he next sought Death valley, and after enduring untold hardships and privations he reached the valley on the first of August. The scene before the prospector as he reached the edge of the mesa overlooking the terrible valley, he says, is something beyond the power of man to describe. Destitution of even the scrub foliage of the desert, its sandy wastes stretching miles beyond to the mountains, the first sight of Death valley, Handley said, made an impression upon him that time can never efface.

Pushing boldly on, however, he had soon put four or five miles between him and the mesa, and camped for the night. Prospecting was in order next morning, and all day the search for "croppings" was continued, but without success. Handley states that he spent three weeks in the valley, penetrated it at least 60 miles, and traversed it from north to south from its borders to the hills. He regards the published recitals of the trio of prospectors, who claim to have unearthed vast mineral wealth in the valley, the purest of pure bosh, and states that, outside of some wealthy "pocket" placers, he saw during his stay in the valley not a single sign of quartz croppings or other indication of hidden riches. Handley, while disappointed in his mission, expresses himself as satisfied with his trip, and that an old-time belief in the mineral wealth of that desert country has been, with him at least, exploded.

CARSON MINT AS AN ASSAY OFFICE.—Acting Secretary Fairchild has authorized the reopening of the Mint at Carson, Nevada, as an assay office and for the receipt of deposits of bullion. This action was taken on the recommendation of the director of the Mint, and with the full

approval of the President. It is intended as an experiment, as it is said at the department that it is doubtful whether the deposits at the Mint will warrant even its being conducted as an assay office. Its future operations as a coinage mint will depend altogether upon the extent of its deposits.

### "Are We Dependent on Foreign Skilled Mechanics?"

The *Mechanical Engineer*, under the above head, after quoting from several of our leading technical journals extracts wherein those journals assert that we are keeping our own young men and would-be mechanics in the back-ground and importing skilled mechanics by thousands from Europe, thus placing ourselves in a position of dependence upon foreigners for skilled mechanics, denies the asserted fact as "stuff" and "nonsense" "scribbled in back rooms."

So far as our native mechanics are charged with lack of skill in designing machinery, etc., and their power to "create and construct" is called in question, the *Engineer* may be correct; but we do hold it as a fact that by the stringent rules of labor unions in regard to taking apprentices we are gradually depleting our shops of native skilled labor, thereby forcing our boys into idleness or into the overcrowded classes of employments where the unions do not interfere with the wishes of employers. This disposition on the part of our mechanics is already working great harm and is much to be deplored. But, as a general thing, American boys, when they do get into a shop, especially the better educated and better disposed portion of them, take readily to the work, make rapid progress, and are the ones who soon come to the front as "designers" and "creators." So long as even a very few of our native boys, brought up and educated here, whether of native or foreign-born parentage, are allowed to enter our machine shops and manufactories, we can depend upon a good supply of native mechanics to fill all the places where superior intelligence and skill are required, and we need have no fear that we shall ever become "dependent on foreign skilled mechanics."

The trouble chiefly complained of is that too large a portion of the ordinary positions in the shops are being filled by newcomers from abroad—not that the positions where special skill and genius are required are thus monopolized. Our cotemporary correctly says, and gives himself away in so saying, that our "machine shops are besieged with young men by the hundreds who want to learn the trade, but cannot get in because there are so many ahead of them. Ask any leading machine firm in the country if they have not a long list of applicants to learn the trade, and the reply will be as we have stated."

Why is it that these long lists of applicants have to be turned away? Is it not because of the overstringent rules of the unions, which keep down the number of apprentices below a reasonable figure, in order that the newcomers, with trades already learned, may be accommodated with work? Is it a reflection upon the good sense of our people that there is not a wider door opened for our own young men—our boys—to enter and obtain for themselves a trade by which they may be able to secure a good living for themselves, and support for a possible future family? The assertion of our cotemporary of the *Engineer* that our young men choose clerkships and other light work because they "think that honest labor, which soils their hands and makes their backs ache, disgraceful," and "that they ought to be poorly paid or not paid at all," is a libel upon the great numbers of boys in every manufacturing city in the Union, who make earnest application for opportunities to learn trades, and are refused "because there are so many ahead of them." Employers would gladly open their doors wider and admit a greater number of apprentices, if they could do so without coming in collision with their adult employees, who assume to say to their employers whom they may and whom they may not employ.

The *Scientific American* very truly says: "We are accustomed to believe that demand and supply regulate themselves, but in this very problem of the future of our boys we are brought face to face with a curious incongruity. We see on the one hand the overcrowded professions, and hosts of clerks who are ready to apply for any vacant position, however low the salary, while on the other hand we see a market for labor which is so far from being glutted that its supplies must be brought from foreign countries."

Every person of ordinary observation knows that the above remark is true to the letter, and yet our cotemporary refers to it in the following unjust and flippant manner: "Now what is the object of writing such stuff as this? \* \* \* If these writers were machinists or engineers out of a job, and would take a trip through the country trying to obtain one, at prices proportionate to their ability, they would learn some facts about the labor market that they will never get by reading exchanges and scribbling nonsense in back rooms." The question of employment for our young men and boys is of too serious a nature to be treated in such a trifling way, and it is truly "not the least of the counts against the unions that they stand resolutely in the way of young Americans, who wish to acquire knowledge of any craft."

### Local Cable Railroad Notes.

Work on the new cable railroad on Ninth street, from Market to Brannan, is being rapidly pushed forward, and it is expected that it will be in running order by the 15th. With the exception of about 200 feet between Mission and Howard streets, and one street-crossing, the roadbed is all completed, and the turntable and gearing for taking up the slack cable is in position on Brannan street. The whole work is being done in the most thorough and substantial manner. The cable tunnel is formed of concrete. The grips and rails are of steel manufactured in this city at the Pacific Rolling Mills. The latter weigh 40 pounds to the yard, and are of a peculiar pattern. They rest on yokes made of flat iron placed three feet apart, and instead of being spiked down as other rails, are held in place by malleable-iron clamps attached to the yokes, which are clinched firmly over the flange of the rail. The roadway the whole length between the tracks is paved with basalt blocks, the interstices between the blocks being filled in with cement. The residents of the lower part of the Mission, the Potrero and adjoining district, are eagerly looking forward to the completion of the road, which will give them the rapid means of entering the city of which they have so long stood in need.

#### Market-street Engine-house.

The offices and engine-house of the Market Street Railroad Company, situate at the junction of Valencia and Market, are at present undergoing an extensive system of improvements. The buildings of the corporation have been up to the present entirely composed of wood, and it is now intended to replace these structures by a more permanent and imposing edifice of brick. The construction at present in course of erection will consist of a solid red-brick building, with a frontage of 50 feet on Market street, and a depth running back at right angles to Mission street. The grounds to be covered by the new buildings are at present occupied by wooden sheds, where the steam and cable dummies used on the lines are located. The different workshops incidental to the establishment are here. The company's purpose in erecting the substantial buildings now in course of construction is not only stability and elegance of design but also security from fire. The frontage is to consist of an ornamental brick facade 50 feet in breadth, with a depth of 177 feet. The space in rear will be occupied by an engine-shed, two tightening-sheds, cable-rope manufacturing sheds, boiler-rooms and other necessary buildings. From foundation to roof the new edifice is to be fire-proof. The Market Street Cable Company have obtained a franchise to extend their line by Market-street cut to Seventeenth street. This enterprise will not, it is believed, be undertaken before the beginning of the new year. When the construction of the line will have been completed, steam dummies will be entirely dispensed with.

#### Clay-street Road.

The directors of the Clay-street Hill Railroad have seemingly at last aroused from their slumbers, says the *Bulletin*. The contemplated road down and up Washington and Jackson streets has probably caused them to realize the threatened destruction of their property unless they keep up with the progressive spirit of the age. The Clay-street road once took the lead in enterprises of cable character, but it lost since the post of honor, and has for a long while been far in the rear. The management will doubtless do a good thing by extending the road-bed to First avenue, as now intended. There is a good settlement to be tapped by the operation, which will more than likely increase somewhat rapidly when car facilities are available. But the company can do yet greater benefit to its stockholders and the public by carrying the line easterly from its present terminal point at Kearny away down to the water-front. It must be done some time, and the present occasion is about as acceptable as any, while the expense will probably be never lighter than now. While in the improvement and extension mood, the directors had better make a neat and clean job of it and put the line in such shape that it will both begin and end somewhere, so to speak.

#### The Powell-street Railroad.

From the apparent apathy of the owners of this important cross-town railroad, many people are beginning to believe that its existence will be on paper only, like other similar undertakings that might be named. It should be remembered, however, that most of the few stockholders are business men of repute, who cannot afford to have their good name tarnished by any kind of trickery, especially when public interests are so directly concerned. We know that considerable difficulty has been experienced in securing a site for engine purposes, and have never lost confidence in the ultimate carrying out of the project, as originally designed. The obstacle noted was overcome last week by the purchase of the vacant 50-vara lot on the north-west corner of Washington and Mason, and plans for carhouse and other necessary devices are being arranged. It is fair to assume that the construction of the road will be pushed with energy and capital, as both are well represented in the management of the concern.

It is stated that in Butte, Montana Territory, a new railroad company has been formed with sufficient capital to build lines to all the principal mining camps.

### "Snow-shoe Thompson."

In the *Overland Monthly* for October is an excellent sketch by Dan De Quille of that well-known California character, "Snow-shoe Thompson." From this we take the following paragraphs:

The most remarkable and most fearless of all our Pacific Coast mountaineers was John A. Thompson, popularly known as "Snow-shoe Thompson." For over 20 years he braved the winter storms, as both by day and by night he traversed the high Sierra. His name was the synonym of endurance and daring everywhere in the mountains, where he was well known and famous in all the camps and settlements. He was seldom seen in the valleys or any of the large towns, except Sacramento, as he only went when business called him. Notwithstanding that he seldom left his mountain home, there are but few persons of middle age on this side of the continent who have not heard of "Snow-shoe Thompson," or who have not in times past read an occasional paragraph in regard to some one of his many wonderful exploits. Before the completion of the Central Pacific Railroad, when he was regularly crossing the Sierra Nevada during the winter months, with the mails strapped upon his back, more was heard of him, through the newspapers and otherwise, than during the last few years of his life; yet every winter up to the last he lived, he was constantly performing feats that excited the wonder and admiration even of his neighbors and friends, though for years they had been familiar with his powers of endurance and his undaunted courage.

John A. Thompson, the man to whom the people of the Pacific Coast gave the name of "Snow-shoe Thompson," was born at Upper Tins, Prestjeld, Norway, April 30, 1827, and died at his ranch in Diamond valley, at the head of Carson valley, 30 miles south of Carson City, Nevada, May 15, 1876, after an illness of but a few days.

Mr. Thompson was a man of splendid physique, standing six feet in his stockings, and weighing 180 pounds.

Mr. Thompson came from Illinois to California in 1851, settling at Placerville, then known as Hangtown, afterward going to Putah Creek on a ranch. Early in the winter of 1856, while still at work on his Putah Creek ranch, Mr. Thompson read in the papers of the trouble experienced in getting the mails across the snowy summit of the Sierra Nevada mountains. At the time he was engaged in cutting wood on his ranch. What he heard and read of the difficulties encountered in the mountains, on account of the great depth of the snow, set him to thinking. When he was a boy, in Norway, snow-shoes were objects as familiar to him as ordinary shoes are to the children of other lands. He determined to make a pair of snow-shoes out of the oak timber he was engaged in splitting. Although he was but ten years of age at the time he left his native land, his recollections of the shoes he had seen there were in the main correct. Nevertheless, the shoes he then made were such as would, at the present day, be considered much too heavy and somewhat clumsy. They were ten feet in length, were four inches in width behind the part on which the feet rest, and in front were four inches and a quarter wide.

Having completed his snow-shoes to the best of his knowledge, Thompson at once set out for Placerville in order to make experiments with them. Placerville was not only his old mining camp, but was also the principal mountain town on the "Old Emigrant Road"—the road over which the mails were then carried. Being made out of green oak, Thompson's first shoes were very heavy. When he reached Placerville he put them upon a pair of scales and found that they weighed 25 pounds. They were ponderous affairs, but their owner was a man of giant strength, and he was too eager to be up and doing to lose time in making another pair out of lighter wood.

Stealing away to retired places near the town, Thompson spent several days in practicing on his snow-shoes. His whole soul was in the business, and he soon became so expert that he did not fear letting himself be seen in public on his snow-shoes. He was so much at home on them that he felt he should do no discredit to his native land.

When he made his first public appearance, he was already able to perform such feats as astonished all who beheld them. His were the first Norwegian snow-shoes ever seen in California.

Snow-shoe Thompson did not ride astride his guide-pole, nor trail it by his side in the snow, as is the practice of other snow-shoers, when descending a steep mountain, but held it horizontally before him after the manner of a tight-rope dancer. Having satisfied himself in regard to what he could do on his snow-shoes, he resolved to take the trail across the mountains, making his first trip in January, 1856. He went from Placerville to Carson Valley, some 90 miles. With the mail-bags strapped to his back, he glided over the fields of snow that were in some places from 30 to 50 feet in depth. Having successfully made the trip to Carson Valley and back to Placerville, Snow-shoe Thompson became a necessity and was soon a fixed necessity in the mountains. Through him was kept up the only land communication that there was in winter between the Atlantic States and California. But he never failed, no matter how wild the storms.

The loads that Snow-shoe Thompson carried



strapped upon his back would have broken down an ordinary man, though wearing common shoes and traveling on solid ground. The weight of the bags he carried was ordinarily from 60 to 80 pounds; but one winter, when he carried the mails for Chorpenning, his load often weighed over 100 pounds.

While traveling in the mountains, Snow-shoe Thompson never carried blankets, nor did he even wear an overcoat. The weight and bulk of such articles would have encumbered and discommoded him. Exercise kept him warm while traveling, and when encamped he always built a fire. He carried as little as possible besides the bags containing the mail. During the first year or two after he went into the business, he carried a revolver. Finding, however, that he had no use for such a weapon, and it being of the first importance to travel as light as possible, he presently concluded to leave his pistol at home.

All that he carried in the way of provisions was a small quantity of jerked beef, or dried sausage, and a few crackers or biscuits. He never carried provisions that required to be cooked. The food that he took into the mount-

nice in this respect as to carry with them dope for different hours of the day, using one quality in the morning, when the snow is frozen, and others later on, as the snow becomes soft. As Thompson used no dope, soft snow stuck to and so clogged his shoes that it was sometimes impossible for him to travel over it. Thus it frequently happened that he was obliged to halt for several hours during the day and resume his journey at night when a crust was frozen on the snow.

Snow-shoe's night camps—whenever the night was such as prevented him from pursuing his journey, or when it was necessary for him to obtain sleep—were generally made wherever he happened to be at the moment. He did not push forward to reach particular points, as springs or brooks. He was always able to substitute snow for water, without feeling any bad effect. He always tried, however, to find the stump of a dead pine at which to make his camp. After setting fire to the dry stump, he collected a quantity of fir or spruce boughs, with which he constructed a sort of rude couch or platform on the snow. Stretched upon his bed of boughs, with his feet to his fire,

winters, he never, in all that time, encountered a grizzly bear, nor even saw a bear of any kind. Hundreds of times, however, he saw their tracks in the snow, and also in the mud about springs and brooks.

If not the swiftest, it was universally conceded that, even up to the time of his death, Thompson was the most expert snow-shoe runner in the Sierra Nevada mountains. At Silver Mountain, Alpine county, California, in 1870, when he was 43 years of age, he ran a distance of 1600 feet in 21 seconds. There were many snow-shoers at that place, but in daring Thompson surpassed them all. Near the town was a big mountain, where the people of the place were wont to assemble on bright days in winter, to the number of two or three hundred. The ordinary snow-shoers would go part way up the mountain to where there was a bench, and then glide down a beaten path. This was too tame for Thompson. He would make a circuit of over a mile, and come out on the top of the mountain. When he appeared on the peak he would give one of his wild High-Sierra whoops, poise his balance-pole, and dart down the face of the mountain at light-

line will never be seen again. The times and conditions are passed and gone that called for men possessing the special qualifications that made him famous.

In connection with this biography of Snow-shoe Thompson, it may interest the readers of the Press to see a sketch of some snow-shoe racing in the Sierras. The engraving was made some years since from drawings made at a race in Plumas county. This winter sport is a favorite one in some of the mountain towns of California.

**SPEED OF MINING CAGES.**—In the course of a discussion this morning between miners, on the speed with which a miners' cage can be hoisted and lowered in a shaft, one of them said that the fastest time ever made in lowering was in the Union shaft. A cage with men was dropped from the surface to the 2900 level in one minute and 12 seconds. This was at the speed of a little more than 40 feet in a second, and slightly less than 30 miles an hour. On another occasion, when a shaft was flooded through the breaking of a pump, 63 tanks of water were



SNOWSHOE RACING IN THE SIERRA NEVADA MOUNTAINS, CALIFORNIA.

ains was all of a kind that could be eaten as he ran. For drink he caught up a handful of snow, or lay down for a moment and quaffed the water of some brook or spring. He never took with him brandy, whisky, or liquor of any kind. He was a man that seldom tasted liquor.

Snow-shoe never stopped for storms. He always set out on the day appointed, without regard to the weather, and he traveled by night as well as in the daytime. He pursued no regular path—in a trackless waste of snow there was no path to follow—but kept to a general route or course. By day he was guided by the trees and rocks, and by night looked to the stars, as does a mariner to his compass. With the places of many stars he was as familiar as ever was Hansteen, the great astronomer of the land of his birth.

At the time Thompson began snow-shoeing in the Sierras nothing was known of the mysteries of "dope," a preparation of pitch, tallow and other ingredients, which, being applied to the bottom of the shoes, enables the wearer to lightly glide over snow softened by the rays of the sun. Dope appears to have been a California discovery. It is made of different qualities and different degrees of hardness and softness. Each California snow-shoe runner has his "dope secret," or his "pet" dope, and some are so

and his head resting upon one of Uncle Sam's mail-bags, he slept as soundly as if occupying the best bed ever made; though, perhaps, beneath his couch there was a depth of from 10 to 30 feet of snow.

When unable to find a dry stump, he looked for a dead pine tree. He always selected a tree that had to it a decided lean. If he could avoid it he never made his camp beside a tree that was perfectly straight. For this there was a good reason. It very often happened that the tree set on fire in the evening was burned through and fell to the ground before morning. With a leaning tree he knew the safe side on which to make his bed.

At times, when traveling at night, Thompson was overtaken by blizzards, when the air would be so filled with snow, and the darkness so great, that he could not see to proceed. On such occasions he would get on top of some big rock, which the winds kept clear of snow, and there dance until daylight appeared; the lateness of the hour and the blinding storm preventing his making one of his usual camps. A certain notch or pass in the mountains was much "addicted" to blizzards, and at that point was a big, flat rock on which Thompson danced many a midnight jig.

Although Snow-shoe Thompson traveled through the wilds of Sierra for more than 20

ning speed, leaping all the terraces from top to bottom, and gliding far out on the level before halting.

Snow-shoe Thompson seldom performed any feat for the mere name and fame of doing a difficult and daring thing; yet W. P. Merrill, postmaster at Woodford, Alpine county, writes me as follows, in speaking of some of Thompson's achievements: "He at one time went back of Genoa, on a mountain, on his snow-shoes, and made a jump of 180 feet without a break." This seems almost incredible, but Mr. Merrill is a reliable man, and for many years Thompson was his near neighbor, and a regular customer at his store. Thompson doubtless made this fearful leap at a place where he would land in a great drift of soft snow. I spoke of this feat to Mr. C. P. Gregory, formerly Thompson's neighbor in the mountains, but at present a resident of Virginia City, Nevada, and he answered that although he had never heard of that particular leap, he did not doubt what Mr. Merrill said. "I know," said Mr. Gregory, "that at Silver Mountain he often made clear jumps of 50 and 60 feet."

John A. Thompson was the father of all the race of snow-shoers in the Sierra Nevada mountains; and in those mountains he was the pioneer of the pack train, stage coach and locomotive. On the Pacific Coast his equal in his peculiar

raised to the surface from the 1300 level in the space of one hour. During this time it was necessary for the cable in ascending and descending to travel 2600 feet in less than one minute, making a total of nearly 32 miles traveled in the hour.—*Virginia Chronicle*.

**AN IMPORTANT CASE.**—The case of the Chicago Mining Company vs. John Oliver, to quiet title to land on Gold Flat near Nevada City, which is being tried before the Superior Court, involves some important questions. In 1870 the Central Pacific Railroad Company got a patent to the land under an act of Congress passed in 1862. In 1879 a quartz location, including a surface area of 1500 by 600 feet, was made within its boundaries, and in 1884 a United States quartz patent was issued to the Chicago Company. It is the first time a case of this kind has come up in Nevada county, and perhaps this is the first one involving all the same points that has been tried in the State. Judge Sawyer has decided in the Circuit Court that a railroad patent is good against mineral claimants, but the Chicago Company claim there are other decisions to the contrary.

**A GOOD FLUX** for soldering iron, brass, etc., is made by dissolving chloride of zinc in alcohol.





A. T. DEWEY. W. B. EWER.  
DEWEY & CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER, SENIOR EDITOR.

#### Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrearages must be paid for at the rate of \$3.50 per annum.

#### Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.  
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

#### SAN FRANCISCO:

Saturday Morning, Oct. 9, 1886.

#### TABLE OF CONTENTS.

**EDITORIALS.**—The Copper-Lined Furnace; Arizona Mines; Manganese; The Mud and the Straw, 229. Passing Events; Coming into Line; Coal at San Francisco; Foundry Notes; Drawing Lead from Smelting Furnaces; Academy of Sciences; A Roasting Furnace for Shasta County, 232. Verbal Leases of Mines; Shaw's Concentrator and Amalgamator; Quartz but Not Gravel, 233.

**ILLUSTRATIONS.**—Copper-Lined Furnace, 229. Snow-Shoe Racing in the Sierra Nevada Mountains, California, 231. Shaw's Disk Concentrator and Amalgamator, 233.

**MECHANICAL PROGRESS.**—Mechanical Wreathes; Rivet Holes in Boiler Plate; On Casting Steel; A New Process of Welding Steel; Cracking of Cylinders in Large Engines; Strength of Cast Iron; Smoke-burning not Economical; Skill with the Hammer; A New Telegraph Wire, 234.

**SCIENTIFIC PROGRESS.**—A New Attachment; Volapuk; Soil, Crops and Moisture; Electricity Under Air Pressure; The Late Eclipse of the Sun; Scientific Exploration; When Trees Work and Sleep; Practical Use of Metallic Hydrogen; Spanish Geography; A New Form of Tin; A Curious Flower; Magnetism and Heat; The Recent Earthquake at Charleston; Pear Phosphates; A Remarkable Explosion, 234.

**USEFUL INFORMATION.**—French Masonry; Use of Molasses for Making Briquettes of Coal and Ore; Grinding vs. Filing Saws; An Electric Sward; Facts Concerning Timber; Removing Oil, Etc., by Infusorial Earth; A Pointer for Molders, 235.

**GOOD HEALTH.**—Color-charged Waters; Dogs are Subject to "Running Fits"; Medicinal Qualities of Vegetables; Cholera-Infantum; Lead Poisoning from Eating an Apple; Cleansing Ladies' Hair; Smoking and Drinking; Grief Anticipates Age; Nutmegs Poisonous, 235.

**MISCELLANEOUS.**—The Miners and Trees; Prospecting in Death Valley; "Are we Dependent on Foreign Skilled Mechanics?" Local Cable Railroad Notes; "Snow-shoe Thompson," 230. Notices of Recent Patents, 235.

**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 236-37. **MINING STOCK MARKET.**—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 240.

#### Business Announcements.

Delinquent Notice—Truckee Ice Company.  
Metal Spinner—August Lutz.  
Ore Feeders—Joshua Hendy Machine Works.

See Advertising Columns

#### Passing Events.

The gradual advance in the price of silver, after long-continued depression, is very gratifying to the silver miners on this coast. Many mines were on the point of closing down when the advance commenced. Now we hear of renewed efforts on all sides.

The statement that a new 160-stamp mill would shortly be built in this city for Arizona has interested many, as it shows that people were only waiting for a settlement of the Indian difficulties to put capital into Arizona enterprises.

Activity in California quartz mines continues, and shows an increase also. Good gold properties are in demand.

Reports have come to hand of rich diggings of gold in the Stickeen mines, British Columbia. These reports have been so often received, however, and then been contradicted, that little faith is placed in them this time.

THE San Diego Union says that R. W. Waterman has purchased the Stonewall mine, near Julian, San Diego county, for \$150,000. This mine lay idle and practically abandoned for several years until a short time since, but has been paying well of late.

#### Coming into Line.

California has aptly been termed a land of excesses and deficiencies—of contrasts and extremes. These peculiarities are inherent to her natural conditions. They are impressed upon her topography, her soil, her climate, and even upon the races that have in turn inhabited the country. Nearly the entire State is divided into tall mountains and wide extended plains. Rich and well-watered valleys are opposed by a vast expanse of dry and sandy deserts—a wonderful production offset by a frightful sterility. Heavily-timbered mountains look down on treeless wastes, while peaks that lift their heads into the region of perpetual frosts stand over chasms so steep-walled, narrow and deep that the rays of the sun never reach their bottoms. We have but two seasons—a wet and a dry—hot days and cool nights being a notable feature of our summer climate. Even the ethnology of the country is marked by the same contrariety. The aborigines were sensual, godless and grossly materialistic—mere animals, possessing so little of the religious idea that they failed to rise even to the dignity of idolaters. Their successors, the Catholic Fathers, were schoolmen, bred to the church, and wholly devoted to spiritual things. Following them came the people who now occupy the country—ambitious, grasping money-makers, as little like these God-serving priests as the root-digging Indian who first possessed the land. Of a truth, the dwellers in this strange region have been quite as antipodal as everything else pertaining to it.

But many of these dissimilarities that have so long distinguished California, her people and their occupations, are gradually disappearing. Gold mining, at first the almost exclusive pursuit, has given way to a great variety of other industries. Even the climate, under the influence of land culture and irrigation, seems to have changed perceptibly. Instead of importing almost everything we consume, we have become large exporters of many commodities, sending some to the very countries from which we formerly obtained our supplies. We export now not only the product of our mines but also mining machinery and occasionally a mining expert. We swap rich men with other countries, some of our millionaires going abroad to live and the millionaires of other lands coming here to sojourn and sometimes make permanent abode. And so it is, many things once considered characteristic of California are undergoing a change. Fruit and grape growing is beginning to encroach on the deserts, water is being carried into the dry places, and arboriculture practiced on the treeless plains. Our pursuits are being diversified and extended, and the too strong coloring of California life so toned down as to bring us into harmony with the rest of the world.

#### Coal at San Francisco.

The importance of this port as a coal market is constantly increasing. The collieries up the coast have increased their output largely within the past few years, and there is scarcely a day passes that a cargo of coal does not arrive. For several years steam colliers have been doing a great deal of work, but to cheapen the products, sailing vessels have been again substituted. As the mines are opened their product is increased. Moreover, the rapid settlement of the surrounding country and the facilities offered by new and extended railroads enlarge our market. Although a great deal of coal now goes to Wilmington (the port of Los Angeles) direct, our imports here are increasing. Vessels coming here for wheat cargoes always bring coal, as a ready market is found here. The largest single fleet of coal ships that ever arrived in San Francisco in one day came on Tuesday last. Their combined freight tonnage was greater than that of any fleet that has ever arrived here. Following is the list of vessels and the quantity of coal carried by each: From Newcastle, N. S. W.—British ships Stockbridge, 3000 tons; Lancaster Castle, 3200 tons; British Ambassador, 2400 tons; Forrest Hill, 3120 tons; Ben Cruachan, 1982 tons; Ardencaple, 2000 tons; Hospodar, 2450 tons; British bark Akaroa, 1440 tons. From Sydney—British ship Celestial Empire, 2000 tons; Wennestay, 2400 tons; British bark Star of Scotia, 1569 tons. From Sunderland—British bark Westward Ho, 1530 tons. From Tacoma—American bark Eliza S. Thayer, 1776 tons.

Total, 32,083 tons. The appearance of so many coal vessels in port caused much comment from persons along the water front.

#### Foundry Notes.

In the East the iron business is beginning to be quite lively again, and though we have not felt the influence of this change here very much, there are nevertheless more hopeful signs. For a long time past the business at the foundries has been dull and unusually so. There has been, of course, more or less job work, but heavy contracts, especially for mining machinery, have been scarce. It is stated now that a contract will shortly be let here for a 160-stamp mill to go to Arizona, and probably more machinery will go in that direction before long.

At the Rolling Mills they have some 500 men at work.

The Pacific Iron Works have been running a large force for some time past, turning out an unusual amount of mining work. Among the more prominent jobs may be mentioned a 20-stamp silver mill for the Bolanos Company, in Mexico, all made in sections for mule transportation; a 10-stamp silver mill for the Manzanita mine, in Colusa county; a 10-stamp gold mill, with Duncan concentrators and chlorination furnace, for the Foster Gold Mining Company, of British Columbia; a 10-stamp gold mill, with Duncan concentrators, for the Golden King mine, of Idaho; a 40-ton smelting tunnel for the Portland Smelting Works, Oregon; a 30-ton plant for Lima, Peru; pumping and hoisting works for the Garden Springs Company, of Arizona; a wire rope tramway for the American Syndicate Company, of Honduras. The 20-stamp mill of the Cunnigar Company, of Australia, has recently been equipped with Duncan concentrators, as also a 20-stamp mill in Honduras and three 10-stamp mills in South America.

The Risdon Iron Works are at present running to their full capacity on mills for different parts of California. Among others, they have contracted with W. B. Bourne to build and erect at the North Star mine, Grass Valley, a 30-stamp gold mill, complete in every respect. The mill is to be erected next to the present North Star hoisting works, and when completed will be a model in every respect. They have just shipped a 20-stamp mill to P. Bargion, Shingle Springs, El Dorado county, and expect to have it in operation in a few weeks. Elwin Benner has gone to put the mill up. An additional five-stamp mill for George Ives and others, complete with necessary steam power, has just been shipped to the same vicinity. A complete 30-stamp gold mill is being built and erected by the Risdon Iron Works at the Rathgeb mine, San Andreas, Calaveras county. This mill will be run by water power, and is expected to be in operation in about 30 days.

For some time past the Risdon Iron Works have been experimenting with a new "Bryan" ore crusher. They have built several, and have the highest indorsement from those who are using them. One is at present on exhibition, and those interested are invited to call and examine.

#### Drawing Lead from Smelting Furnaces.

As far back as 1871, W. S. Keyes and Albert Arents, both well-known mining men, invented and patented a method of tapping or withdrawing molten lead and other metals from a smelting furnace. A small basin, set beside the furnace, is connected by a tube with the furnace, so that as fast as the lead comes from the ore, it passes through the tube upward to the basin, where it is removed at will. This system has been almost universally adopted. In some cases the patentees have had difficulty in collecting the royalty charged for its use. They have had several years' fight with the Grant Smelting Co., of Denver, which uses 13 furnaces, to collect the royalty of \$250 a year per furnace. The case has been five years in the Supreme Court. Messrs. Keyes and Arents have finally triumphed, however, and last week received their money for the use of the patent from the company. These gentlemen have carried on the fight for their automatic tap patent themselves, and there are very few examples where inventors have done such a thing and succeeded in the end.

#### Academy of Sciences.

At the meeting of the California Academy of Sciences last Monday evening, President Davidson exhibited two phials containing small particles resembling a dark metallic dust, which fell from the air during the eruption of Pabloff (St. Paul) volcano on the Alaska peninsula. The volcano is situated in latitude 55° 26' and longitude 161° 50'. One of the specimens was gathered at the town of St. Paul, on Kodiak island, by Fred Sargent, of the United States Coast and Geodetic Survey, on a cruise for tidal observation. The other was gathered by Captain Carlee, of the Alaska Company's schooner *Kodiak*, off Choumagin island, and forwarded by the United States steamer engaged in the survey. A vessel that was in the vicinity of the eruption at the time it took place, which was in August, will arrive here in a few days and bring the particulars. The extent of area over which the dust fell may be partially inferred from the fact that the quantity contained in one of the phials was gathered at a distance of 335 miles from the volcano. Prof. Davidson said he had tested the powder with a fine magnet, and found that it took up every particle, and under the microscope he found that they had a metallic luster and that at least every one in 10 contained silica or quartz.

Capt. W. Churchill spoke of the correspondence recently noted in the customs of the savages of Melanesia and those on the northwest coast of North America. He spoke of the making of nets, bows and arrows, and the tattooing of the women.

Mrs. Mary K. Curran, curator of botany, presented several species of recently-collected plants.

Dr. H. W. Harkness exhibited a new fungus from Auburn; also specimens of larvæ of *Cades fly*, found on floating leaves.

Prof. Davidson spoke on the subject of "Submarine Valleys on this Coast." He exhibited a map and pointed out the location of a number of those valleys, ranging from 200 to 500 fathoms in depth. He said that a deep valley was lately discovered running into the shore between Point Gorda and Cape Mendocino. Its existence accounts for the loss of two ships off the coast, the cause of which was never definitely known. The captains of the vessels marked the soundings between the ridges of the valley. When they found 25 fathoms of water they thought that they were a considerable distance from land, and shortly after ran ashore.

The resignation of Vice-president J. P. Moore was received and accepted. Mr. Moore is now in the East.

#### A Roasting Furnace for Shasta County.

Robert Skinner and Capt. Geo. H. Atkins have purchased the right for Shasta county, and will immediately put up a Russell furnace at Redding for custom work. There is a vast amount of base ores in that vicinity, and thus will give owners a first-class chance to test their mines. The furnace in question has been practically tested at West Point, Calaveras county, and we gave an account of it some months since in the PRESS. It has also been worked in San Francisco. There is very little free-milling ore in that part of Shasta county where the new furnace will be put up. Most of the ore needs roasting before further treatment.

Messrs. Skinner and Atkins propose to roast and work the ore and make returns to mine-owners. The company to carry on the enterprise will be formed in Redding. The furnace will be of 10 tons capacity.

Mr. Skinner, whom we met this week, states that mining matters thereabouts look very encouraging, but there is no property there with ore that can be worked without roasting. Furnaces are absolutely necessary. This one will prove what can be done. Mr. Skinner gave us the following results accomplished by a Russell furnace in Colorado: The ore contained 5½ per cent of sulphide of iron, 1 per cent sulphide of lead, 6½ per cent of sulphide of zinc, 3 ounces of copper, 25 ounces of silver and 2 ounces of gold. They worked the silver up to 84 per cent, and gold to 87½ per cent, which was a higher percentage than had been before obtained by any other furnace. Mr. Skinner has great hopes that the new furnace project will largely advance the mining interests of Shasta county.



## Verbal Leases of Mines.

A decision of great interest to miners has been rendered in Department 1, in this city. In effect, the decision is that verbal leases of mines may be revoked at the lessor's will. The action was brought to perpetually enjoin defendants from extracting and removing gold from the mining claim of plaintiffs in Placer county.

Defendants had judgment, from which and from an order denying a new trial plaintiffs appeal.

The amended complaint avers that on the 28th day of August, 1883, the defendants entered into the tunnel which penetrates the mining claims in question and at a distance of about 2000 feet from its mouth began to dig the gold-bearing gravel and bedrock on the sides of the tunnel and to take gold therefrom; that plaintiffs required them to desist from so doing, which they refused to do; that they have continued such acts up to the time of the commencement of this action and threaten to so continue; that defendants are insolvent, etc.

The answer to the amended complaint denies all wrongful acts on the part of defendants and avers "that ever since about the 14th day of February, 1883, and down to and including the 1st day of September, 1883, these defendants were lawfully possessed of and were actually engaged in working and mining said part of said claim, pursuant to a contract and agreement between plaintiffs and themselves; and defendants aver that they still are and at all times since the 1st day of September have been entitled, under said contract and agreement, to continue the working of said part of said claim."

Defendants justify their acts under this contract, but do not plead it except to the extent and in the manner above quoted.

At the trial the defendants were permitted, against the objection of plaintiffs, to prove that plaintiffs and defendants entered into a verbal contract, by the terms of which defendants were permitted to enter upon, occupy and mine a portion of the Paragon mining claim, the property of plaintiffs, in consideration of the payment to plaintiffs by the defendants of one-fourth of the gross yield of gold to be derived from such mining. The objection to the evidence under which this verbal contract was established was based upon "the ground that no contract was pleaded in the answer, and no issue raised on any contract."

The court decides that the verbal contract of February 14, 1883, as found by the court and jury under which defendants were to enter and work a certain portion of the mine if they saw fit, and to exercise their own discretion whether they worked it or not, did not create the relation of landlord and tenant between them and the plaintiffs. The contract gave to them no greater right and had no more force in law than a verbal contract for the sale of the land would have possessed. Their right under such a contract was not in and to the realty, but to the gold as personalty where it should be severed from the land. Had it been in writing it would have given to defendants merely an incorporeal hereditament, and being verbal, it operated as a license to them to dig and mine for gold within the specified limits, which license protected them from a charge of trespass while in force, but was liable to revocation at the will of the licensors.

There is a broad distinction between a lease of a mine, under which the lessee enters into possession and takes an estate in the property, and a license to work the same mine.

In the latter case the licensee has no permanent interest, property or estate in the land itself, but only in the proceeds, and in such proceeds not as realty, but as personal property; and his possession, like that of an individual under a contract with the owner of land to cut timber or harvest a crop of potatoes thereon for a share of the proceeds, is the possession of the owner.

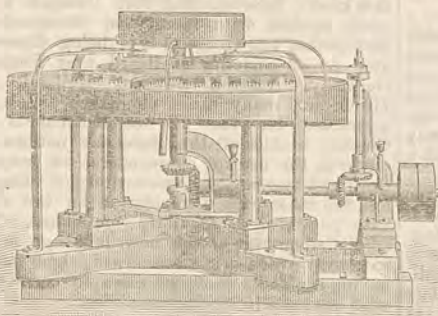
The agreement was revocable at the will of the plaintiffs, and having been by them revoked before suit was brought, plaintiffs were entitled to a recovery. For the reasons given in the foregoing opinion the judgment and order are reversed and cause remanded for a new trial, with leave to defendants to amend their answer if so advised.

THE Oro Fino mill near Calico produces about \$12,000 a month.

## Shaw's Disk Concentrator and Amalgamator.

We give on this page an engraving of Shaw's disk concentrator and amalgamator, which received a medal at the recent Mechanics' Fair. In this machine there is a circular copper dish in the shape of a very shallow cone with the apex turned downward, to which an eccentric motion of about one-half-inch throw is communicated by a vertical spindle, which is geared even to a light horizontal shaft running from 200 to 250 revolutions per minute. The disk does not revolve, being subject only to the eccentric motion, the result being the "panning motion," considered so desirable in all concentrating appliances. When in operation the movement of the concentrates is toward the center, where they are discharged by means of the tube or pipe shown in the engraving. The tailings escape over the periphery of the disk into a circular trough. This is inclined, and is adjustable so the discharging point can be brought to any desired position to lead off the tailings and water.

In order to assist or retard the motion of the pulp toward the periphery, a number of revolving radial arms are provided, to which are secured, at short intervals, small notched stirrers of sheet copper, which dip into the pulp to



Shaw's Disk Concentrator and Amalgamator.

within about a quarter of an inch of the face of the pan or disk. These revolving stirrers regulate the discharge of the pulp. They are set like wings, and can be adjusted at different angles so as to throw the pulp out more or less rapidly as desired.

The appearance of the machine is well shown in the engraving. The inventor claims that it is lighter, more simple and works more efficiently and rapidly than ordinary concentrators. It is not an expensive machine, and will save both fine and coarse sulphurets. It is of a capacity to take the pulp from a five-stamp mill with a 40 screen. The disk can be silvered so as to catch the free gold in the pulp. Two of these machines have recently been shipped to Cornucopia (Pine creek), in Oregon. When packed for shipment, each one weighs 750 pounds. Mr. S. W. Shaw, the inventor, is at No. 308 Phelan Block, Market street, in this city. He has a machine set up for work, and will be pleased to show it to mining men who are interested in this essential of a mining outfit.

## Mining Accidents.

Near Volcanoville, last week, Mike Callahan was killed while engaged in sinking a shaft to prospect a gravel bed. The shaft was about 75 feet deep, and the bottom covered with large boulders. As he was being lowered by his partner, Mr. Nichols, the spliced rope pulled apart and he fell a distance of some 50 feet upon the boulders, breaking his neck.

Mr. Frank Blake met with a severe accident while working in his quartz mine at West Point, in Calaveras county. A large rock, while being loosened, fell on his foot, mashing the toes so badly that they had to be amputated. It was nearly 36 hours after the accident before Mr. Blake arrived at the hospital.

A miner named Manuel had his right hand badly crushed at the Emerald mine, Tombstone. He caught his hand in the king-bolt of the cage, almost completely severing the forefinger and mangling the others in a terrible manner. His wound was properly dressed and he will doubtless recover speedily—minus one finger.

On the 6th inst., at Deadwood, D. T., a box of 30 pounds of giant powder exploded in the 300-foot level of the Caledonia mine, blowing four men to pieces and injuring five or six others. A spark from a pipe is said to have caused the explosion.

## Centrifugal Pumps and Draining Machinery.

[Written for the Press by J. RICHARDS.]

NUMBER 3.

## History of Centrifugal Pumps (Continued).

In 1845, Henry Bessemer, the great steel scientist of our day, invented and patented a centrifugal machine, or pump, mentioned in the first chapter.

It is not necessary to give drawings of this machine. It has simply a disk wheel, or "inclosed runner," as we now say in this country, revolving in a free chamber or casing; the discharge or tangential force of the water being neutralized and lost in the surrounding body or stratum. The writer has reason to understand these pumps, having himself gone through perhaps the same chain of experiments and reasoning 40 years later, but with a different result. The principle or method of operating was found applicable to high heads or high pressure, the loss of power being compensated in other ways.

The pumps of Mr. Bessemer were a kind of "roundabout" way of attaining a simple result, and contained some kind of a pneumatic attachment that we need not now trouble ourselves to even inquire about, and much less describe. The pump, aside from its last-named feature, which was no essential part of it, had been not only anticipated, but exceeded, by Blake's of 1831, which was a better and more simple machine, embodying all the operating features of its pretentious successor of 14 years later.

I am not at all astonished at Mr. Gwynne's resentment respecting the Bessemer pump or the Appold pump of Easton and Anderson. Both of them were in a sense "upstarts," as their subsequent history has proved.

We must, however, concede to Mr. Bessemer and no doubt to Easton and Anderson, also that they were in ignorance of what had been done in this country more than 30 years before.

In 1846, after the Andrews pump had been applied to a great variety of purposes in this country, it was improved and again patented both here and in England, Messrs. Gwynne & Co. acquiring the right for that country.

At this date we find the inclosed runner,

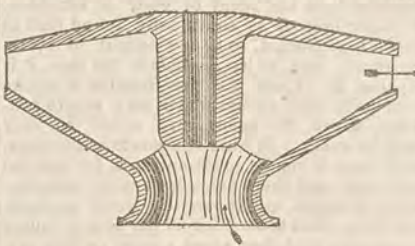


Fig. 6.—Inclosed Runner.

Fig. 6, which so nearly conforms to the modern form that its invention may with all fairness be ascribed to Mr. Andrews and claimed for this country. This is conceded by impartial English authority of six years later, and adds another to the claims made in the first section of these articles.

In the same year, 1846, Messrs. Von Schmidt, of New York, patented in this country a new modification of centrifugal pumps, an adaptation or change of the Andrews pump, but having no claims beyond its early date that need receive attention here.

A glance at the drawings of this pump will show that the theory of their action was then but little understood.

In 1848, two years later, we come to the celebrated Appold pump, and my first comment must be like that of Mrs. Trotwood—"Why celebrated?"

It was made by Messrs. Easton and Amos, now Easton and Anderson, of London, then and now very celebrated hydraulic engineers; but in so far as Appold's pump, the only new feature was the curved blades conforming to the Barker mill pumps that had preceded. Appold's first pumps had diagonal vanes set at an angle of 45° from a diametrical line. The want of novelty in this arrangement is sufficiently proved by the fact that no patent could be procured, and the importance of this form of vanes, as before remarked, is dependent on speed and pressure.

In some cases for low heads, where a pump's

work is performed by impact, or "mechanical push" it may be called, more than by centrifugal force, curved vanes of the Appold would not only lose their function but lower the efficiency.

The change of Appold's wheel or disk from a tapering section, with discharge orifice of narrow width, to one with parallel sides, shows that at least one of the main laws of hydraulics, a change of velocity without change of volume, was not known or disregarded.

On the whole, we are justified at this distance of time, when the merits of various methods have been demonstrated by experience, in concluding, as just intimated, that the reputation of the makers and the contest at the exhibition did more to make the Appold pump known than its working merits.

Subsequent tests, notably one at the Chatham dockyard in England and one at Trafalgar square, London, showed that however important the curved vanes might be, other features of the pump were bad or wanting.

Messrs. Easton and Anderson are, however, very able engineers, and as will be hereafter shown, have constructed some of the best and most efficient centrifugal plants known.

The fact is that the controversy of 1851, so often mentioned here, removed the pump matter from the field of engineering investigation to one of commercial contention. In respect to vanes, for example, there were at the time in England plenty of engineers and scientific men who could have developed from mathematical data the true and best form for pump vanes at different heads. It is true Prof. Rankine did define a form of vanes which did not give a good result under certain circumstances. I am speaking from memory, not having seen the drawings for some years past; but as now remembered, the professor's method was suited for low heads only, and no doubt his computations were correct, as all must be, if the premises are not mistaken I may also remark in respect to Appold's wheels that such deductions would not in any case produce vanes of a true curve such as are shown in drawings of his pumps made at the time.

We come next to Bessemer's second patent of 1849, a treatise it might be called on the general and special adaptations of Mr. Bessemer's pumps to various purposes. It has been before noticed, and can be explained by Fig. 2, which is typical of all the modifications.

I need not again remind the reader of Blake's pump of 1831. The analogy is so complete that the variation of a line or two would enable the same diagram to be employed for illustrating both machines.

The inventions of Mr. Gwynne, or rather his adaptation and introduction of American centrifugal pumps in England, form the next stage of our history and bring us to that period when the best methods of construction and adaptation were discovered and applied; the period also when, to Messrs. Gwynne's credit be it said, the workmanship on centrifugal pumps and the engines to operate them reached a perfection that perhaps no other branch of similar engineering work could at the time claim. It was also seen, by comparisons then possible, that Harvey's engines, employed to drain Haarlem lake, in Holland, could have been excelled in performance at one-half the investment had centrifugal pumps been employed for the same work. This branch of our subject will form a new chapter.

IRON is firm and in brisk demand everywhere excepting San Francisco, where it is very dull. A circular says: "Recent cable quotations from Great Britain show a marked advance in rails, scrap and pig iron. So far no difference is noticeable here, but it will be later on, as importers are not seeking orders for loading at former quotations. Foundrymen still complain of a want of orders, business generally being very quiet."

QUICKSILVER is firm. The exports from this port by sea from January 1st to October 1st were 5513 flasks, against 11,439 in the same time last year, and 12,490 in 1884. The exports by rail up to September were 1815 flasks.

RECEIPTS of coal at this port during the first three quarters of the year were 636,200 tons, against 691,600 in the same time last year. The market is quiet and well stocked, while supplies on the way here are heavy.



## MECHANICAL PROGRESS.

## Mechanical Wiseacres.

At regular and frequent intervals some mechanical wiseacre makes, in his imagination, the alarming discovery that there is a constant falling off in mechanical skill; that mechanics 30 years ago were much more competent than they are to-day, and that in this respect things are getting altogether bad. There is never an atom of evidence going to show that there is any truth in this statement, but a good many well-meaning men believe it, and proceed to set up ingenious theories to account for the assumed fact. Of all statements that receive almost universal credence, this is by odds the most stupid. Thirty years ago it was comparatively rare to find mechanics who knew more about the trades they followed than was required to enable them to use the tools they worked with. When there was one who studied beyond this he stood out phenomenally, by contrast. At the present time all mechanics study the literature relating to their trade, and many of them are close students of the principles of mechanics. But methods have been changed in 30 years, and a good deal of work that was done then by skilled workmen is now done by those who do not pretend, or at least more than pretend, to be mechanics. Machinery which requires only the attention of a small amount of special skill is made to do much of the drudgery formerly done by the mechanic, hence it is common to find a good many men working in the trades but not at the trades. These are ranked by the superficial thinker as mechanics, and compared with those of the "old times." The mechanic of to-day who has learned his trade is, as he should be with the advantages of better facilities and immensely better opportunities for reading and studying in the proper direction, much better able to follow it intelligently than he would have been 30 years ago.

It would be just as reasonable, and quite as correct, to argue that business men were less proficient now than formerly, because they have come to make use of specialists in various departments of business; men who make no pretensions to an understanding of more than the particular part they do. But no one would believe this.

Akin to the wiseacre who sees ruin in the waning abilities of the mechanic is the one who, seeing things quite differently, but equally falsely, evolves the conclusion that machinery has done away with the need of skilled mechanics. Skill of a high order was never more in demand.

As we have at different times pointed out, there is danger that a disinclination on the part of manufacturers to take apprentices may make the supply of the right kind of mechanics scarce, but then the demand for them will be still greater. In any event, they will be more skillful year by year as long as the world continues to grow wiser.—*American Machinist.*

**RIVET HOLES IN BOILER-PLATE.**—In a report made by a committee of English master-mechanics, it appears that a large majority of railway master-mechanics advise drilling boiler-plate instead of punching. The committee made the following tests, all the pieces being from the same sheet of five-sixteenths-inch boiler-plate, and of one and three-fourths inch width. Three pieces were torn in two by hydraulic pressure at an average strain of 32,685 pounds; three pieces punched, one five-eighths-inch hole in each piece, broke under an average tensile strain of 13,485 pounds; three pieces drilled one five-eighths-inch hole in each, broke under an average tensile strain of 17,645 pounds. The average strength of the drilled plate was then 4160 pounds greater than that of the punched plate. Three pairs of plates, punched and riveted with the best five-eighths-inch rivets, one rivet to each pair, broke in the center line of hole at an average strain of 17,549 pounds, and three pairs of plates drilled and riveted in the same way sheared the rivet at an average strain of 16,342 pounds. It is not regarded as probable by this committee that the tensile strength of the boiler-plate, per sectional square inch, is impaired by drilling, but they are satisfied that it is impaired by punching; they therefore recommend drilling and the use of one-third-inch rivets.

**ON CASTING STEEL.**—A practical steelmaker writes to a foreign paper as follows: "Every steelmaker will admit the desirability of allowing the metal to stand in the ladle as long as possible before casting, and then casting as slowly as possible. I have always found that the slower the ingot has been cast and cooled the better it has worked under the hammer, and the greater the ductility of the test-pieces, to say nothing of the greater soundness of the ingots and consequent saving in the amount of scrap produced."

**A NEW PROCESS OF WELDING STEEL.**—Mr. E. D. Wassell, of this city, has invented a new process of welding steel, by which steel bars of any content of carbon can be piled and welded together. He has demonstrated this by making a homogeneous weld of a pile made of bars containing 65 points of carbon. The process is not applicable to bars alone, but any miscellaneous steel scraps may be put up in fagot form and welded in the same manner by the rolling process. Another feature of this method is that

the carbon can be reduced to any point desired; that is to say, steel of 65 points can be reduced to 10 points in carbon while in the solid form without remelting. The process will cover the working of old rails and old steel scrap. The great usefulness of the invention consists in that piles can be welded from which plates can be made as large as 10x4 feet, and thus, it is claimed, the method will cover the whole agricultural field and like branches of the steel industry.

**CRACKING OF CYLINDERS IN LARGE ENGINES.**—A correspondent of the *London Engineer* asserts that the chief cause of cracked cylinders in large engines is starting the engines too soon. In large ships, he says, the steam can be got up in an hour in the boilers, but the engines should, as a rule, have from two to four hours to warm the cylinders, so that the metal will have no undue strain on it through unequal expansion when starting—sometimes they get it, and at other times not. When the steam is up, and just when the cylinders are warmed enough to put the inner ring of metal in a state of compression, and the outer one in a state of tension, the engines are started at a speed quick enough to bring over a few buckets of water from the boilers, there are a few bangs and bumps, and then everything appears to be all right; but some time after, when the cylinders are opened, there is a crack found in one. Again, some of the cylinders in the merchant service, according to this writer, are very large, but they receive quite another sort of treatment; steam is up from four to six hours before starting, and when they do start there is no stopping, with few exceptions, till the ship gets in port again.

**STRENGTH OF CAST IRON.**—No considerable strength in large iron castings can be calculated on unless they cool, after pouring, slowly and in such a manner as not to leave them subject to much internal strain. Where there is any considerable internal strain a large casting may be broken into many pieces from a blow with a small hammer or even a sudden jar. Some years ago some bridge girders were cast at the Tinsley Park Works, near London, England. Several of these girders were broken in cooling. The patterns were then changed a little so as to more thoroughly equalize the cooling. Still, one out of every six broke on cooling. At last six girders that were considered perfect were sent out, every one of which soon afterward broke from the jar of heavy thunder in a single storm. Cast-iron boilers have been known to crack after a heavy peal of thunder. These facts were made public on no less an authority than that of Zera Colburn. Of course, improper conditions of cooling were the cause in each instance.

**SMOKE BURNING NOT ECONOMICAL.**—There is little doubt, says Prof. Lodge, but that the experience of many engineers and manufacturers is hostile to the complete combustion of fuel—technically called the consumption of smoke—regarded from the point of view of economy. In boiler fires it is continually found that as smoke is consumed, so is the output of steam decreased; and, so long as this is the case, it is hopeless to expect the non-emission of smoke from boiler fires, except under very severe penalties, which the community would be very loath to exact. In high-temperature furnaces, experience of smoke consumption is far less discouraging, and there are not wanting manufacturers to assert, on apparently good grounds, that they effect some 40 or 50 per cent economy in coal now that they adopt a more perfect system of firing.

**SKILL WITH THE HAMMER.**—In an interesting article in the *Industrial American*, Mr. Joshua Rose calls attention to the usefulness of the hammer, and the many departments of work in which it is necessary to perfection of output. "I know a man," says Mr. Rose, "who was paid \$50 a week for his skill in using a hammer, and I have seen a man use a hammer to make work straighter than the finest and most delicate tools had been able to do."

**A NEW TELEGRAPH WIRE.**—As is generally known, compound telegraph wires consist of copper deposited upon iron and steel. A wire, however, is now being brought out in England in which the relation of the two metals is reversed, the steel surrounding the copper. The wire is said to be drawn from compound metal consisting of a hollow ingot of steel filled with copper.

**WIRE OR FIBROUS NAILS** are coming into use, and are claimed to be, in some respects, quite an improvement upon the ordinary cut nail, especially on the score of tenacity. They are not only tough but stiff, and will penetrate hard wood, where cut nails would break sharply off or become badly crooked.

A REASON why steel will not weld as readily as wrought iron is that it is not partially composed of cinder, as seems to be the case with wrought iron, which assists in forming a fusible alloy with the scale of oxidation formed on the surface of the iron in the furnace.

A MANCHESTER, ENGLAND, firm has just made the largest locomotive frame-slotting machine ever turned out. The bed is 30 feet long, 5 feet wide, and will weigh 60 tons. It has improved arrangements for driving. It is attracting the general attention of engineers.

## SCIENTIFIC PROGRESS.

A NEW ATTACHMENT to the microscope has been devised, the object of which is to observe the melting points of minerals while under the process of examination. The device is called a "meldometer," from the Greek word *meldein*, to melt. It consists of an adjunct to the mineralogical microscope, whereby the melting points of minerals may be compared or approximately determined and their behavior watched at high temperatures, either alone or in the presence of reagents. It consists of a narrow ribbon of platinum, 2 mm. wide, arranged to traverse the field of the microscope. The ribbon, clamped so as to be readily renewable, passes bridgewise over a little scooped-out hollow in a disk of ebony. The clamps also take wires from a battery, and an adjustable resistance being placed in circuit, the strip can be thus raised in temperature up to the melting point of platinum. The disk being placed on the stage of the microscope, the platinum strip is brought into the field of a one-inch objective, protected by a glass slip from the radiant heat. The observer is sheltered from the intense light at high temperatures by a wedge of tinted glass, which further can be used in photometrically estimating the temperature by using it to obtain extinction of the field.

**VOLAPUK** is the name given to a new and what is intended to be a "universal commercial language," which was originated about five years ago by Herr Schleyer, of Switzerland, and which seems to be meeting with greater favor than has been accorded other projects of this kind. It is reported that Volapuk is already spoken with facility by thousands of Europeans; knowledge of it is being disseminated by 53 societies scattered over England, Germany, Austria, Sweden, Holland, Asia Minor and many other countries. Volapuk grammars for the use of Hottentots and Chinese, besides all the European nations, are either in the market or in course of preparation; and two reviews, one entirely of Volapuk, and the other with a translation on the alternate pages, are regularly published. The special advantage of the new language is the ease with which it can be learned, eight lessons having enabled a Parisian class to correspond with students in foreign countries.

**SOIL, CROPS AND MOISTURE.**—The interesting researches in Germany, by Prof. E. Wollny, have shown that both soil and crops have a great influence upon the proportion of moisture in the atmosphere. Other things being equal, the atmosphere moisture is greatest over humid soils, least over sands, and takes an intermediate position over clays. The air over flat and concave surfaces is moister than that over adjacent slopes, while easterly and westerly inclines take an intermediate place. The moisture is greater over a plant-covered tract than over a bare soil, and increases with the density of the vegetation. Among ordinary crops, meadows impart most moisture to the air; then follow perennial fodder plants, such as clover and lucern; then summer crops which have a prolonged vegetation, such as turnips, maize, oats, beans and potatoes; then those of briefer growth, as flax, rye, barley and peas; and, lastly, winter wheat.

"BORE" OR "EAGRE" is the name given to those peculiar phenomena in which the tide moves all at once in the one direction or the other. The best and most noted examples of this phenomenon are said to be furnished by the mouths of the rivers Amazon, Hoogly and Tsientang. In the case of the last mentioned river, in China, the wave plunges on like an advancing cataract, four or five miles in breadth and 30 feet high, and thus passes up the stream to a distance of 80 miles, at the rate of 25 miles an hour. The change from ebb to flood tide is almost instantaneous. In the Amazon the whole tide passes up the stream in five or six waves following one another in rapid succession, and each 12 to 15 feet high. A very noted example of this phenomenon is also seen in the Bay of Fundy, on this continent.

**ELECTRICITY UNDER AIR PRESSURE.**—A German scientist, Mr. Walter Hempil, has recently made a discovery that may lead to important results. He has observed that the quantity of electricity furnished by a machine increases considerably when the latter works in an atmosphere of compressed air. A machine that, under ordinary atmospheric pressure, produces, for instance, 15 sparks a minute while making 400 revolutions, produces 32 when the pressure is increased to two atmospheres. By further increasing the pressure of the surrounding air the quantity of electricity generated increases in considerable proportions. This curious phenomenon will most likely add greatly to the economical value of electricity.

**THE LATE ECLIPSE OF THE SUN.**—Important photographs of the sun have been secured at Granada, where the eclipse has been seen to great advantage. The corona extended nearly two diameters from the sun and exhibited a feathery structure at the poles. The coronal spectrum was similar to that of the eclipse observed in 1883 in the Caroline islands.

**SCIENTIFIC EXPLORATION.**—W. G. Blunt, the naturalist, has been commissioned by the Smithsonian Institute to institute a thorough scientific exploration of the botany and archaeology of San Miguel island, off the southern coast of this State. The island is said to abound in Indian mounds and relics of a somewhat peculiar character. The exploration will be undertaken by the consent and through the courtesy of W. H. Mills, Esq., the owner of the property.

**WHEN TREES WORK AND SLEEP.**—Science tells us something very different from what we would naturally think—namely, that the fruit on trees slumbers in the daytime and works at night. The fruit of the cherry laurel, for instance, has been found by Dr. Krauss, of Halle, to increase at the rate of 90 per cent at night and only 10 per cent by day, while apples increase 80 per cent at night and 20 per cent in the daytime. While the juices enter and enlarge the fruit chiefly by night, the warmth and light of the sun by day elaborate the same and cause it to assume its proper relation and conditions in the particular fruit into which it has entered.

**PRACTICAL USE OF METALLIC HYDROGEN.**—Two Germans of unpronounceable and unspellable names have recently published in an unpronounceable technical journal a very interesting paper on the application of metallic hydrogen to analytical chemistry. Following Graham, they find that hydrogen, absorbed by palladium—which they consider as metallic hydrogen—possesses a remarkable reductive power, nearly all the metals being precipitated by it in a metallic state. The authors use a thin rolled plate or a wire of palladium saturated with hydrogen by the galvanic process.

**SPANISH GEOGRAPHY.**—The field for geographical explorations is not yet exhausted even in Europe. Schrader states that in the north of Spain several ranges of mountains exist, some reaching a height of 10,000 feet, which have no place on any geographical map. In the Aran valley another discovery has recently been made. Triangulation showed a gap unfilled between two chains of peaks which, approached from different sides, had been supposed to form a single range, and further exploration proved that the gap contained a large and hitherto unknown lake.

**A NEW FORM OF TIN.**—An American paper says a new form of tin, called by the inventor, Albert Assam, of Rahway, N. J., "assayne," is produced by a special treatment of tin. It has all the good qualities of the latter, can be pressed into any shape, or cast into statuary, or used for plate ware of any description. A beautiful bronze color can be given to the latter, or any shade from bronze to a silver color; and as it does not in the least corrode, it is especially valuable as a silver solder. It melts at a temperature of 430°, or 18° less than tin.

**A CURIOUS FLOWER** is said to have been recently discovered on the Isthmus of Tehuantepec, Mexico, which has a faculty of changing its color during the day. It grows on a tree. Another peculiarity of this floral chameleon is that it only gives out perfume at noon. One of the strangest things about this flower, however, is that it should be found in Mexico, when its colors are those of the United States flag. In the morning it is white, at noon it changes to red, and at night it adopts a soft blue color.

**MAGNETISM AND HEAT.**—Scientists are now discussing the curious fact that the usual heat produced by friction is conspicuous by its absence when the articles are magnetized. One example described was where a workman fastened a couple of powerful magnets to his lathe to hold more securely a piece of metal which he wished to drill and turn. The presence of the magnets kept the metal so cold that no water was needed to keep the drill moist, a very unusual circumstance, which may lead to important mechanical advantages.

**THE RECENT EARTHQUAKE AT CHARLESTON** has brought up numberless reminiscences in regard to former earthquakes on the North American continent. Among others the dwellers in the Merrimac valley in New England are reminded that, at the time of its first settlement by whites, frequently and seriously shaken were they by internal convulsions in the lower Merrimac, where the city of Lawrence now stands, ruptures of the earth occurred, and sulphurous deposits offensive to the noses of the pioneers were thrown out.

**PEAR PHOSPHATES** for extracts are made as follows: Take Bartlett or other good pears, cut or chop very fine, press, allow to settle, pour off supernatant liquid. To one pint of this pear juice add one pint acid phosphate and one pound of sugar, or enough to sweeten. The acid phosphate referred to is generally a solution of the phosphates of lime, magnesia, potash and iron, in such a form as to be readily assimilated by the system.—*Scientific American.*

**A REMARKABLE EXPLOSION** recently occurred in Germany, which shows the force possessed by finely disseminated dust, and the facility with which it may be exploded. A sack of flour, falling downstairs, opened and scattered the contents in a cloud through the lower room where a burning gas flame set fire to the dust, causing an explosion which lifted part of the roof off the mill and broke almost all the windows.



## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

**TRACE-HOOK.**—Chas. Dudley, Stockton. No. 349,632. Dated Sept. 21, 1886. This invention relates to that class of trace-hooks in which a plate is secured properly to the trace, and has on its end a suitable engaging-hook. This hook has a guard projecting within the space inclosed by said hook, which prevents any accidental disengagement. A fold of the trace also guards the entrance to the hook to prevent any portion of the harness from becoming entangled.

**OSCILLATING GAS METER.**—Anson F. Fisher, Chico, Butte Co., assignor of two-thirds to Allen Henry and A. M. Barley. No. 349,489. Dated Sept. 21, 1886. This invention relates to that class of gas meters in which an oscillating cylinder or drum is operated by the inlet and exhaust of the gas passing through it; and the invention consists in the novel cylinder or drum in connection with the water seal on which it operates; in the peculiar valve-mechanism operated by the cylinder, whereby the gas is admitted and exhausted, and in certain improved details of construction.

**TRUSSES.**—Jesse G. Henderson, Grizzly Flat, El Dorado Co. No. 349,498. Dated Sept. 21, 1886. The object of this invention is to provide a simple and effective truss—one which can be worn without inconvenience, and which, on the contrary, will give the wearer all the comfort to be obtained from a perfectly-fitting, pliable apparatus, the pad of which is soft and yielding, and on account of its construction and the connections of its securing-bands, cannot get out of place, but will remain in position no matter what may be the position assumed by the wearer.

**ENGINE VALVE-GEAR.**—Robt. A. McLellan, S. F. No. 349,512. Dated Sept. 21, 1886. This engine valve-gear consists of a lever centrally fulcrumed to the frame, and having its lower end connected with an eccentric in a radial plane with the crank, and a second lever, the upper end of which is suspended from the upper end of the first and its center connected with a second eccentric, set in advance of the crank. These are combined with a rod adjustable upon the second lever and connected with the steam-admission valves. The resultant motion, due to the action of the two eccentrics, is communicated by a rod to the valves.

**ADDING MACHINE.**—Arthur E. Shattuck, Sacramento, and Charles Thorne, Jr., S. F., assignors of one-third to Geo. C. Gaylord, Nevada City. No. 349,459. Dated Sept. 21, 1886. The device is an apparatus for mechanically adding columns of figures. It consists of one or more open belts, slides, or chains, passing over rollers having digits imprinted upon them, and tables with corresponding digits, and mechanism connected with the rollers, whereby those representing the next higher denominations are properly rotated and prevented from turning too far; and, in connection with these, of an independent drum or roller having a series of figures only upon its periphery, whereby the higher amounts may be indicated without increasing the number of chain wheels and connected mechanism.

**MINES IN EASTERN OREGON.**—Professor Clayton says he has in the Blue mountains of Eastern Oregon an old vein precisely similar to the blue lead which runs through Plumas, Sierra and Tuolumne counties in California. Where the rim of this Oregon dam has been broken down in places, rich placer mines and many nuggets, running from an ounce up to \$1000, and in one case up to \$3237, have been found. The professor believes that if the bottom of the ancient channel can be reached, the greatest gold deposit of the West will be uncovered.

To all appearances the experiment of bringing white cigar-makers to this city for the purpose of supplanting the coolie labor engaged in that occupation has proven a failure. Many of the men have been sent back to their Eastern homes. The cause of the failure is said to be due very largely to the advertising given the blue label, which had the effect of flooding the local market with Eastern cigars, 26,000,000 having been imported in a single month. There were also other causes which operated against the white laborer.

**FRANK OLIVER and Mr. Johns**, our harness-maker, have been doing some prospecting on "Jump-off Joe" creek during the past ten days, and obtained \$28 of the very choicest coarse gold for about six days' actual labor performed. The manner of work was by sinking holes and cleaning the bottom of them up.—*Or. Courier.*

**THE DISPOSAL OF SNOW BY STEAM HEAT** is successfully practiced in London, and at a much less outlay of money than is required to cart it from the streets. Pits are provided with steam coils at the bottom; into these pits the snow is shoveled, and being rapidly melted, runs into the sewers.

## USEFUL INFORMATION.

**FRENCH MASONRY.**—The walls of buildings in French cities are generally built solid, and the method of working and fixing is different from that followed in England. The masons are divided into two classes: first, those that take the rough block as it comes from the quarry; two men generally working together sawing and roughing out, and making beds and joints. The principal tools used are the axe and a kind of drag, formed out of a piece of wood about eight by three inches, with six pieces of saw plate inserted. The prepared stones are taken by laborers to the lift, which is in most cases a square, fixed scaffold with patent crab at the bottom, which can be worked by hand or steam power. These scaffolds are fixed at the commencement of building to the intended height, and are built of timber from eight to ten inches square, braced with bolts and dogs. The stones are drawn up the height required, and are then rolled from the scaffold to the wall, and placed in by means of bars, no other appliances being used. This is certainly no improvement on the English system of fixing. The beds and joints are rough and large, varying from one-half to three-quarters of an inch. In fixing and working, the men do not regard the position of beds and joints. These often come close to the nose of architraves in the center of pilasters and close to breaks. After the wall is built, they start from the top of the structure and work down. The masons who do this part seem to be very good workmen, finishing their work quite as well as English masons. Their tools are similar, excepting that they use planes which are formed to suit any kind of molding. These tools would not answer for English soft stones, which are more subject to veins and bars.

**USE OF MOLASSES FOR MAKING BRIQUETTES OF COAL AND ORE.**—A German chemist and metallurgist, Dr. Kosmann, strongly recommends the use of molasses for forming small coal and fine ore into solid briquettes, as first proposed by Saltery. A mixture of from one to one and a half per cent of molasses was sufficient to make coal-dust of very lean Silesian coal, into good solid blocks that gave a strong coke. Such blocks are also excellent for gas-making. In similar manner blocks can be made of any powdery iron ore, such as some magnetic ores and pyrites' residues. For the direct production of iron from ore so treated, it is proposed to have chambers built in connection with coke ovens in such a manner that the gases from the ovens can be made to pass through the charge of iron ore. Worked, for instance, in connection with a range of Coppee ovens, as each Coppee chamber will hold three tons of coal, the chambers for the iron ore would require to be about one-fifth the size in order to hold the same amount of ore of from 65 to 70 per cent. Such a charge would give about two tons of iron sponge, and a charge could be put in, reduced, and drawn out every four hours, so that in 24 hours 12 tons of sponge would be produced. The sponge would be squeezed and hammered, and the bloom, after reheating, drawn out to bars, which would be cut up and used as excellent material in the Siemens-Martin or in the crucible steel process.

**GRINDING VS. FILING SAWS.**—The majority of sawyers now grind their saws. It is quicker than filing, is cheaper, and leaves the saw in good shape. Some writers say "grind square across," and we have tried it, but we think it is better to have the front of the teeth a little "fleaming," even for hard wood, and more so for soft. According to our principles, as laid down in our article on cutters, this should be so. Saws that are filed by the average shop hand often look as though they could "gum it" better than they could cut with their teeth. Don't run a saw with the teeth half filed down; gum your saws and keep them gummed. Some room must be left for the sawdust to fall into as the teeth cut it out. Give the saw a liberal set. If you are afraid of using up too much lumber, get a thin saw. Thin saws are the ones to do the work, but they must be kept out of the hands of cheap men. Many shop-owners have the idea that it is a saving to have one man furnish the brains to run the shop, and hire 75 cent men to run the machines. This works well enough in theory; but in practice cheap hands will run in every knotty or poor piece of stock available, and the cost of keeping their machines in order is more than equal to the amount saved from their pay. Put the best men in the shop that you can get. Establish a set of premiums for better work, and better methods of doing it, and your shop will pay.

**AN ELECTRIC SWORD** has been invented which, when the point touches the party attacked, sends a powerful shock through him, and if not immediately killing will at least put him *hors de combat*. The sword is an ordinary military saber, but along its whole length is let in a fine platinum wire which ends at the foil of the weapon. A small but very powerful storage battery is strapped about the waist, much the same as a cartridge-box. Insulated wires connect this battery with the sword, and by pressing a button the holder can complete the circuit at pleasure.

**FACTS CONCERNING TIMBER.**—Some timber is more durable in wet ground or immersed in water, such as elm, beech, alder; while others,

such as ash, oak and fir, are more durable in dry situations. The increase in strength due to seasoning of different woods is given as follows: White pine, 9 per cent; elm, 12.3 per cent; oak, 26.6 per cent; ash, 44.7 per cent; beech, 61.9. The comparative value of different woods showing their crushing strength and stiffness, is: Teak, 6555; English oak, 4074; ash, 3572; elm, 3469; beech, 3079; mahogany, 2571; spruce, 2522; yellow pine, 2193; sycamore, 1833; cedar, 700. Regarding the relative degrees of hardness, shell-bark hickory stands the highest, calling that 100; white oak is 84; white ash, 77; dogwood, 75; scrub oak, 73; white hazel, 72; apple, 70; red oak, 69; beech, 65; black walnut, 65; yellow oak, 60; white elm, 58; hard maple, 56; wild cedar, 55; yellow pine, 54; chestnut, 52; white pine, 30.

**REMOVING OIL, ETC., BY INFUSORIAL EARTH.**—Scouring or removing oil or grease from substances such as wool and woolen cloth, by means of either infusorial or fullers'-earth, is claimed as an improvement by Groth. This kind of earth is one that absorbs a great quantity of liquid, and is what is used to absorb nitro-glycerine and make it into dynamite. The patentee states that it is this extraordinary power of taking up liquids which enables it to withdraw oil from textiles containing it. The process is to warm the textile with the infusorial earth in some apparatus where the temperature may exceed by 10 or 20 degrees the melting point of the oil or grease. As soon as it is liquefied, the infusorial earth takes it up from the textile. After this the materials are passed through warm water which washes off the earth, leaving the cloth clean.

**A POINTER FOR MOLDERS.**—A correspondent of the *American Machinist* writes: "I was making at one time some castings with a very steep joint. I used to get lake sand, wet it and sleek it up. One day a tramp came along and stood looking at me. Said he, 'Why don't you get some rags for that job and use them in the place of that sand?' I got some rags, wet them and put them on, and they beat all the parting sand and paper I ever tried."

**A FIRE SCREEN** has been devised, the object of which is to prevent the spreading of fires in cities. It is a broad netting of iron wire which is carried on trucks and run up on proper appliances in such a way as to cut off the flames from a burning building. It operates on the same principle as the Davy safety lamp.

## GOOD HEALTH.

**COLOR-CHARGED WATERS.**—A new remedial agent seems to be seeking recognition, as witness the following from E. D. Babbitt, M. D., in a late number of *Herald of Health*: "Now, as the seasons of summer complaints are upon us, I wish to impress upon all readers the great importance of the blue-charged water to check diarrhea, dysentery, summer complaints, spasms, nervousness, etc. Put ordinary water in a blue bottle, and let it stand in the sun from an hour upward, the longer the better, and then for a child afflicted with summer complaint give a teaspoonful every 30 to 60 minutes until relief comes. For diarrhea, etc., give an adult a tablespoonful at a time. Hundreds of cases have been cured thus. A case of chronic diarrhea in Brooklyn, which had baffled eminent physicians for years, was easily cured by this blue-charged water.

"I want to call attention once more to the yellow-orange or amber colored bottle in which to sun-charge water for curing constipation, rousing the liver into greater action, etc. One of the millionaire business men of New York, whose name is like a household word throughout this and several other countries, had such inactive liver and bowels that he had to take medicines daily to bring about action. I furnished him with a yellow bottle, and although he was somewhat faithless as to its good effects, he found he could throw aside the drugs he had been taking. He said it was worth a thousand dollars to him, and that he had not been so well for three years. This yellow principle is especially nerve-animating, and is very useful for those who tend toward paralysis."

**DOGS ARE SUBJECT TO "RUNNING FITS."**—The talk about Pasteur and hydrophobia, a dog-fancier informs us, has had a marked effect on his trade. The sending of people across the water to be treated for hydrophobia has riveted attention to the danger of keeping dogs, and many fashionable ladies have disposed of their pugs and other four-footed beasts, and babies are growing in popularity as pets. "Hydrophobia is a fraud and Pasteur is a humbug," said Fourfoot, the fancier. "Dogs have running fits which will pass off if they are let alone. If caught by the windpipe and salt put in his mouth, a dog will be cured of these fits. They may bite sometimes, but hydrophobia results from nervous fright." But such talk, even though widely advertised, will not help the trade. Dogs with "running fits" will continue to be treated as mad, and they are not likely to get the benefit of any doubt on the subject, either.—*New York News.*

**MEDICINAL QUALITIES OF VEGETABLES.**—Spinach has a direct effect upon the kidneys. The common dandelion, used as greens, is excellent for the same trouble. Asparagus purges

the blood. Celery acts admirably upon the nervous system and is a cure for rheumatism and neuralgia. Tomatoes act upon the liver. Beets and turnips are excellent appetizers. Lettuce and cucumbers are cooling in their effects upon the system. Beans are a very nutritious and strengthening vegetable. Onions, garlic, leeks, olives and shallots, all of which are similar, possess medicinal virtues of a marked character, stimulating the circulatory system and the consequent increase of the saliva and the gastric juice, promoting digestion. Red onions are an excellent diuretic, and the white ones are recommended eaten raw as a remedy for insomnia. They are a tonic and nutritious. A soup made from onions is regarded by the French as an excellent restorative in debility of the digestive organs. With vegetables, as with everything else, much depends upon the cooking and the care and preparation beforehand. Washing in several waters is necessary to prepare nearly all kinds of green vegetables for the table, and great care must be given in examining spinach, lettuce, greens and cauliflower, as often very minute insects are lurking in or under the leaves of these.—*Phila. Grocer.*

**CHOLERA-INFANTUM.**—Absolute cleanliness is the first thing to be observed. Bathe your child every morning two hours after its breakfast. Keep a flannel bandage about its abdomen throughout the summer. Change all its clothing on putting it to bed at night. Keep it in the open air about eight hours a day. Feed it at regular intervals of about four hours. Offer it pure cold water several times a day. If you feed it artificially, you must pay the strictest attention to the cleanliness of the nursing bottle. You cannot trust this to any one else; you must attend to it yourself. The bottle when not in use should be kept standing in cold water. It should be daily placed in boiling water. When a child is actually suffering from this disease, give rice water. This has been found highly satisfactory, and been the means of saving many a child during such an attack.—*People's Health Journal.*

**LEAD POISONING FROM EATING AN APPLE.**—The *Journal de Medecin de Bruxelles* reports that a lady who had previously enjoyed perfect health was suddenly taken with violent colic, which, though very severe, passed away, and the next day she consulted a Parisian physician, who diagnosed lead colic. No possible source of the lead could be suspected, however, until the lady called to mind that the day before the attack she had eaten an apple in which she had found, on eating, a shot pellet. It was then concluded that this pellet, in combination with malic acid of the apple, was the cause of the attack. The story shows, at any rate, what expert shots Parisian, as well as other physicians, sometimes are at a diagnosis.

**CLEANSING LADIES' HAIR.**—We object to the use of carbonate of potash by hairdressers for cleansing the hair of their customers. The cleansing action of this powerfully alkaline substance is very effective, but it is prejudicial to the hair at the same time. A teaspoonful of pulverized borax in a cup of boiling water, or cleansing the hair with the yolk of a fresh egg, and following this with a warm solution of borax or salt and water, especially sea water, is much preferable, and has the effect of cleansing and softening the skin of the scalp. Eastern ladies, remarkable for the beauty of their hair, adopt the latter mode of cleansing it.—*Herald of Health.*

**SMOKING AND DRINKING.**—Tobacco blindness is becoming a common affliction. At present there are several persons under treatment for it at one London hospital. It first takes the form of color blindness, the sufferers who have smoked themselves into this condition being quite unable to tell the color of a piece of red cloth held up before them. Sometimes the victim loses his eyesight altogether. Although smoking is to a large extent the cause of the malady, and so gives it its name, heavy drinking is also partly responsible.

**THE KING OF SERBIA** seems to have a parental care over his subjects, as witness the following edict, which, it is said, he has recently issued: "Whereas, it is irrefutably proved by science that the so-called antiseptic treatment of wounds yields more beneficial results than all other methods, we are pleased to order that henceforward the said antiseptic plan of treatment be solely employed in all the hospitals of our kingdom, and that corrosive sublimate and iodoform be used until our further disposition."

**GRIEF ANTICIPATES AGE.**—Dwelling on the inevitable past, forming vain hypotheses as to what might have been if this or that had or had not been, acquiring a craze for a recounting of what has occurred—these acts do more harm to future health and effort than many things connected with real calamity. Occupation and new pursuits are the best preventives for mental shock and bereavement.

**NUTMEGS POISONOUS.**—The common nutmegs are poisonous in large doses. In a case which came under medical treatment, a lady had eaten a whole nutmeg and a half, which caused extreme drowsiness, then great nervous excitement, followed by subsequent depression and pain in the region of the heart. This case points to the presence of an active principle which should be investigated.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Alameda.

**MAGNESIA.**—Livermore Herald, Oct. 2: John Hayes has started a train of four mules between the magnesite mine and the end of the chrome road on the top of Cedar mountain. The distance is nearly two miles, and the difference in altitude 1200 ft. Each mule packs out two sacks of magnesite at a trip, aggregating 225 pounds. There are now five men at work in the mine, and the rate of production has been largely increased. The average is now nearly a ton a day of cleaned and assorted magnesite. There is but little change in the appearance of the vein now being worked, though that little is for the better. The first carload will be shipped as soon as it can be hauled in, which will be by the middle of next week. A second carload will be ready soon after. The product goes direct from Livermore to New York by rail.

## Amador.

**SUTTER CREEK.**—Amador Ledger, Oct. 2: The rock at the Lincoln is getting scarce, and in all probability operations will soon come to a standstill for awhile. As soon as one of the adjoining mines starts up, however, there will be a chance to resume work, as taking the water from the Mahoney will drain the Lincoln, and the presence of so much water without adequate facilities to control it is the trouble with the latter. Three gentlemen interested in the Mahoney mine came up from San Francisco this week. It is evident they intend to do something with the property soon. It may not be anything more than surface work, but even that will be hailed as a decided improvement upon the inaction which has prevailed so long. It is expected that the job of cleaning up the Eureka mill will take until near Christmas to complete. The water in the Amador canal is running low, and considerable machinery has come to a standstill in consequence thereof. The South Spring Hill mill is idle for want of water.

**MISCELLANEOUS.**—A force of six carpenters was set to work Monday last to erect hoisting works on the McKay mine, in Hunt's gulch. The works are to be run by water-power. Eight hundred feet of pipe is being made by Hewitt Bros., and the fall will be about 150 feet. The mine is said to be looking well as far as prospected. The depth of the shaft is 50 feet. It is the intention to sink a couple of hundred feet before thinking of erecting a mill. There has been some talk that the Moore mine has been sold, but we are unable to say whether there is any truth in it. The mine is said to be developing in grand style, and giving better promise than ever of becoming a permanent and paying property.

## Calaveras.

**BONDED.**—Calaveras Citizen, Oct. 2: The Rathgeb mine, situated about three miles from San Andreas, has recently been bonded to an English company, and active preparations are being made for the erection of a large mill on the same. The machinery is on the road, and a large force of laborers was set to work grading a place for the mill, which will be erected on Calaveras creek, a short distance below Binn's. George Wiggins, of the Banner mill, has the contract to furnish the lumber, and now has several teams busily engaged hauling it.

**ANGELS MINING NOTES.**—The Gold Cliff mine, situated about half a mile from Angels, is closed down at present, pending the repairs on the Union Water Company's ditch. As soon as the ditch is completed and the water turned in, the Gold Cliff will resume operations. A 60-stamp mill will be erected as soon as all the material can be got upon the site. Lumber is being hauled at present, and soon the ringing of saws and hammers will be heard echoing through the hills. The Stickle mine is also at a standstill, awaiting the arrival of water. Mr. Carter has been appointed superintendent, vice Mr. Rose, resigned. The Tozer mine, which has been closed down for the past three months, will also resume operations as soon as water can be had. Steam is generated tri-weekly for the purpose of freeing the mine from water. It is reported that a new 20-stamp mill will be erected to take the place of the "cannon-ball" mill, which formerly did the work of pulverizing. The Utica mine, superintended by Chas. Lane, is running in full blast night and day. The mill sends forth an incessant roar, and is pulverizing some very rich ore at present. A large cleanup is expected. The Utica is the only mine in operation in this place at present. The large reservoir recently constructed by the Utica Mining Company on Bald Hill has proved a profitable investment this season during the repairing of the Union Water Company's ditch. The reservoir was filled while water was plentiful, and has aided materially in keeping the mine in operation during the repairing of the ditch. The Matson mine is shut down for the same cause that the other mines are. It will start up with the balance. As soon as the mines start up the mantle of dullness, which has grown monotonous, will be lifted, and the busy hum of activity will again enliven every avenue of this village.

## El Dorado.

**SHINGLE SPRINGS.**—Independent, Oct. 3: A load of machinery came up on Wednesday for the Oro Fino mine. The Vandalia mine, we are informed, has been bought by Kelly, Ives & Co., who will proceed immediately to put on a five-stamp mill and steam power. The Old Church mine, north of the Springfield, has been bought by a company which is now to be called the Ruth Mining Company, who are now putting up machinery for developing the same.

**MENDON.**—Placerville Observer, Oct. 2: There are quite a number of people living up here in the woods, and all seem to be doing something. Quite a number are working in the timber regions, some are farming, while a goodly number are prospecting for quartz. The Crystal mine, L. L. Alexander, superintendent, under the supervision of John Richards, a miner of great experience, is kept running night and day. They are running a tunnel in to cut the ledge. The tunnel is now in something over 700 feet, and they have several hundred feet yet to run before tapping the vein, when they expect a bonanza. The Parker Brothers have done considerable

work on their mine, and are at present erecting a mill. There are several hydraulic mines in this part of the county, which bid fair to develop into good properties. Among these is the Slug Gulch mine, owned by Mr. Hale, the Hale and Buchanan mine at Indian Diggings, the Ball mine, and also the Claghorn mine, owned and worked by our worthy deputy assessor of that name. We have also several promising mines east of this place, one of which has been sold recently by Mr. Jas. Oxley, who has since accepted the position of foreman of the Slug Gulch mine.

## Inyo.

**MILL STARTED.**—Inyo Independent, Oct. 2: For several weeks past preparation was making to start up the Hawley mill, at Keeler. Nothing had been done at the mill in a long time, but now a good deal of ore is on hand and the mill is likely to be kept busy for some time. It was expected that everything would be ready for starting yesterday or to-day, and in all probability the mill is now running.

## Mono.

**THE BODIE.**—Miner, Oct. 4: North drift on 620-foot level is extended 23 ft in good ore. South upraise from 700-foot level is extended 12 ft. Middle upraise from 700-foot level is extended 11 ft. South drift on 800-foot level is extended 30 ft. West crosscut from south drift on 800-foot level is extended 7 ft. North drift on 800-foot level is extended 14 ft in \$25 ore. Winze from 700-foot level is extended three feet in fair ore. There were employed 15 miners and 2 carmen at \$4 per day, and jointly with Mono 2 firemen, 1 blacksmith's helper, 1 carman, and 1 watchman at \$4 per day; 1 blacksmith and 6 engineers at \$5 per day; 13 carpenters, 9 laborers, 1 bricklayer and 1 foreman.

**THE MONO.**—We are taking out ore below the 700-foot level. There were employed 2 miners at \$4 per day, and jointly with the Bodie Con., 2 firemen, 1 blacksmith's helper, 1 carman and 1 watchman at \$4 per day; 1 blacksmith and 6 engineers at \$5 per day; 13 carpenters, 9 laborers, 1 bricklayer and 1 foreman.

**THE DUDLEY.**—The south drift, 700, is extended 10 ft with no change. There were employed 2 miners at \$4 per day.

**THE BULWER CON.**—The south drift No. 1, 100, is extended 16 feet in \$30 ore. The south drift No. 2, 100, is extended 10 feet in \$33 ore. The north drift, 100, is extended four feet in low-grade ore. Upraise No. 2, 200, is extended 12 feet; two feet good ore in face. All chutes, dead-work, etc., on this level are completed. The west crosscut, 300, is extended five feet. Upraise No. 1, 360, is extended 10 feet in rich ore. Upraise No. 2, 360, is extended five feet in low-grade ore. Upraise, 400, is extended 14 feet in good ore, with ledge increasing in size and quality. Have eight feet further to run to connect with the 360 level. There were employed 21 miners, 3 carmen and 1 blacksmith at \$4 per day; 1 shift-boss at \$5 per day, and 1 foreman at \$6 per day.

## Napa.

**QUICKSILVER SHIPMENTS.**—Calistogan, Oct. 2: The increase of price of quicksilver has evidently had a tendency to increase the production, as the shipments from Calistoga appear to be greater, and particularly is this true for September, for which month the following is a record: Sulphur Bank mine, 156 flasks; Great Western mine, 116 flasks; Napa Con. mine, 54 flasks; Bradford mine, 21 flasks; total, 347 flasks. The Sulphur Bank mine, since a couple of assessments on its stock have been paid, is doing finely, and present stockholders are evidently making money out of it. The Bradford brothers are doing the best business in quicksilver mining of all the rest. They are, of course, not producing as much as is taken from the larger mines, but they have comparatively little expense, the metal being very easily obtained. Furthermore, all the money they receive is theirs, there being no outsiders interested in the property. Their receipts the past month from shipments amount to about \$800.

**KNOXVILLE QUICKSILVER.**—Napa Reporter, Oct. 2: The balmy days of Knoxville are passed, if not for all time, at least for many years. Once the scene of great activity, when hundreds of men found constant employment in the Redington quicksilver mine, it now has the appearance of a deserted village. In the old days referred to, quicksilver sold for \$1.50 per pound, and as long as these prices ruled the mine was worked for all it was worth, and proprietors, miners and teamsters were happy. When the price of quicksilver dropped to a low figure eight or ten years ago, the mines shut down in whole or in part, and though the price of the metal is now higher than it was a short time ago, work at the mine has never since been vigorously prosecuted. About 18 months ago the mine changed hands, Messrs. A. McMillan, who has been connected with it in one capacity or another for many years, and J. D. Langenour, of Woodland, becoming owners. Twenty-five men are now employed in two shifts, day and night, and the monthly output is about one hundred flasks. It is sent to market via Napa City. Since the new furnaces (Livermore patterns) were erected, much of the ore that was thrown away under the old style of roasting is now profitably worked. The old furnaces are, and have been for several years, idle, and will in all probability never again be used. Several men are at work in the tunnels, and recently a vein of very fine ore was struck which promises excellent returns.

## Nevada.

**WORK BEGUN.**—Nevada Transcript, Oct. 1: Fifty men were put at work yesterday, grading for the pipe line that is to convey the waste water from the Empire mine to the works of the North Star. A fall of 250 feet, giving about one-horse power for each inch of water, is to be had. The pipe will be extended in time to the Allison Ranch mine, giving at the latter 200 feet of fall.

**BOSS.**—North San Juan Times, Oct. 2: The Boss mine, or, as the head one of the owners termed it, the "mother ledge," is at work. How well it is doing nobody but the owners know, and they will not tell. They say, when interviewed, "We are satisfied with the results, and are not discouraged." From the best evidence we can obtain, and much of that is rumor, we are inclined to believe that the rock will pay on an average six or eight dollars per ton, and that with a 20-stamp mill in operation the mine would pay very extensively.

**RICH QUARTZ.**—Tidings, Oct. 5: We are informed that some rich quartz is being struck in the

vicinity of Rough and Ready. The strikes are mostly of the pocket order, being decomposed ore, and, when found, prove to be very rich. We understand that two parties of Rough and Ready struck a \$700 "pocket" last week.

## Placer.

**NEW MILL.**—Placer Republican, Sept. 29: The new mill at the Belvoir mine near Ophir will start up this week. It is about a year since this mill was begun, but it has been well built, and if the novel machinery which has been put in is found to be good, it will be one of the best mills in the county. Instead of stamps, a J. B. Low quartz mill has been put in and is the first one of the kind in this part of the country. This mill consists of a cylinder, four feet in diameter and about three feet thick, which revolves on a horizontal shaft. Within the cylinder is an iron ball, weighing about 1600 pounds, which, as the machine revolves, rolls in a groove on the inside of the cylinder. The rock runs through a self-feeding tube into the cylinder, and is crushed by the ball. The sides are covered with wire netting through which water carries the crushed rock. The Belvoir mill is fitted up with two of these machines which are expected to work from 15 to 20 tons a day. It also contains a concentrator made after original plans by Samuel Howe, who has charge of the mine.

**FOUR-FOOT VEIN.**—Mr. Huntington, inventor of the Huntington quartz mill, arrived from San Francisco last week and paid a visit to a quartz claim near Damascus, which he is prospecting. It is reported that the tunnel has just cut a four-foot vein of good quartz. Ten men are employed at the mine now, and if the report of the strike is true, a quartz mill will be at once erected and the working force largely increased.

**PIKE CITY AND THE ALASKA MINE.**—North San Juan Times, Oct. 1: We made a flying trip to Pike City on Sunday last. We had the pleasure of exploring the vast depths of the Alaska mine. We, for the first time, were lowered to the bottom of that mine, 500 feet below the surface, to the place where the great pump performs duty. It is a wonderful place and a wonderful pump. It keeps the mine at that place as dry as powder, throwing volumes of water at every stroke. Of course we did not explore the hidden mysteries of the mine, because our eyesight is too defective to follow the winding paths. The Alaska mine is running full-handed and at present is crushing some excellent rock. How well it is doing is past finding out, as the Alaska is a close corporation and not given to boasting. The Alaska Company is making extensive preparations for winter work, and have about 8000 cords of wood now placed in the yard and 2000 more in the woods ready for delivery. There are 125 men on the pay-roll, and wages range from \$2.50 to \$3.50 per day. The rock now being raised is not so rich as some heretofore crushed, but it pays handsomely. The Alaska is a good mine and under the present management is worked economically and successfully.

## Trinity.

**FROM DEADWOOD.**—Cor. Shasta Courier, Oct. 2: J. Falan, of the Vermont mine, has been hauling his quartz to Geo. Klein's cannon-ball mill, and last week from nine tons of rock cleaned up \$575, being within a small fraction of \$64 to the ton. His ledge is from four to six feet, and he is so well satisfied with his prospects that he has given up all ideas of either bonding or selling. His lessees, Wren & Leas, are also jubilant over what they have in sight, and are working vigorously. The Chlorination Works at the south fork of Deadwood gulch are progressing rapidly; ten men are employed. The clay for the bricks has to be hauled two miles, but they are determined to have everything solid and substantial. Everything about the Brown Bear and McDonald mines indicates prosperity.

## Tuolumne.

**TO COMMENCE CRUSHING.**—Independent, Oct. 2: Prof. Shraff expects to commence crushing at his mine on next Monday. The enterprise and speed displayed in building the mill and village at this mine is remarkable, and shows what Californians can do when they push things. We hope the ore will turn out the gold far beyond the fondest expectations, and wake up others to set other mines in active operation. These enterprises give occupation to a large number of workmen, and boom business of all kinds. Every man who starts up and makes a success of any one of the many good mines now idle is a public benefactor, and is, or should be, recognized as such.

## NEVADA.

## Washoe District.

**UTAH.**—Enterprise, Oct. 3: Have completed cutting a station on the south side of the shaft 472 feet below the surface, which corresponds with the 520 level in the Sierra Nevada mine, and have started a west drift.

**SIERRA NEVADA.**—On the 520-foot level west crosscut No. 4, started at a point 160 feet south from west crosscut No. 3 from the north lateral drift, was advanced 28 feet; total length, 28 feet. The face is in vein porphyry.

**UNION CONSOLIDATED.**—On the 700-level the work of advancing west crosscut No. 1 and the joint Mexican and Union Consolidated west crosscut at the south line is resumed.

**MEXICAN.**—Operations confined to extending the joint crosscuts mentioned above.

**OPHIR.**—On the 1465 level the timbering of the south drift from the Ophir shaft is being repaired.

**CONSOLIDATED CALIFORNIA AND VIRGINIA.**—On the 1400 level west crosscut No. 1 from the south drift from the C. and C. shaft was advanced 42 feet; total length, 293 feet. On the 1500 level from the station in the old Consolidated Virginia shaft, the south drift has been connected with the Consolidated Virginia stopes. On the 1600 level, the southwest drift, corresponding with the south drift on the 1465 level in Ophir ground, has been connected with the old California stopes. On the 1650 level, the timbering of the southwest drift running from the main west drift from the C. and C. shaft is being repaired. On the 1435 level, the south drift was extended 40 feet; total length, 75 feet. This drift corresponds with the 1300 level in Ophir. During the past week 1032 tons and 1595 pounds of ore were shipped to the Morgan mill. The average value of

the ore milled during the week, according to assays from battery samples, was \$18.38. Bullion of the assay value of \$25,941.53 was shipped to San Francisco since last statement.

**BEST AND BELCHER.**—On the 600 level a south drift started from west crosscut No. 1 in the 12-foot quartz body was advanced 18 feet; total length 87 feet. Operations at this point are suspended, as the face of the drift is near the Gould and Curry north line. East crosscut No. 1 was extended 57 feet; total length, 383 feet. The face is in vein porphyry, showing clay and a little water.

**GOULD AND CURRY.**—All work through the upraise connecting the 500 level with the 425 level is suspended. The station on the 425 level in the Bonner shaft is cleaned out and retimbered. The main west drift from this station has been reopened and timbering repaired a distance of 120 feet.

## Columbus District.

**YANKEE DOODLE.**—Candelaria fissure, Oct. 2: This promising claim is situated about one mile from the Mount Diablo. The tunnel is in about 30 feet. There is a four-foot ledge which will average about \$30.

**GLADSTONE.**—The owners have about 12 tons already sacked for shipment to San Francisco. The mine is looking fine, with a three-foot ledge of first-class ore.

## Cortez District.

**THE CAMP AND MINES.**—Cor. Silver State, Oct. 1: Any one wishing to arrive at Cortez all safe must leave the cars of the C. P. R. R. at Beowawe. The stage leaves Beowawe for Cortez three times a week. We have a population in our vicinity of perhaps 250. The mill in which the leaching process is used, of 50 tons per day capacity, is not surpassed by any in the State. Mr. Wenban pipes his water a distance of eight miles to his mill; thence it is pumped to the mine, a distance of three-quarters of a mile, and a height of 800 feet perpendicular, where it supplies his men with water, also his boiler for running his air compressor, which is used for driving the Barleigh drills, and supplying air for such places in the mine as require it, although the mine is generally well ventilated without the use of compressed air. It is only a short time since that the water for running the machinery, domestic purposes, etc., had to be packed on mules or hauled in wagons to the mine. The Garrison, which is the name of the mine—and it is truly well named, for 20 well-armed men could stand an army off—is situated well up on the mountain side, about 7000 feet above sea level. The formation is limestone, with a giant ledge of quartzite extending for miles along the mountain, losing itself in the valley, and making its appearance again on the opposite side, some 15 miles distant. The Garrison produces some very beautiful and rich ore, principally chloride. All that Nevada wants to bring it to the front is for silver to be put on a solid basis and at \$1.29 per ounce, where it ought to be. Mr. Wenban's mill is running steadily on ore from his mine, and doing good work. Everything around both mill and mine is run in first-class order, and the owner certainly deserves a great deal of credit for his perseverance and energy.

## Eureka District.

**ORE SHIPMENTS.**—Eureka Sentinel, Oct. 2: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Richmond works—Geddes and Bertrand, 25½ tons; Willow creek, 1½; Silver Lick, 17; Silver West, 2½; Macon City, 13; White Pine, 6; Marguerita, 2½; Bullwhacker, 10; Western Contact, 14. To the Eureka Con. works—Jackson mine, 3 tons; Beck, 2; Willow creek, 1½; Featherstone, 14; Basey, 1; Dunderberg, 33; Altoona, 36.

## Ophir District.

**THE MILL.**—Belmont Courier, Oct. 2: The mill at Ophir, owned by John Foster, H. H. Warne, Pat Leonard and James Cruickshanks, is running steadily and producing fine bullion. The ore reduced is from their gold mine in Ophir. They feel sanguine that their venture will prove profitable. The Chicago Mining and Reduction Co. continues to make regular shipments of silver bullion from Ophir. The mine is looking well, and easily produces enough good ore to keep the mill running steadily.

## Philadelphia District.

**SILVER.**—Belmont Courier, Oct. 2: Silver—96¾—is on the upgrade. We hope to see it 106¾ inside of a week. The quicker it reaches its par value the better it will be for mining generally in Nevada. The mines of Belmont would then be started up and worked for all that is in them, and deep mining would take the place of surface scratching. There are big bodies of ore below any of the present workings of the mines in Philadelphia District which will be cut into and uncovered as soon as the price of silver will justify the necessary outlay of capital to place them in a condition to become self-sustaining bullion producers.

## Robinson District.

**A PRODUCER OF GOOD ORE.**—Eureka Sentinel, Oct. 2: The Keystone mine in Robinson District, White Pine county, has produced very good ore of late. Mr. Featherstone recently shipped to the Eureka Con. furnace 24 tons, four of which worked 270 ounces of silver to the ton, and the balance about 80. He has on hand 15 tons which he says will furnace at least 300 ounces to the ton. He expects to make a shipment of from 12 to 20 tons every two weeks from now on until the winter sets in in earnest. By those who saw it recently, the mine is said to look very promising.

## Tuscarora District.

**BELLE ISLE.**—Times-Review, Oct. 2: Belle Isle and Navajo line crosscut has been advanced 22 feet.

**NAVAJO.**—During the past week No. 1 winze on the east vein, 350-foot level, has been sunk 8 feet. The vein shows some improvement in width and high-grade ore. Crosscut, 150-foot level, has been extended 8 feet. South drift, west vein, same level, advanced 9 feet. Have resumed work in south drift No. 2, west vein.

**NORTH BELLE ISLE.**—Have commenced work in No. 1 crosscut, 300-foot level. The formation is the same as that in the hanging wall of the vein on the 150-foot level. The rock is breaking well, and good progress will be made in extending the crosscut to the vein. Good progress has been made



in No. 1 winze, 150-foot level. The quantity and quality of ore show no material change since last report. It continues to carry down high-grade ore from the foot wall to and beyond the west side of the winze. The drifts along the vein from No. 1 and No. 2 crosscuts, on this level, are looking well. All other work in and about the mine is being forwarded as speedily as possible.

## ARIZONA.

**HASSAYAMPA DISTRICT.**—Prescott *Courier*, Oct. 1: The following items we glean from G. H. La Berteu, just in from Hassayampa mining district: The steam arastras, together with the Governor mine, on the east fork of Maple gulch, have been leased by Mr. H. Layton, an old-time Prescottite and thorough miner and millman, who is, at the present time, busily engaged in retimbering the working shaft of the mine and putting things in shape to commence taking out ore for reduction in his arastras, four in number, with capacity to grind six tons per day. The steam-works of these arastras are of the finest quality and capable of running ten stamps. The mine is well developed by shafts, levels and a 150-foot tunnel, the latter tapping the vein at a depth of 300 feet. This is a valuable property and should have a 20-stamp mill to supply its requirements. The U. P. mine, which includes two claims in length, has developed into a triple mine. Formerly this property was valued only for its moderately-sized but rich vein of gold ore. Although it was known that a large vein traversed the claims, it was passed over as worthless, as in those days nothing short of about 40-dollar rock was considered any account. Lately there have been developed two separate veins measuring inside of their walls about four feet. One of these veins is developed by a tunnel 40 feet, which will tap the mine at a depth of 170 feet, and shows good-looking gold quartz. The other vein has a shaft sunk on it 50 feet with 15 feet of a drift, and assays well in gold, silver and copper. These three veins run parallel, and from every indication extend through the entire length of two claims. Mr. Dunlap, a very intelligent gentleman and good miner, has been for the past two years engaged in developing two mines at the head of Maple gulch, both of which are large and will undoubtedly develop into a very valuable property.

**PLACER MINERS.**—Tombstone *Epitaph*, Oct. 1: For years past placer miners have worked at different times in the Canyada del Rio, situated about 25 miles north of Tucson, and all the time, says the *Florence Enterprise*, they have known that an iron lead, 25 feet in width, cut across the head of the canyon, but none of them considered it worth while to prospect this lead. They found the placer gold distributed all the way up the canyon to the ledge, and none above it, but did not stop to think this would indicate that the gold came from the lead. Last week, however, Dr. Vanholster concluded to prospect this iron lead, and discovered that the rock was thoroughly impregnated with the precious metal. How rich the rock is has not yet been determined, but the unusual width of the lead will give it great value, even if the ore should prove to be very low grade. The news of this discovery will cause prospectors, who have passed over the lead without prospecting it, to hire an able-bodied mule to kick themselves with. It is now a known fact that nearly all of the iron leads in this country carry gold to some extent, and the wise prospector will not, in the future, pass over one in the belief that it is barren until he shall thoroughly prospect it.

**SILVER BULLION.**—Prescott *Courier*, Oct. 2: W. C. Dawes arrived here yesterday from Alexandra, Peck mining district, with two bars of silver bullion, containing 2500 ounces. This goes to San Francisco, through Wells, Fargo & Co. Mr. Dawes is lessee of the Peck mill and mine. The mine was flooded when he took it. It cost him \$8000 to raise the water out of it and put it in working condition. He kept up expenses by working tailings; is now in good fix to go on and will, we most sincerely hope, make a stake. He gives employment to about 50 persons.

## COLORADO.

**ORE.**—Georgetown *Courier*, Oct. 1: Reilly & Co., lessees on the Humboldt lode, Ute creek, are said to be taking out ore which returns 25 ounces gold and 40 ounces silver per ton. Stopping is going forward on the Detroit lode on sulphurets from one to six inches in thickness which mills 592, 176 and 117 ounces silver per ton, according to class. The Lewis placer, below Idaho springs, is yielding from 2 to 2½ ounces gold per day. The shaft has reached a depth of 35 feet. The underground working comprises 150 feet of tunneling. Chris. Turpin and W. W. Hickman are driving the tunnel steadily ahead for the Argentine lode, on Leavenworth mountain. They are now in over 200 feet, and soon expect to reach the objective point. The Blue Ribbon lode, at the head of Peck gulch, shows two distinct veins of ore in the bottom of the shaft—one of three inches and the other of eight inches—which mill \$400 and \$150, respectively, to the ton. A shaft-house is now in course of erection, preparatory to the work being prosecuted all winter. The Lone Star lode is being worked by the owner, Al. Penery. A shaft has been sunk on the vein 23 feet, the bottom of which shows a large vein of mineralized quartz which assays well. A Hartford five-ton smelting furnace will be among the improvements soon to be introduced in this county. The Wallace lode, near the Freeland mine, is yielding large quantities of ore valued at about \$130 per ton. The water has all been raised from the shaft and lower workings of the Centennial lode, preparatory to sinking the shaft further.

**IDAHO SPRINGS.**—*News*, Oct. 1: More mining activity on Fall river than we have noticed for years. Some leasers are taking out good-looking quartz from the Williams lode, Virginia canyon. The ro-stamp mill of the Plutus company is running constantly on mill ore from that mine. It is reported that an excellent body of ore has been struck in the Lake lode, Virginia canyon. The Bald Eagle, Virginia canyon, is working continuously and turning out some good ore. A party has taken a lease of the German mine, and is taking out the water preparatory to working it. The Ramage stamp mill, on Fall river, is running on the ores from a group of mines owned by Mr. Ramage. The parties owning the Rover lode shipped to tons of sacked ore to Denver Wednesday. This property is showing up splen-

didly. The Mona, recently purchased by Mr. Hills, an Englishman, is having T-rail laid, and a contract will be let to drive it in Bellevue mountain. One of the biggest strikes of gold quartz on record has been made in a certain vicinity. It beats the palmy days of the old Specie Payment. But mum is the word until further developments are made. The large new air compressor and receiver, with the necessary attachments, has arrived for the Plutus company, occupying four cars in transit. This machinery will be put in place as soon as possible by McFarlane & Co., of Central, and in less than thirty days will be in full working order. This is a new departure in economical mining; and using compressed air for pumping and hoisting purposes will be the means of saving a large sum annually in the item of fuel. When this huge machinery is in place it will be quite an interesting point to visit and watch its operation. The sale of what is known as the Arizona, No Name and Gonda mines, which has been pending for some time, was brought to a close by the paying of \$32,000 to Messrs. E. W. Williams, Edward Jones, Hugh Hughes and Owen L. Hughes, the owners of the properties.

## DAKOTA.

**COMING BONANZAS.**—Black Hills *Tribune*, Oct. 1: Among the many mines attracting attention as prospective bonanzas are the Retriever and Cambrian. These mines are located on the divide between Nevada gulch and Fantail gulch near Bald mountain. The mines are quite extensively developed by a system of cuts and tunnels. These workings show continuous bodies of ore of a high grade, carrying mostly gold. Assays made by S. F. Molitor, of Deadwood, return from \$30 to \$120 per ton. Two men have been working on the Cambrian for a month, and in that time have taken out and stacked on the dump over 40 tons of fine ore. The width of the chute is, as yet, unknown, but from indications good judgment places it at over 40 feet. If work is continued on this property, as no doubt it will be, a short time will suffice to place many thousand dollars' worth of ore in sight. A force of men is also working on the Retriever, and splendid results obtained. One cut on the north end of the claim shows a large body of ore. About 40 tons of ore is stacked on the dump. Further south a succession of cuts expose a continuous ore body for several hundred feet. At present the workmen are uncovering an ore body which has been developed by two shafts and which averages over \$50 a ton. It is from this portion of the ore body that shipments will shortly be made.

## IDAHO.

**SHEEP MOUNTAIN DISTRICT.**—Challis *Messenger*, Sept. 28: The Summit mine is about eight miles northwest of the old Cape Horn house, on the left of the trail from Cape Horn to Sheep mountain, and about 12 miles from Sheep mountain in a nearly south direction. The Summit is owned by Emanuel Bell, Geo. Baldwin, D. C. Kerlee and Jas. Cearley; is developed by a 20-foot tunnel, from which they have made a small shipment of 10000 ore. The Clayton smelter reduced it. The vein is 12 to 14 inches in width; although the whole of it is not so rich, it is all profitable ore for reduction. The country rock of all this region is granite. The Maggie D. mine, owned by Baldwin, Bell & Kerlee, is on the mountain north of the Summit, running nearly parallel, and possesses about the same characteristics as to walls, strike, dip, size, nature of ore, but has had less work done on it. The Bell, owned by Baldwin & Bell, is also another location on the same mountain, of the same quality of ore, and looks very fine for the amount of work performed on it. The Victor, owned by Baldwin, Bell, Cearley & Kerlee, is of the same nature. On the next mountain to the west is the Birdie R., owned by Baldwin, Bell & Hurlbut, of similar indications, that is, of late discovery. Also the 49, owned by Boulette & Lamenstein; new discovery. The Baldwin mine, owned by Baldwin & Bell, is of older location. Some rich rock was shipped from this mine last year, and this season a trainload was shipped to the Clayton smelter, which went about \$325 per ton. It carries some lead. Then there is the White Goat, owned by Baldwin, Bell, Kerlee, Watson & Faulkner, the croppings of which have yielded assays from \$248 to \$350 per ton; located this summer. The Sea Foam, located on the next ridge or mountain west of the Baldwin, about a mile and a half, owned by Post & Co., has some high-grade ore on the dump ready for shipment. This is the same grade of ore as far as developed; development small and by an open cut. The Josephus, lying about five miles west of the Baldwin mountain, was discovered this month by I. N. Daily, and owned by I. N. Daily, Sam Robinson, A. W. Wilson and W. M. Oster, and is the great find of the season as far as we are now advised. From the top showings this is really wonderful. It, like the other veins of this country, carries sulphurets and chlorides and lies in the formation usual to this part of Custer county. It has an immense body of float lying in exact line, covering a space of about 20 feet in width and extending, boldly, nearly 1000 feet in length. Assays of the rock run from 400 to 700 ounces.

**BIG MINING FLUME.**—Coeur d'Alene *Record*, Oct. 2: Wednesday night Civil Engineer Miller completed the survey of the big flume of the Coeur d'Alene Water and Mining Company from Sullivan to Buckskin gulch. The total length is 19½ miles, and when completed it will contain over 2,000,000 feet of lumber and will be one of the largest and longest mining flumes in the United States. It is already completed as far as the crossing of Bear gulch above Raven, and to-day, Thursday, the boxes are being laid there across the top of the big trestle 65 feet above the bottom of the gulch. The mill at Sullivan is now turning out lumber faster than it can be used by contractor McDonald's force of carpenters. He is still unable to get as many men as he wants to push the work.

**ORE.**—Davidson Bros. and Griff. Thomas, leasers on the Elkhorn mine, sold six tons of ore to the Philadelphia smelters this week. The six tons brought \$3500. Harry J. Murdock has bought his brother's—Geo. L. Murdock—one-fourth interest in the Ophir mine, Boulder. Harry now owns a one-half interest in this valuable mining property. He intends working the mine to every advantage, and take out ore as rapidly as possible. M. Carey was down from the Irving Tuesday. He reports the un-

covering of a fine ledge in the Alvia mine. It is over ten feet in width and a true fissure. It was estimated the ledge contained an extensive ore vein a few feet further ahead in the tunnel, which is being run as rapidly as possible. The Alvia mine is owned by Mr. Carey and T. E. Clohecy.

**SLAGGERS INSTEAD OF ROASTERS.**—Ketchum *Bulletin*, Oct. 2: Two more of the roasters at the Philadelphia smelters are undergoing repair and will be converted into slaggers. By this process the ore, after being thoroughly roasted, is melted and drawn from the roaster in the form of slag. It is claimed the ore is easier smelted after this improved treatment in the roasters. Hereafter, all the ores will be treated by the slagging process in the roasters.

## MONTANA.

**ANACONDA AND PHILLIPSBURG.**—*Inter-Mountain*, Oct. 2: From a gentleman just up from Anaconda and Phillipsburg several interesting pieces of mining information are derived. At Anaconda, Saturday night, the company commenced running two shifts in the construction of its new concentrator, and the force thus employed, added to that at work remodeling the old concentrator, increases the total to about 500 men. Anaconda, he says, is now as lively, or even more lively, than Butte. A gigantic new crusher is being placed in a position at the new concentrator. It is a ball crusher and has a crushing capacity of from 800 to 1000 tons per day when doing its level best. It is also a fact, he says, that the company is making changes in the interest of economy at the mine, and it is evident that it is getting ready to produce copper with a sufficient additional saving to enable it to compete successfully with the Lake region or any other copper country. It was mentioned a few days ago that \$50,000 had been offered by foreign capitalists for an opportunity to examine the Cable mine, with the privilege of buying it at a larger figure than had ever been offered for a mine in Montana. The figure was not stated at that time, but it is now understood to have been \$3,000,000. The property, as is well known (or rather believed, for its secrets are never made known) is of fabulous richness and extent—30 feet of \$40 gold ore for the most of the way along the vein for 3200 feet, the extent of development. The offer, large as it was, was promptly refused. Gov. Hauser and other Helena capitalists last week paid \$60,000 cash for a quadruple claim parallel with and adjoining the Cable property. The Pyrenees mill is running steadily on ore from the deepest level (the new one), which is 125 feet below the one from which all previous ore worked has come. West Granite developments go steadily on, but what there is at the inner end of the workings has not been made public. The Blue-eyed Nellie, near Anaconda, keeps up its regular shipments of rich ore.

**STRIKE IN THE LEXINGTON.**—*Inter-Mountain*, Oct. 1: Within the past few days a very rich but singular discovery has been made in the Lexington. It has always been a silver mine. For ten years it has been a steady producer of silver ore. On the 800-foot level, where prospecting has been active of late and where a shoot of the usual character of ore was expected, a body of distinctively copper ore has recently been struck. The size of the strike has not yet been developed. The ore is a pyrites and beautiful color and assays from 25 to 30 per cent copper, and about 80 ounces in silver. Of course it can only be treated by smelting. The discovery dispels the idea that copper may not abound at great depth under all the silver mines in the vicinity of Walkerville. The freak of the Lexington is as interesting as it is important.

## OREGON.

**PLACER AND QUARTZ.**—Jacksonville *Times*, Oct. 1: Miners are generally making preparations for the coming season. The ore in the Hope ledge on Wagner creek is improving as work progresses. There is considerable activity in the Wagner Creek district, and ledges are still being located. The Chinese who have wingdammied Rogue river, near Galice creek, are said to be doing well. Parties from the East have been on Grave creek, inspecting several mines, with the intention of investing. Jack Layton has done well in his mines on Farris gulch this season, and is making preparations for the next. The Sterling Mining Co.'s ditch has been cleaned out, the flumes repaired, and everything will soon be in readiness. L. D. Brown's quartz mill is being put up on the site of the Swinden ledge, and will soon be ready to commence crushing quartz. Keaton, Klippel & Co. are drifting the ground they bought of N. S. Drew on Applegate, and seem well pleased with their prospects. More interest is now being taken in trying to develop quartz mines in and about the vicinity of Canyonville than formerly. Many apparently good prospects are being found. Hopkins & Moon will soon put up a quartz mill on Wright's creek, to thoroughly test the quartz ledge Messrs. Patton have discovered on the ridge north-west of Ashland. McKee & Co., of Forest creek, who are mining in the Elliott Creek district, have struck some excellent prospects, and expect to take out considerable gold dust before snow falls. All the machinery for Baume, Klippel & Co.'s quartz mill is on the ground, and will soon be in running order. The arastra, which will crush the blanket tailings, is now being constructed. J. N. Casteel has bonded the real estate on Forest creek belonging to the Hopkins estate for \$1000, and will immediately put it in shape for the coming mining season. It is supposed to be rich in precious metals. The tunnels being run into the Sugar Pine ledge on Galice creek by the parties who have bonded it are progressing rapidly, and there is every prospect of Green Bros. receiving the large sum of money for their property which it is worth. Alex. Watts was in Jacksonville Wednesday, from whom we learned that he was busily engaged in getting his mines in Josephine county, near Kerbyville, ready for winter. He has finished digging a ditch, and purchased the hydraulic pipe formerly used by Keaton & Klippel on Poorman's creek. The mining interests of Jackson and Josephine counties are looking up. Not only the placers, but the quartz mines, will soon receive the attention they deserve, and more solid work than ever will be done in the near future, when it will be definitely ascertained if our mineral resources will not warrant the investment of a large amount of capital.

## NEW MEXICO.

**BONDED.**—Silver City *Enterprise*, Oct. 1: Messrs. Irwin & Corbett, who have their mine bonded to J. H. Flagler, got returns from a 30-ton shipment of ore that netted them \$600 last week. These gentlemen have a group of claims that are attracting universal attention in mining circles. Mr. Kohlenberg, the principal owner of the Telegraph property, although a little discouraged at the loss inflicted by the big flood on the Gila to his dam and flume, is not a man to sit quietly down and brood over his misfortune. He has started to build a 300-foot dam across the widest place in the river near his property. This will be such a substantial piece of work that a dozen such floods as the last one can have no effect upon it. Six weeks will be consumed in building it, at the end of which time the mill will resume full operations. Mr. Comstock, an experienced mining man, arrived here lately to take charge of the Peerless mine. He started up the property on Monday with a force of eight men, which he will increase from time to time as he can do so with advantage. Although the ore showing at present upon this claim is not extensive, the mine is one of the most promising in Grant county. It is understood that Mr. Comstock has carte blanche to work it extensively.

**HERMOSA.**—*Black Range*, Oct. 1: Reavis & Foster made a shipment of ore from their lease on the Eagle this week. Beebe & Dunn also made a shipment of Antelope ore. Both shipments of ore are of high grade. The late floods carried away the flumes of Ledford's concentrator, which have been replaced and is now running steadily. The nine tons of ore lately shipped from the Palomas Chief gave returns of over \$300 per ton in silver and a good percentage in gold and lead. The Chief is looking well and has plenty of good ore in sight. Frank Reavis discontinued work on his Eagle lease, and is about to commence work on his Small Hope property. The Small Hopes make an excellent showing, and Frank will strike it rich. Mr. Marshall is working a newly discovered prospect from which he is taking out \$500 ore. J. H. Drake has purchased Geo. Leaming's interest in the Argonaut-Consolidated mine. Mr. Drake and Mr. Dunn are now equal owners in this property, which contains a good body of low-grade ore with kidneys of 365 ounce ore scattered through it.

## UTAH.

**SANDSTONE MINING NOTES.**—Southern Utah *Times*, Oct. 2: James Mutton has resumed work on the Annie. Thorne & Hurley are working the Vanderbilt mine, which is looking first rate. Al Hartman has drawn out of the Annie lease, and is prospecting on the Stormont. Bailey & Nesbit are making a good shipment of ore to their leachers, from the Bonanza mine. Dick Jarman and J. B. Smith are opening out the Emma, which is showing up in good shape. The Nesbit, Bailey & Co. leachers had to suspend operations for several days on account of delay of chemicals. Taylor & Lambson have leased a portion of the Leeds mine, and are taking out a lot of ore to work at the leachers. Henry Holland has out about eight tons of fair-grade ore extracted from the Silver Gate mine, which will be manipulated by the N. B. & Co. leachers. In consequence of some important connections having to be made in the Buckeye, the Stormont laid off 15 miners on Sept. 27th, the rest of the force being deemed sufficient. Oct. 1st, the River mill closed to remain inactive for 30 days; the daily shipment of ore to the mill will be continued on a curtailed scale. As soon as the necessary improvements are made work will resume as before. Erroneous reports are afloat concerning the wage cut in the Reef. The facts are as follows: The Christy is the only company which enforced the cut. This company in the first place announced a four-bit cut, to take effect on a certain day, whereupon most of the miners quit work and were replaced by new men at the old wages. September 15, without warning, the company again announced the cut and put it into effect at once. As I understand it, most of the new men stayed with the cut, and the Christy mines and mill are being operated by a full force. The first reduction was announced in connection with a promise of a restoration of the \$3 rate as soon as silver advanced to \$1.

**IMPROVEMENTS.**—Park *Record*, Oct. 2: The grading of the steep hillside, preparatory to erecting the contemplated hoisting works and new buildings of the Crescent, is going ahead. The grading will be finished long before winter sets in. Another improvement is the work of conducting water from the head of Thayne's canyon to the Crescent mine for culinary and machinery uses.

**THE NEW SHOPS.**—Thursday morning a force of masons and laborers was set to work grading and laying the foundation for the new mechanical shops of the Ontario and Daly Companies, just south of the Marsac mill. The main building will be 30x124 feet in size, and will be used for the principal machine and carpenter shops of the two companies. In the building 12x22 feet will be the electric-light dynamo to be run by water power. The old No. 4 works of the Ontario are being torn down, and the material is to be used toward constructing the new buildings, which will be pushed toward completion with all possible speed.

**CAMP CROSSCUTS.**—The entire force at the Anchor mine has been laid off temporarily; but three men, however, are clearing up things for the reception of the two large boilers which are expected to arrive from the East at any day. In a few weeks work will be renewed, and it will not be long before the dropsical mine will be relieved of the surplus water. J. M. Kennelly has put a few men to work on the Great Basin mine. Everything is going on with clock-work precision at the Ontario, Daly, Sampson, Crescent and Apex mines, and, of course, good results are forthcoming.

**ORE AND BULLION SHIPMENTS.**—For the week just ended the Mackintosh sampler received 498,760 pounds of Ontario ore, 152,750 pounds of Daly and 112,530 pounds of Sampson ore; total, 764,040 pounds. During the week the Crescent shipped 325,889 pounds of concentrates and 189,700 pounds of first-class ore. The Daly bullion product from the Marsac mill for the week was seven bars, containing 7879 fine ounces of silver. The output of Ontario bullion for the week was 31 bars, containing 18,493 fine ounces of silver. Add Dakota





THE CONSUMERS' COMPANY.

**VULCAN B B AND AJAX.**

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**

218 California Street, San Francisco, Cal.

**THE GIANT POWDER COMPANY**

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

**GIANT POWDER or DYNAMITE,**  
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

**JUDSON POWDER IMPROVED.**

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

**BANDMANN, NIELSEN & CO.,**

CAPS and FUSE for Sale.

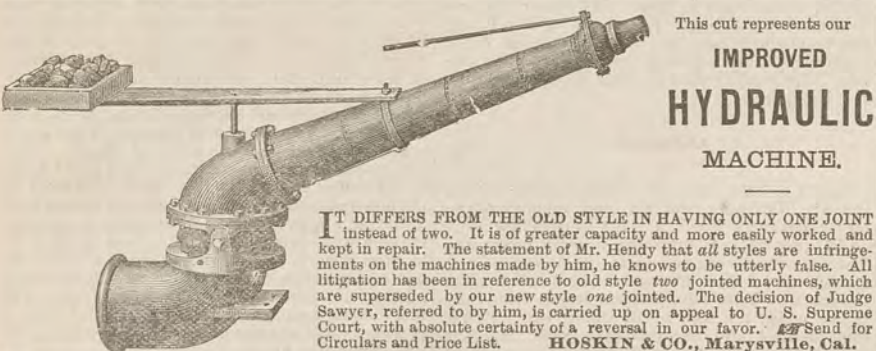
GENERAL AGENTS, SAN FRANCISCO, CAL.



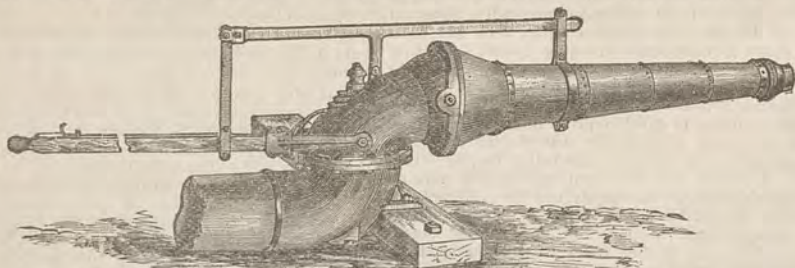
We are now in the field as manufacturers of SINGLE-JOINTED HYDRAULIC GIANTS, and are prepared to furnish the several sizes with quick dispatch, and they will be found to be the equal of, if not superior to, a similar form ordinarily known as the Marysville Nozzle, and will quote prices upon application.

**JOSHUA HENDY MACHINE WORKS,**

Nos. 39 to 51 FREMONT ST., SAN FRANCISCO, CAL.



This cut represents our

**IMPROVED  
HYDRAULIC  
MACHINE.**IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List. **HOSKIN & CO., Marysville, Cal.****IMPROVED FORM OF HYDRAULIC GIANTS.**The above cut illustrates the **IMPROVED FORM OF HYDRAULIC GIANTS**, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

PRICES furnished upon application to

**JOSHUA HENDY MACHINE WORKS,**  
39 to 51 Fremont St., San Francisco, Cal.**RICHARD C. REMMEY, Agent,**  
**Philadelphia Chemical Stoneware Manufactory,**  
1100 East Cumberland St., PHILADELPHIA, PA.Manufacturer of  
all kinds of  
**Chemical Stoneware**  
—FOR—  
Manufacturing  
Chemists.  
Also Chemical Brick  
for Glover Tower.

BACK FILES of the MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$5. Inserted in Dewey's patent binder, 50 cents additional per volume.

**QUARTZ BREAKERS!**

—AND—

**Pulverizers Combined.**To Run by Hand or Power.  
Mining Machinery of Every Description; Drawings, Plans and Specifications.**E. I. NICHOLS, 316 Mission Street, S. F.**

This paper is printed with Ink Manufactured by Charles Eneu Johnson &amp; Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

**H. P. GREGORY & CO.**

Nos. 2 and 4 California St.,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

**MACHINERY**

SOLE AGENTS FOR

J. A. FAY &amp; CO.'S WOODWORKING MACHINERY.

FRANK &amp; CO.'S WOODWORKING MACHINERY.

NEW HAVEN MANUF'G CO.'S MACHINISTS' TOOLS.

BEMENT &amp; SON'S MACHINISTS TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND EXHAUSTS.

SHIMER MATCHER HEADS.

BRAINARD MILLING MACHINES.

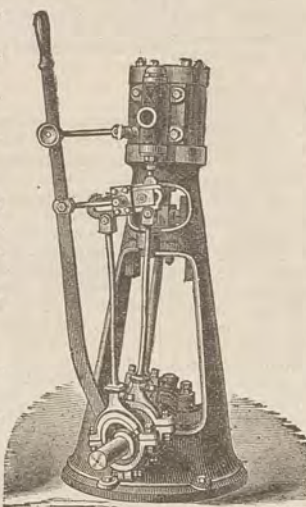
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS.

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISHERS.



WILLIAMSON BROS' HOISTING ENGINES.

ATLAS ENGINE WORKS ENGINES AND BOILERS.

PAYNE'S VERTICAL AND HORIZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS.

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECTORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

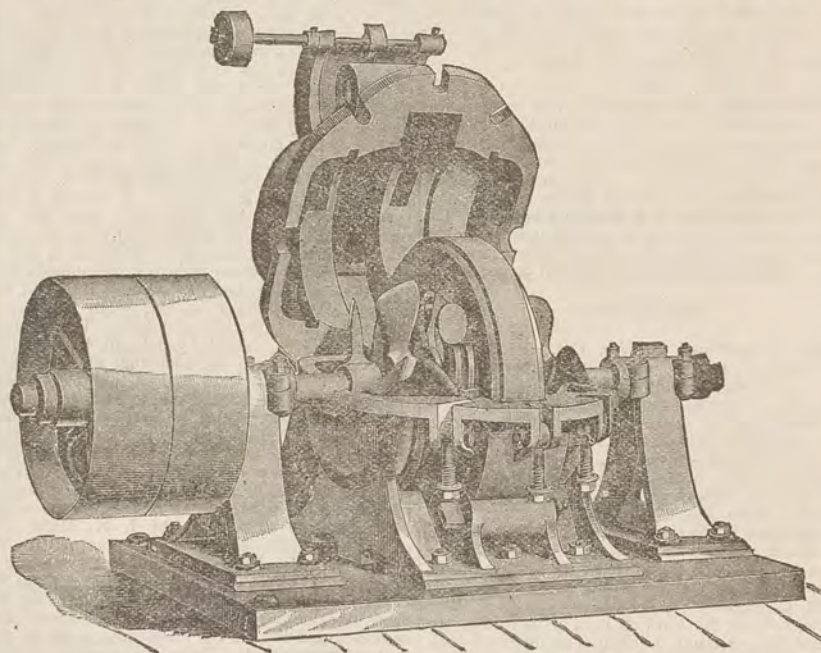
H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

YACHT ENGINES.

**ENGINES and BOILERS**

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

**THE FRISBEE-LUCOP MILL,****A CENTRIFUGAL ROLLER MILL**

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.

Certificates as to performance of the Mills, and any information required, furnished on application.

**THE FRISBEE-LUCOP MILL CO.,**Office, 104 & 106 Washington St., NEW YORK.  
OR PACIFIC IRON WORKS, SAN FRANCISCO.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,  
JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

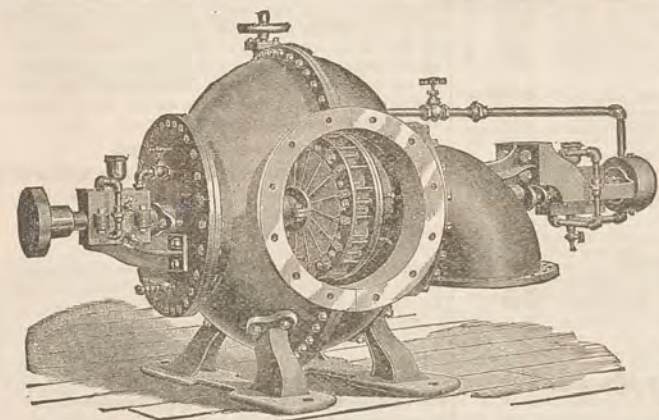
TRAMWAYS.

GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

UTAH OFFICE—SALT LAKE CITY, UTAH.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.  
MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.



## JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.  
Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.  
Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,  
Springfield, Ohio, or 110 Liberty St., New York.  
FRASER & CHALMERS, General Agents,  
Chicago, Ill., and Denver, Col.  
PARKE & LACY, General Agents, San Francisco, Cal.

## MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

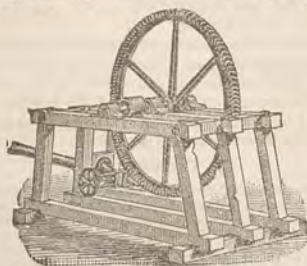
Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

## KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.  
SEND FOR CIRCULAR.

EDWARD A. RIX & CO.,  
Sole Agent,

18 and 20 Fremont Street, San Francisco.

INVENTORS, TAKE NOTICE

L. PETERSON, MODEL MAKER,  
258 Market St., N. E. cor. Front (up stairs), San Francisco.  
Experimental machinery and all kinds of metal, tin, and brasswork.



## PATENT LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning  
and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, Threshing and Stock-driving, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,  
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.

## CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 First Street, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

## THOMAS PRICE'S ASSAY OFFICE, CHEMICAL LABORATORY,

BULLION ROOMS and ORE FLOORS,  
524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

## Metallurgy and Ores.

**SELBY  
SMELTING and LEAD CO.,**  
416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY  
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphures.

...MANUFACTURERS OF...

BLUESTONE,  
LEAD PIPE,  
SHEET LEAD,  
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,  
Under Chamberlin Patent.

C. H. AARON,

ASSAYER AND METALLURGIST,  
NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

**WM. D. JOHNSTON,**  
ASSAYER AND ANALYTICAL CHEMIST,  
514 Kearny Street,  
SAN FRANCISCO, CALIFORNIA  
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

**JOHN TAYLOR & CO.,**  
IMPORTERS AND DEALERS IN  
ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

## Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt,)

Mining Engineers and Metallurgists.

**METALLURGICAL WORKS,**  
318 Pine St. (Basement),  
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.



The California  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

FLOUR AND OTHER MILLS.  
Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.



## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DRAWN & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING SEPT. 28, 1886.

- 349,831.—MOVABLE ICE CHAMBER—J. Allegretti, West Berkeley, Cal.  
 349,835.—PRESERVING PILES—Jas. Cass, Cayucos, Cal.  
 349,700.—EXPANSION DRILL—J. F. Dye, Santa Paula, Cal.  
 349,712.—OVERFLOW GATE FOR RESERVOIRS—Halley, Wilkinson & Bissett, Auburn, Cal.  
 350,002.—SUBMERGED FORCE-PUMP—L. A. Kelly, East Oakland, Cal.  
 350,070.—SHIRT—S. Mendelsohn, S. F.  
 349,902.—CUFF-HOLDER—Richardson & Barkeley, Jr., Los Angeles.  
 349,750.—PLOW—F. Rothmunt, S. F.  
 349,845.—MOLDING MACHINE—Richard Savage, S. F.  
 349,817.—ANTI-FRICTION THILL TIP—R. W. Simpson, S. F.  
 350,008.—CASTRATING INSTRUMENT—J. Trullinger, Silverton, Ogn.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Quartz But Not Gravel.

In the Superior Court, on the 4th inst., the County of Sacramento obtained an absolute injunction against J. B. Hobson for hydraulic mining on the American river, or allowing others to thus mine his mine, or to use the water thereof for hydraulic mining purposes. Soon after, Wm. Singer, Jr., representing the defendant, appeared before the Board of Supervisors, and they passed resolutions to the effect that Hobson would not be molested so long as he confined his operations to quartz or drift mining. The resolutions contained the following:

Whereas, the said J. B. Hobson has consented that judgment may be entered against him enjoining him as prayed for in the complaint in said action without costs, and his attorney represents that the said J. B. Hobson will not mine by the hydraulic process;

Now this is to assure the said J. B. Hobson that the County of Sacramento will not in the said suit prosecute the said J. B. Hobson for contempt, provided he mines only by the quartz process or the drift process, as now conducted and understood; and will not prosecute him for contempt if he mines by the sluice process, if running by the said sluice process he does not deposit in the American river or any of its forks, ravines, or tributary streams, any tailings, boulders, cobbles, gravel, sand, clay, debris, or refuse matter from mining ground, or allow others to do so, or allow his water supply to be used therefor, and shall not in any instance do any of the damages complained of; it being understood that the said plaintiff desires to obtain the result prayed for in the complaint, and will not prosecute said defendant so long as he does nothing to affect the result obtained by the injunction in said case.

## Mining Share Market.

The announcement that operations below the 2400-foot levels on the Comstock have been suspended is a severe blow to the stock market. The lower levels are to be stripped of machinery entirely, and work there abandoned. The Combination shaft is down to 3255 feet, and was sunk by the Chollar, Norcross and Savage Companies. The Savage have refused to pay their share of pumping expenses; hence the shut-down.

A prominent superintendent authorizes the statement that the shut-down will not be so disastrous as represented; that it is only temporary, and that negotiations are pending for the immediate starting up of the pump at the Yellow Jacket new shaft, the expense to be borne jointly by the Potosi, Alpha, Exchequer, Crown Point and Belcher. This will relieve the burden of the cost of draining, now borne solely by the middle mines.

He further stated that extensive prospecting operations will be inaugurated in the Chollar and Potosi mines above the 2400 level, and that the management of the Gold Hill mines are determined to drain the flooded levels for the purpose of thoroughly prospecting the 2700 level in the Belcher.

The following mines report cash on hand on the 1st inst.: Belcher has \$345,691; Bodie Tunnel, \$87,813; Crown Point, \$25,823.01, with an overdraft at Virginia City of about \$69,207.01; Con. Imperial, \$528,011; Dudley, \$14,671.10; Humboldt Hill, \$987,661; Manhattan has assets to the amount of \$43,729.32; Syndicate, \$417,295; Union, \$509,511.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Con. Virginia and California, Oct. 3, \$25,941; Moulton, Sept. 28, \$11,000; Marget Ann, 28, \$45,821; Lexington, Oct. 1, \$20,954; Germania, Sept. 28, \$36,241; Queen of the Hills, 28, \$28,901; Germania, 29, \$11,439; Alice, 29, \$14,762; Hanauer, 30, \$54,301; Stormont, 30, \$29,651; Hanauer, Oct. 1, \$25,601; Queen of the Hills, 1, \$36,001; Germania, 2, \$17,890; Hanauer, 2, \$25,280; Queen of the Hills, 2, \$13,350; Silver Reef (for September), \$28,619; Hanauer, 3, \$52,601; Queen of the Hills, 3, \$19,701.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENT.									
COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Andes S M Co.	Nevada.	30.	25.	Sept 15.	Oct 21.	Nov 10.	R Burris.	309	Montgomery St
Bodie Con M Co.	Calif ornia.	51.	50.	June 21.	Aug 23.	Oct 18.	G W Sessions.	309	Montgomery St
Bullion M Co.	Nevada.	31.	30.	Aug 31.	Oct 5.	Oct 26.	R R Grayson.	327	Pine St
Bedrock M Co.	California.	2.	10.	Sept 13.	Oct 18.	Nov 8.	J L Hunt.	308	Montgomery St
Baker Divide M Co.	California.	12.	25.	Sept 24.	Oct 25.	Nov 17.	D M Kent.	330	Pine St
Best & Belcher M Co.	Nevada.	35.	50.	Sept 29.	Nov 4.	Nov 24.	W Willis.	309	Montgomery St
Champion M Co.	California.	22.	40.	Aug 31.	Oct 5.	Oct 21.	T Wetzel.	522	Montgomery St
Chollar M Co.	Nevada.	21.	50.	Aug 24.	Sept 29.	Oct 20.	C E Elliot.	309	Montgomery St
Golden Jacket M Co.	Nevada.	2.	10.	Sept 1.	Oct 14.	Nov 4.	R G McClellan.	331	Montgomery St
Gould & Curry M Co.	Nevada.	54.	50.	Sept 28.	Nov 3.	Nov 24.	A K Durbin.	309	Montgomery St
Golden Fleece M Co.	California.	6.	15.	Oct 18.	Oct 23.	Nov 13.	W J Gleason.	312	Phelan Block
Gold Point M Co.	California.	11.	01.	Aug 1.	Oct 23.	A B Brady.			Grass Valley
Liberty Hill Con M Co.	California.	1.	15.	Sept 1.	Oct 7.	Oct 28.	F E Luty.	330	Pine St
Mount Cory M Co.	Nevada.	1.	1.00.	Aug 25.	Oct 2.	Oct 23.	G Frier.	309	Montgomery St
Mayflower Gravel M Co.	California.	32.	25.	Sept 6.	Oct 15.	Nov 12.	J Morizio.	328	Montgomery St
Nevada M & M Co.	Nevada.	1.	1.00.	Aug 25.	Oct 2.	Oct 23.	G L Brander.	309	Montgomery St
Pilgrim M Co.	Idaho.	6.	01.	Aug 7.	Sept 17.	Oct 16.	A Halsey.	328	Montgomery St
Potosi M Co.	Nevada.	10.	30.	Aug 31.	Oct 5.	Oct 26.	C E Elliot.	309	Montgomery St
Silver Lining M Co.	Nevada.	2.	10.	Sept 14.	Oct 18.	Nov 5.	A H Clough.	431	California St
Sierra Nevada S M Co.	Nevada.	53.	25.	Sept 11.	Oct 13.	Nov 1.	E L Parker.	309	Montgomery St
Utah M Co.	Nevada.	53.	50.	Aug 24.	Sept 28.	Oct 18.	A H Fish.	309	Montgomery St

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Con. Cal. & Virginia M. Co.	Nevada.	A. W. Havens.	309 Montgomery St.	Annual.	Oct 11
Exchequer M. Co.	Nevada.	C. E. Elliot.	309 Montgomery St.	Annual.	Oct 18
Eureka Con. M. Co.	Nevada.	E. H. Wilson.	309 Montgomery St.	Annual.	Oct 18
Gold Canyon M. Co.	Nevada.	F. A. Berlin.	439 Montgomery St.	Annual.	Oct 12
Mayflower G. M. Co.	California.	J. Morizio.	328 Montgomery St.	Annual.	Oct 18
Plumas Con. M. Co.	California.	J. L. Fields.	328 Montgomery St.	Annual.	Oct 11
Sherman M. Co.	California.	H. Ropper.	329 Pine St.	Annual.	Oct 11
Silver West Con. M. Co.	Nevada.	F. R. Bunker.	628 Montgomery St.	Annual.	Oct 19

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Paradise Valley M. Co.	Nevada.	W. Lott Oliver.	328 Montgomery St.	20.	Sept 30
Silver King M. Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Aug 15
Young America M. Co.	California.			40.	May 20

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Sept. 16.	WEEK ENDING Sept. 23.	WEEK ENDING Sept. 30.	WEEK ENDING Oct. 7.
Alpha.	.55	.60	.65	.70
Alta.	.95	1.25	1.25	1.50
Andes.	.15	.25		.10
Argenta.		1.25	1.35	
Belcher.				1.25
Belding.				
Best & Belcher.	1.00	1.20	1.00	1.10
Bullion.		.10	.10	.05
Bonanza King.				.35
Bodie.	.35	.60	.80	.60
Bodie Con.	2.40	2.55	2.40	2.80
Benton.	.25	.30	.30	.15
Bodie Tunnel.				.40
Bulwer.	1.55	1.75	1.85	1.75
California.	2.60	2.90	2.70	2.80
Challenge.			.25	.30
Champion.				
Chollar.	.55	.65	.45	.55
Confidence.		2.50		2.55
Con. Imperial.			2.50	2.55
Con. Virginia.	2.60	2.90	2.70	2.80
Con. Pacific.				2.50
Crown Point.			1.00	1.10
Day.				.95
Eureka Con.	3.70	3.75	3.20	3.75
Eureka Tunnel.				3.95
Exchequer.				.15
Grand Prize.				.35
Gould & Curry.	.60	.80	.05	.75
Goodshaw.				.65
Hale & Norcross.	1.10	1.40	1.10	1.20
Holmes.				1.15
Independence.			.20	.60
Julia.				.40
Justice.	.40	.60	.70	.80
Martin White.				.70
Mono.		2.50	2.45	2.50
Mexican.	.55	.65	.45	.50
Mt. Diablo.				2.50
Northern Belle.				2.50
Navajo.	.65	1.15	.95	1.05
North Belle.	1.35	2.45	.35	2.75
Occidental.	.90	1.25	1.20	1.30
Ophir.	1.25	1.55	1.25	1.30
Overman.	.25	.35	.35	.40
Potosi.	.30	.40	.25	.35
Pinal Con.		1.95	2.30	
Savage.	2.20	2.45		1.70
Seg. Belcher.		.35	.40	1.85
Sierra Nevada.	.35	.45	.15	.35
Silver Hill.				.15
Silver King.		5.50	.05	
Scorpion.				.15
Syndicate.	.15			
Tioga.				
Union Con.	.40	.50	.35	.50
Uta.		.50	.35	.50
Yellow Jacket.	.90	1.65	.85	1.00

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., Oct. 7.	100 Mono.	2.30
325 Alta.	7 @ 75c	
300 B. & Belcher.	40 @ 1.50	3.00
200 Bodie Con.	15 @ 2.45	3.68
300 Bodie Tunnel.	15 @ 2.40	3.60
400 Bodie Tunnel.	40 @ 2.40	9.60
450 Bodie Con.	2.45 @ 2.50	10.00
500 Chollar.	65 @ 70c	45.50
600 Con. Va. & Cal.	2.10	1.26
250 Gould & Curry.	55c	1.38
550 Hale & Nor.	75c	41.25
100 Justice.	35c	35.00
1000 Lady Wash.	15c	150.00

## New York Metal Market.

Telegraphic advices dated Oct. 7th give the following New York prices:

BORAX—6 3/4 @ 7 1/2 c.  
 BAR SILVER—66.75 per oz.  
 COPPER-LAKE—\$11.1 1/2.  
 IRON—No. 1, \$17 @ 18.00.  
 LEAD—\$4.85 @ 4.95.  
 QUICKSILVER—43 @ 43 3/4 c.  
 The following is the latest by mail from the "New York Metal Exchange Market Report":  
 COPPER—Steady, spot closing 10.95c @ 11.10c.  
 Transferable Notices (Lake) issued at 11.25; Transferable Notices (Chili Bars) issued at 11.41 5/8.  
 LEAD—Dull at 4.45 @ 4.60c spot. Transferable Notices issued at 4.50.  
 TIN—Active at 22.40 @ 22.45. Transferable Notices issued at 22.60.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.85 @ 23.00; Billiton Tin, \$23.00 @ 23.25; Banca Tin, \$23.00 @ 23.50; Baltimore Copper, \$9.35 @ 9.65; Orford Copper, \$10.25 @ 10.75; P. S. C. Copper, \$9.35 @ 9.65; Foreign Lead, \$4.85 @ 4.95; Foreign Spelter, \$4.70 @ 4.75.

MAKER'S PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18.50 @ 19.00; No. 2, \$17.50 @ 18.00; Grey Forge, \$16.00 @ 16.25. Hudson River, Grade No. 1, \$18 @ 19.00; No. 2, \$17.50 @ 18.00; Grey Forge \$15.50 @ 16.00. Southern, Grade No. 1, \$18.00 @ 19.00; No. 2, \$17.00 @ 18.00; Grey Forge \$15 @ 16.

## San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Oct. 7, 1886.

ANTIMONY—French Star.	9 1/2 @	8
BORAX—San Bernardino.	— @	8
Armstrong.	— @	8 1/2
IRON—Glenbrook ton.	— @	22 50
Eglinton, ton.	— @	21 50
American Soft, No. 1, ton.	— @	24 00
Oregon Pig, ton.	21 00	23 00
Clippard, Nos. 1 & 4.	22 00	23 50
Clay Lane White.	21 50	—
Shots, No. 1.	23 50	—
STEELE—English, lb.	16 @	25
Black Diamond, ordinary sizes.	10 @	—
Plow.	4 @	5
Machinery.	5 @	6
Sanderson Bros.	10 @	—
COPIED.		
Brazers' sizes.	20 @	26
Bolt.	19 @	—
Sheathing.	30 @	—
Ingot.	12 @	13
LEAD—Pig.	4 75 @	—
Bar.	5 25 @	5 50
Pipe.	8 @	—
Sheet, new.	1 05 @	—
Shot, discount 10% on 500 bag.	1 05 @	—
Buck, 8 bag.	1 85 @	—
Chilled, do.	2 05 @	—
ZINC—German.	9 @	10
Sheet, 7x3 ft, 7 to 10 lb. less the cask.	7 1/2 @	—
QUICKSILVER—By the flask.	39 00	40 30
Flask, new.	1 05 @	—
Flasks.	85 @	—
TINPLATE—Coke.	5 00 @	6 50
Charcoal.	6 75 @	7 25

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
 G. W. INGALLS—Arizona.  
 E. L. RICHARDS—San Diego Co.  
 R. G. HUSTON—Montana.  
 FRANK W. SMITH—Nevada and California.  
 GEO. McDOWELL—Fresno and Tulare Cos.  
 O. F. BERGMAN—Tehama and Colusa Cos.  
 J. S. LANTON—Nevada, Sierra and Plumas Cos.  
 SEANNETTE HOUGHTON—San Mateo Co.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

## Take a Receipt.

ALWAYS TAKE A RECEIPT from a newspaper agent. Not simply because a few out of many are tricky or careless, but because accidents will sometimes happen to the best of business men. It is a favor due to the publisher that every subscriber shall take a receipt from the agent, or clerk whom they pay. All our receipts have a corresponding stub which agents are accountable for and are required to return.

EL CALLAO mine, at Venezuela, produced \$293,000 in gold in July, from which a dividend of \$6.20, or \$257,600, was paid in London.

THE Small Hopes Consolidated mine paid a dividend of \$50,000 September 29th, making \$537,500 this year and \$2,276,500 since the beginning.

THE Idahoan mine, at Hailey, Idaho, paid a dividend of \$12,000 on the 17th of September, making a total of \$80,900 this year.

THE Honerine mine paid a dividend of \$12,500 on the 28th of September, making \$75,000 to date.

## About Obtaining Patents.

## Patents are Virtually Contracts.

The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, in order that it may afford him complete protection for his invention during the life of his patent.

## Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which the invention relates. If, by this "preliminary examination," the improvement is found to have been previously patented, our client will receive, for the small sum of \$5 for the examination, a verbal or written report showing definitely wherein his invention has been anticipated, thereby saving him further expense and perhaps much time, anxiety, etc.

To avoid all needless delay, however, and secure patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with \$15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately and forwarded to the inventor for his signature. When he receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fees. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of \$80 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give up a case so long as there is a chance of obtaining a patent. The Agency charge, including drawings, rarely exceeds \$40, and for this we do all we can without appealing the case.

## Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are more satisfactory to the Patent Office than the old cumbersome system of storing up an immense bulk of countless models.

Drawings or sketches, sufficient to illustrate the invention clearly, with a description that will enable us to make a full set of perfect drawings for the Patent Office, is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings often prejudice capitalists and manufacturers against the invention, while in reality it may be of great value, and would meet with ready sale had it been skillfully, completely and artistically portrayed. In all cases prepared by us the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken to have the invention fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public when the patent is granted.

## Advantages to Inventors on the Pacific Coast.



## Books on Assaying.

By C. H. AARON.

## PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the practical miner can mistake his meaning.

The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

## Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scoriafication; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 12mo. pages, with illustrations, well bound in cloth; 1884. Price, \$1, postpaid. Sold by DEWEY & Co., Publishers, No. 252 Market street, San Francisco.

## PARTS II AND III.

Lead, Copper, Tin, Mercury, etc.  
Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

## Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Manipulation, etc.; Lead Ores; Copper Ores; Volumetric Assays; Parkes' Process; Amalgamation; New Process; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of Zinc Ores, New Method; New Assay of Nickel and Cobalt; Assay of Chromium; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Salt; Appendix to Part I; Notes on Crucible Assays; Weighing by Oscillations; Appendix to Part III; The Assay of Lead; The Assay of Copper.

There are 160 12mo. pages with illustrations in the volume which is bound strongly in cloth. Price postpaid, \$1.75. Sold by DEWEY & Co., Publishers, No. 252 Market St., S. F.

## Practical Hydraulics.

By P. M. RANDALL.

## A Book for Civil Engineers, Miners, Millmen, Hydraulicians, Mining Engineers, and Irrigators.

This new work is by one of the most experienced hydraulicians of the country. It abounds with useful tables for ready reference, in which the results of elaborate calculations are all placed in a form so that one can find what he wants in a moment. For the engineer the principles, formulae, coefficients, etc., are given; and for those not familiar with higher mathematics, examples, rules, and tables are prepared. Thus the needs of the scientist and the practical miner or millman are each met. It is the most complete work on the subject yet published, and is specially applicable to the Pacific Coast.

## Table of Contents.

The following brief abstract of the contents will give an idea of the branches of the subject treated:

General Plan; Discussion of the Principles of Hydraulics; Rules Deduced from Formulae Obtained; Examples and Calculations; Extensive Tables for Ready Reference; Fundamental Laws of Hydraulics Demonstrated, and Expressed in Formulae and Rules; Flow of Water through Openings; Weir Coefficients; Triangular Weirs; Flow of Water over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water through Short Tubes and Compound Tubes; Flow of Water through Pipes; Tables of Velocities and Cubic Feet Flows for Given Fall per Mile and Diameter of Pipe; Coefficient for Bend—Circular and Angular; Flow through Nozzles; Inverted Siphons; Flow of Water in Open Channels; Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

Price, \$2.00, post-paid. Sold by DEWEY & Co., Publishers, 252 Market St., San Francisco.

## COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

Practical Treatise on Hydraulic Mining.  
By AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by DEWEY & Co., Publishers, 252 Market St., San Francisco.

## WANTED!

Man of Capital and Mining Experience to buy a number of claims, all in the hands of prospectors. Three Locations on same vein, 10-25 feet; formation, slate hanging, granite footwall; assays from \$10 to \$90 per ton in gold and silver, with a little copper in it. Can be opened and worked with tunnels to a depth from 400 to 2000 feet. Plenty of water and densely timbered. Title perfect. About 20 miles from N. P. R. R., Montana. No Reduction Works in the vicinity. Will bear close investigation. Great chance for practical mining men of some means. Price, \$30,000. For further particulars, address

J. W. LIND,  
Marysville, Lewis & Clarke Co., Montana.

## THE GUTTA PERCHA AND RUBBER MANUFACTURING CO.

—MANUFACTURERS OF—

## RUBBER GOODS.

Patentees of the Celebrated "MALTESE CROSS" Brand Carbolized Hose.

TRADE MARK.

The Best Belting for Threshing Machines is our MONARCH RUBBER BELTING, made with Cotton Stays or Flexible Rivets.



We have also the Patent RED STRIP Rubber Belting, and our Superior STANDARD Rubber Belting. Send for Price List of kind wanted.

JAMES F. HOUGH, General Manager of San Francisco and Portland, Or., Branches 15 and 17 FIRST ST., near Market, SAN FRANCISCO, CAL.

## DELINQUENT NOTICE.

Truckee Ice Company.—Location of principal place of business, San Francisco. Location of works, Martis Creek, Nevada county, Cal.

NOTICE.—There are delinquent, upon the following described stock, on account of Assessment (No. 1) levied on the 1st day of September, 1886, the several amounts set opposite the names of the respective Shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
McAulay, F.....	Not issued.	200	\$2000 00

And in accordance with law, and an order of the Board of Directors, made on the 1st day of September, 1886, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, in San Francisco, on Monday, the 25th day of October, 1886, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of the sale.

GEO. W. SCOTT, Secretary.

OFFICE—202 Sansome St., room 4, San Francisco, Cal.

## DIVIDEND NOTICE.

OFFICE OF THE

Paradise Valley Mining Company  
San Francisco, California.

At a meeting of the Board of Directors of the above-named company, held September 29, 1886, Dividend No. 9, of Twenty Cents (20c.) per share, was declared, payable on Thursday, the 30th day of September, 1886, at the office of the company.

W. LETTS OLIVER, Secretary.

OFFICE—No. 323 Montgomery Street, San Francisco, California.

## A Good Opportunity for a Mechanic.

A variety of good Tools, Patterns, etc., with business for sale cheap by a party retiring from business. A splendid opportunity for an enterprising mechanic.

Address A. B. O., care of this paper.

## San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice

TUBBS &amp; CO.

411 and 413 Front St., San Francisco

## WANTED.

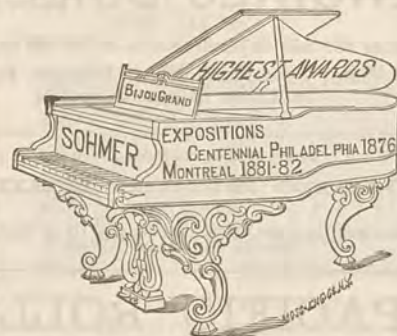
To exchange one-half interest in three mining claims, in Montezuma District, Sonora, for a reasonable amount of money, to be used in developing said claims. One claim has paid a fair profit for over a year. The capture of Geroumo and band by Gen. Miles makes this the safest investment on this coast. For further particulars, address

J. E. BICKERTON,  
1069 Grove St., Oakland, Cal.

AUGUST LUTZ,  
METAL SPINNER,

10 Stevenson St., 3d floor, S. F.

The only custom work spinner in the city. Personal attention given to all work. Orders respectfully solicited.

SOHMER & CO. PIANOS.  
PEEK & SON PIANOS.  
BYRON MAUZY,

SOLE AGENT,

922 Market Street, San Francisco, Cal.

SEND FOR CATALOGUE.



UNCLE Sam has found it at last! A sure remedy for Torpid Liver, Sick Headache, Habitual Constipation, Chills and Fever, and all affections of the Kidneys and Liver. This is a New Compound, and one trial will convince you that it is the Cheapest and Best Remedy in the Market for Diseases of Kidneys, Liver and Stomach. If you want a pure vegetable compound, that is positively guaranteed to contain no mercury, go to your Druggist, and get a Bottle of the Arkansaw Liver and Kidney Remedy. Price, \$1.00 per Bottle.

For Sale by all Druggists.

American Exchange Hotel,  
SANSOME STREET.

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50 PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

N. W. SPAULDING  
SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

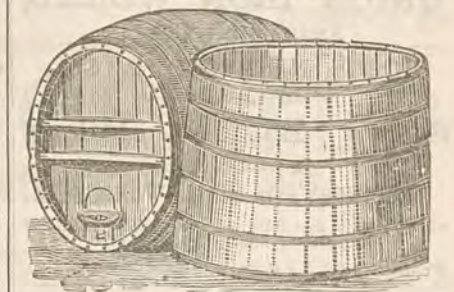
CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.



WATER TANKS! WINE TANKS!

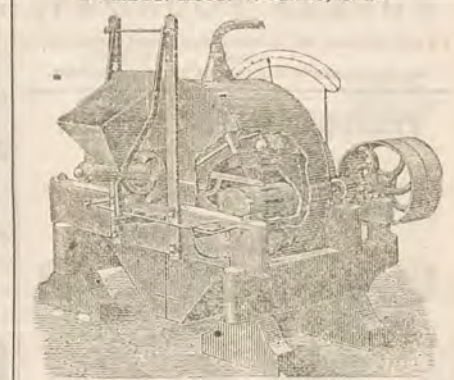
CALIFORNIA WINE COOPERAGE CO.

FULDA BROS., Proprietors,

30 to 40 Spear St., San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

Tustin's Pulverizer  
WORKS ORE WET OR DRY  
FULTON IRON WORKS, S. F.

MANUFACTURED BY

HINCKLY, SPIERS &amp; HAYES,

W. E. CHAMBERLAIN, JR. T. A. ROBINSON.



Returned to new building, former location, 325 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Evening Sessions during the entire year.

Call, or send for CIRCULAR to CHAMBERLAIN & ROBINSON, Prop's.

NATIONAL ASSURANCE CO.,  
OF IRELAND.ATLAS ASSURANCE COMPY,  
OF LONDON.BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.H. M. NEWHALL & CO.,  
GENERAL AGENTS,

309 &amp; 311 Sansome St., San Francisco, Cal.



RUPTURE!

A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort night and day. Gives universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDMER, (Druggist) 701 Market Street, San Francisco.

HEALD'S BUSINESS COLLEGE,  
24 Post St. S. F.  
Send for Circular.

Engraving. Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.



## Iron and Machine Works.

### CALIFORNIA MACHINE WORKS, WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,  
No. 119 Beale St., - - San Francisco.

— BUILDER OF —  
Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines  
Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. **ALL ORDERS SOLICITED.**

### UNION IRON WORKS, SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

Steam Engines, Boilers,  
AND ALL KINDS OF

MACHINERY FOR MINING PURPOSES.

Flouring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front St., bet. N & O Sts., Sacramento, Cal.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S.F.

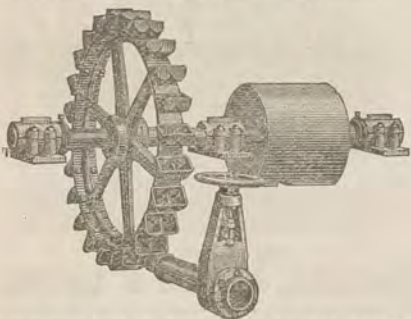
THOMAS THOMPSON THORNTON THOMPSON

THOMPSON BROTHERS,  
EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

### PELTON'S WATER WHEEL.



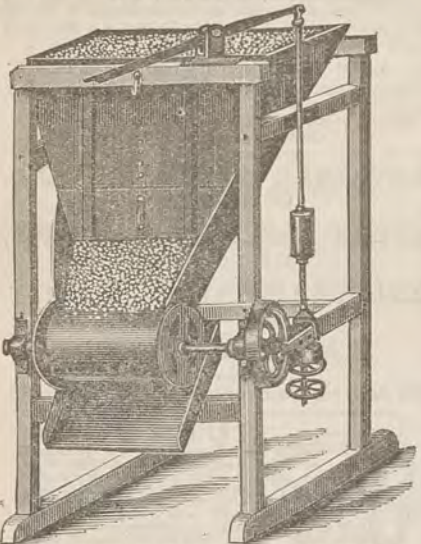
THIS WAS ONE OF THE FOUR WHEELS TESTED  
by the Idaho Company at Grass Valley, Cal., and  
gave 90 2 per cent., distancing all competitors. Send for  
Circulars and guaranteed estimates.

L. A. PELTON,

Agents—PARKE & LACY, 21 and 23 Fremont Street  
San Francisco, Cal.

### THE ROLLER ORE FEEDER

[Patented May 23, 1882.]



This is the best and cheapest Ore Feeder now in use.  
It has fewer parts, requires less power, is simpler in  
adjustment than any other. Feeds coarse ore or soft clay  
alike uniformly, under one or all the stamps in a battery  
as required.

In the Bunker Hill Mill it has run continuously for two  
years, never having been out of order or costing a dollar  
or repairs.

Golden State and Miners' Iron Works.

Sole Manufacturers,

237 First Street, San Francisco, Cal.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold  
in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co.  
(Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting  
that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,  
Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded  
to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quanti-  
ties to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

## FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

## ENGINES AND BOILERS

OF ALL KINDS,  
Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

Deane Steam Pump.

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure  
or Compound, Stern or Side-wheel En-  
gines.

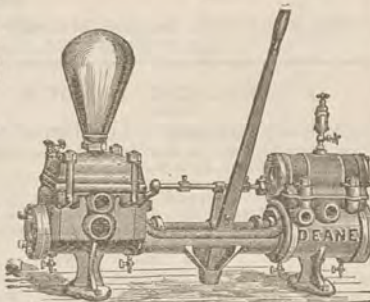
MINING MACHINERY—Hoisting En-  
gines and Works, Cages, Ore Buckets,  
Ore Cars, Pumping Engines and Pumps,  
Water Buckets, Pump Columns, Air Com-  
pressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for  
Dry or Wet Crushing, Amalgamating  
Pans, Settlers, Furnaces, Retorts, Con-  
centrators, Ore Feeders, Rock Breakers,  
Furnaces for Reducing Ores, Water Jack-  
ets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MA-  
CHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines  
and Boilers, Dredging Machinery, Pow-  
der Mill Machinery, Water Wheels.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.

— ALSO —

## HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

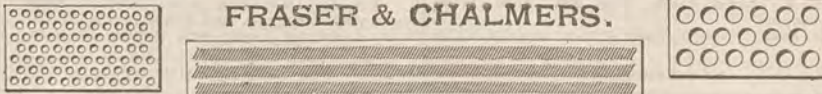
ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
Beams, Angle, Channel, and T Iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

## FRASER & CHALMERS.



CHICAGO, ILL.

U. S. A.

General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.

PERFORATED METALS FOR

REVOLVING and SHAKING-SCREENS,

JIGS & STAMP BATTERIES.



UTAH OFFICE—SALT LAKE CITY, UTAH.

NOTICE TO  
MINING MEN,  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.

Engineers' Tables of Progress

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimate address:

INGERSOLL ROCK DRILL CO.,

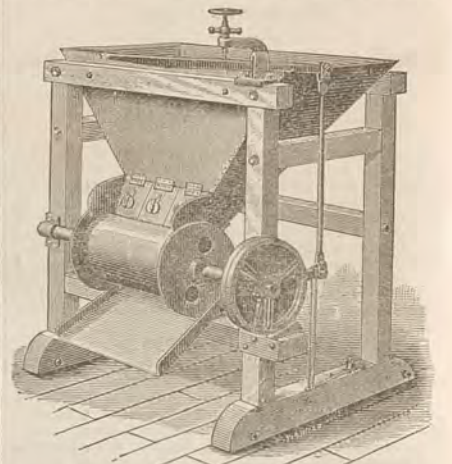
REPRESENTED BY

BERRY & PLACE MACHINE CO.

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

## THE ORIGINAL Roller Ore Feeder.



This form of Ore Feeder is well adapted  
for its peculiar work.

In reference to a similar form of "Roller" Feeder,  
which is being manufactured and offered for sale in this  
city, and of which a cut appears in this journal, we have  
to say that the Superintendent of the Bunker Hill Gold  
Mining Company states that the "Challenge" is far su-  
perior to the "Roller," he having had both of them  
operating side by side. We shall be pleased to show this  
letter, upon application, to any one interested.

We are also manufacturers of the "Challenge" and  
"Stanford Improved."

Prices furnished by the

JOSHUA HENDY MACHINE WORKS,  
39 to 51 Fremont St., San Francisco.

### ORE FEEDERS.

We direct attention to an advertisement, which ap-  
pears in our journal, of the "Original Roller" Ore  
Feeder, manufactured by the "Joshua Hendy Machine  
Works," of Nos. 39 to 51 Fremont St., this city.

As the manufacturers of a similar form of Feeder,  
known as the "Templeton Roller," claim that it is su-  
perior to any other style, and cite those in operation at  
the "Bunker Hill" mill in Amador county, we expressly  
contradict the statement, and in substantiation submit a  
copy of a letter shown to us by a representative of the  
"Joshua Hendy Machine Works," which speaks for itself

BUNKER HILL GOLD MINING CO.,

AMADOR CITY, CAL., July 12, 1886.

To Joshua Hendy Machine Works, No. 51 Fremont  
St., S. F.—GENTLEMEN: We have used the "Challenge"  
and "Roller" or "Templeton" Ore Feeders in our mill for  
the past three years, and I am free to say that I con-  
sider the "Challenge" far superior to the "Roller."  
Feeder, in that most important of all things in a quartz  
mill, namely, the regular feeding of ores to the bat-  
teries. If the "Roller" Feeder is regulated to feed finely  
pulverized ore, the coarser ore will choke the outlet of  
the Feeder, and no ore can reach the batteries. If, on  
the other hand, it is regulated to feed coarse ore, then  
the fine ore when it comes will slide right through and  
fill the batteries. The "Roller" Feeder requires constant  
attention. Yours truly,  
(Signed) N. W. CROCKER, Supt.

### THE RUSSELL PROCESS COMP'Y.

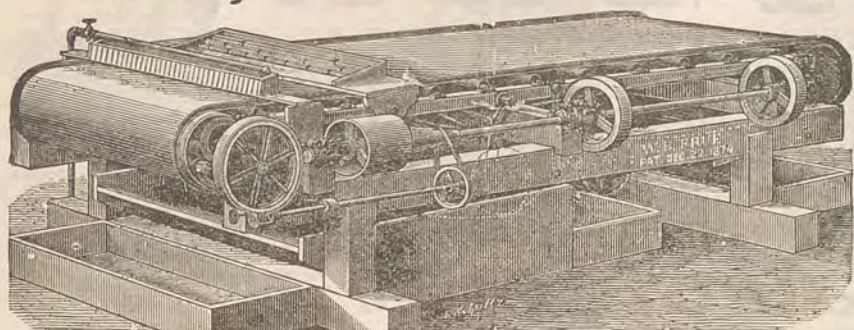
C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

Engraving Superior Wood and Metal Engrav-  
ing, Electrotyping and Stereotyping  
done at the office of this paper.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS  
(\$575.00) F. O. B.**

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), London, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

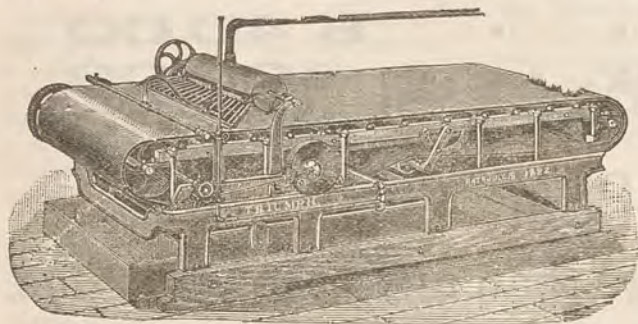
Protected by patents May 4, 1880; December 22, 1874; September 2, 1870; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

**ADAMS & CARTER, Agents Frue Vanning Machine Co.,**

Room 7, No. 109 California Street,

**SAN FRANCISCO, CAL.**

# \$1,000 CHALLENGE ACCEPTED, PRICE, FIVE HUNDRED AND FIFTY DOLLARS (\$550.00).



**THE  
"TRIUMPH" ORE CONCENTRATOR.**

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

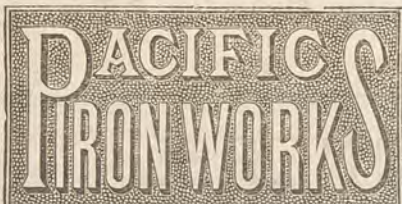
They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE, placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

**JOSHUA HENDY MACHINE WORKS,**

Nos. 39 to 51 Fremont St.,

**San Francisco, Cal.**



1850. 1885.  
**RANKIN, BRAYTON & CO.,**  
...BUILDERS OF...  
**MINING MACHINERY.**

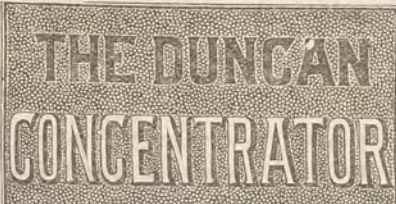
San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

## WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



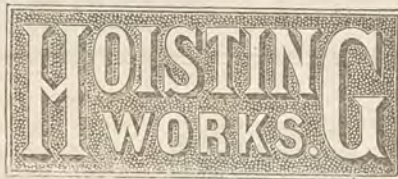
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH of the YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



## BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700 pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE of CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



Geo. W. Prescott, President.  
Irving M. Scott, Gen'l Manager.

H. T. Scott, Vice-Pres't and Treas.

Geo. W. Dickie, Manager.  
J. O. B. Gunn, Secretary.

## UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

—BUILDERS OF—

## STEAM, AIR, AND HYDRAULIC MACHINERY.

**Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

## UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.



Chicago Prices Beaten!

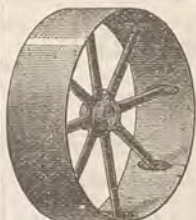
ESTABLISHED 1860.

**S. F. PIONEER SCREEN WORKS,**

221 & 223 First St., cor. Tehama, S. F.

**J. W. QUICK, Prop'r.**

Sheet Metals of all kinds perforated for Flour and Rice Mills, and Malt Driers, Furnaces, Chests, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed



## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

**CLOT & MEISE,**

Sole Licensed Manufacturers of the

**Medart Patent Wrought Rim Pulley**

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

**SHAFTING, HANGERS AND APPURTENANCES.**

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 & 131 Fremont Street,

San Francisco, Cal.

**DEWEY & CO.,** { No. 252 MARKET ST. } PATENT AGENTS.  
Elevator 12 Front St.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



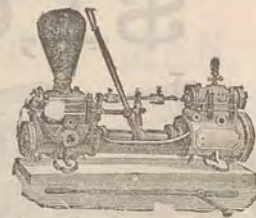
Putnam Planer.

# PARKE & LACY.

IMPORTERS OF AND DEALERS IN.....

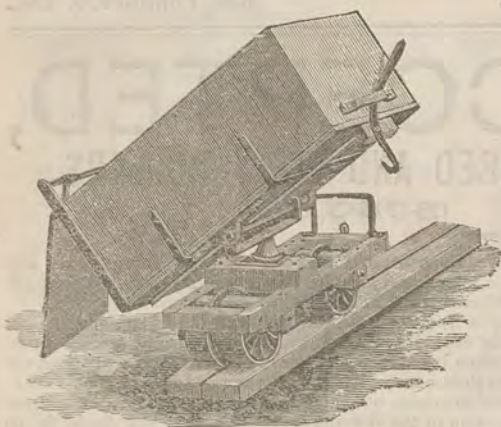
## MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Knowles Steam Pump  
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.



JAMES' PATENT ORE CAR.

## TATUM & BOWEN,

34 &amp; 36 FREMONT ST., Donahue Block, SAN FRANCISCO.

91 &amp; 93 FRONT ST., PORTLAND, OREGON.

Ore Car, . . .	\$ 40.00
Rock Breaker, . . .	100.00
Quartz Mill, . . .	350.00

## THE JAMES QUARTZ MILL

Saves a Higher Percentage than any other machine.

Its action is a reciprocating motion of four separate and distinct Dies attached to a heavy casting in such a way that the **WHOLE WEIGHT and FORCE OF BLOW ACTS ALTERNATELY ON EACH DIE.** In this respect it resembles the Stamp Mill, and in point of amalgamation is superior to any machine in use. There is no wear, except on Shoes and Dies, and there is no expense for setting. Weight, 3000 pounds. Capacity, 6 Tons in 24 hours through No. 40 Screen. Requires 4 H. P.



SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

**BEST SOFT LAKE SUPERIOR COPPER USED.**

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.****E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR &amp; CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

## F. A. HUNTINGTON,

MANUFACTURER OF

## Centrifugal Roller Quartz Mills,

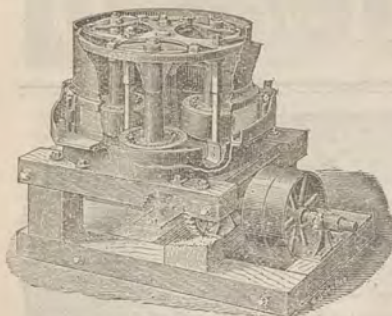
### CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,

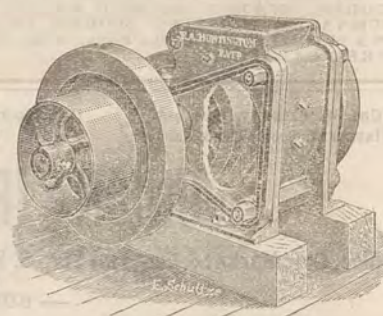
### Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



Centrifugal Roller Quartz Mill.



ORE CRUSHER.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent

L. R. MEAD, Secretary.

## THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

**QUARTZ MILLS**—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
**AIR COMPRESSORS**—Rope Power Transmission.  
**HYDRAULIC PUMPING** and Hoisting Machinery.  
**WROUGHT-IRON WATER PIPE** a Specialty. *NOTE*—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.  
**SAW-MILL MACHINERY** of all kinds.  
**STEAM ENGINES**—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
**SOLE MANUFACTURERS** for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.  
**MACBETH PATENT STEEL-RIM PULLEYS**—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

**REFRIGERATING MACHINERY** for Steamships, Breweries, and Cellars.  
**WILSON'S PATENT GAS-PRODUCER.**  
**STEAM BOILERS** of all descriptions.  
**SUGAR MACHINERY**—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.  
**STEAMSHIPS**—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company

Send for Circular and Price Lists.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, OCTOBER 16, 1886.

VOLUME LIII.  
Number 18.

## Sluices.

A miner's sluice is a trough or box through which gravel or dirt is washed; and a flume is a wooden structure for water only. The facility with which gravel can be moved depends mainly on the inclination which is given to the sluice, and the question of grade is therefore of the greatest importance. Experience, thus far, has led to the adoption in most localities of what is called a 6 or 6½ inch grade, meaning 6 or 6½ inches to the box, 12 feet long, or, say a 4½ per cent grade. In some places in this State, where large quantities of pipe-clay are washed off, 9 and 12-inch grades to the box are used (6 to 8 per cent). In others, on account of natural obstacles encountered, a 1½ per cent grade, or 2½ to 3 inches per box of 16 feet, is used. Mr. Aug. J. Bowie, in his work recently published on "Hydraulic Mining in California," speaks as follows of the grades of sluice-boxes:

Light gravel containing clay or earthy matter can be moved on an easier grade and with less water than heavy gravel; nevertheless, when a 4½ per cent grade can be obtained, it is desirable, as it lessens the labor of handling rocks and more material can be washed. Moreover, as light gravel is generally poor in gold, this deficiency can be made up only by washing large quantities. Light gravel requires that the water should be run with sufficient force to carry off the rocks washed through the sluice, and yet be only of sufficient volume to prevent the packing of black and heavy sand. If too much water is used by superincumbent pressure, the sand drops and packs the riffles.

The best results are obtained with shallow streams on light grades. Coarse gravel demands from four to seven per cent grades and a proportionate increase of water. In washing this heavy material the water in the sluice should be deep enough (10 to 12 inches) to cover the largest boulders ordinarily sent down. As a large volume of water is sent through a sluice running heavy cement gravel, more material can be transported and washed if a proper proportion of light and heavy gravel is made. The rocks and cement, as discharged into the sluices, keep the sand stirred and prevent its packing, while the cement, rolling along the sluice, is disintegrated. With scarcity of water and heavy material, at some places in California they have used a grade of 10 to 24 inches per 12 feet.

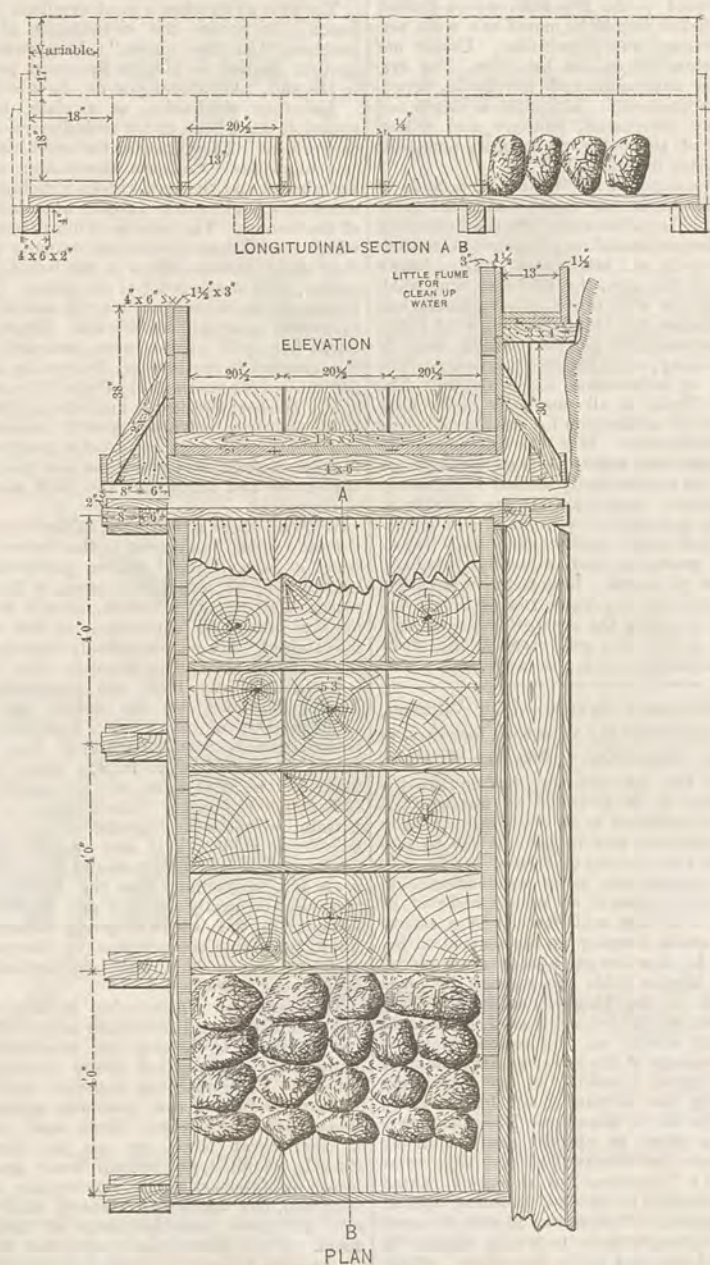
The size of a sluice depends on the grade, character of gravel and quantity of water to be used. A sluice 6 feet wide and 36 inches deep, on a 4 or 5 per cent grade, will suffice for running 2000 to 3500 inches of water. One 4 feet wide, 30 inches deep, on a grade of 4 inches to 16 feet, will suffice for 800 to 1500 inches of water, and on a 4 per cent grade it is large enough for 2000 inches. A sluice 3 feet wide and 30 inches deep, with a 1½ per cent grade, is suitable for 600 to 1000 inches. As to length, the principle is to construct the line sufficiently long as to insure the most complete disintegration of the material, affording ample surface for the grinding of the cement and the best facilities for the gold to settle in the riffles. The length of the sluice should be governed by its yield, the rule being to keep extending the sluice so long as the yield exceeds the expense.

The following details of construction will be useful to miners, as they give the results of long experience in California. Sluices of a width of

4 feet and upward are made of 1½-inch or 2-inch plank, with sills and posts of 4x4 or 4x6-inch scantling. To guard against leakage of quicksilver, it is important that the bottom be tight. To secure this the bottom planks should be of half-seasoned lumber, free from knots, and the joints grooved, and a dry, soft pine tongue inserted. The bottom and sides are spiked together with

To avoid this the flume should be heavily weighted down by loading the ends of the sills with stones. In tunnels, the ends of the sills can be held down by braces extending to the rock overhead.

The annexed diagrams give the detailed construction of the tunnel sluice-box which was used at the North Bloomfield mines, the



SLUICE FOR GRAVEL MINING.

nails 4 inches apart. It is not necessary to plane either bottom or side planks. In many cases the planks are simply fitted well and closely nailed together.

The sills are placed from 3 to 4 feet apart, depending on the size of the scantling used, which is regulated by the width of the sluice; thus, a 4-foot sluice would require a sill 7 feet long, of 4x6 or 4x4-inch stuff. The posts are halved into the sills and firmly spiked, and every second or third post should be supported by an angle-brace. The bottom planks should be solidly secured to the sills by a liberal use of heavy spikes. The bottom of a new sluice is liable to be raised by the pressure of the water which collects under it and finds no discharge.

largest hydraulic mine in this State. The box is 6 feet wide, 12 feet long, with sides 32 inches deep. To each sluice-box was used:

8 posts.....	4 inches x 6 inches x 3 feet 2 inches.
4 sills.....	4 " 6 " 8 "
3 bottom planks..	2 " 24 " 12 "
4 side planks.....	1½ " 16 " 12 "
2 top rails.....	2 " 8 " 12 "
16 braces.....	2 " 4 " 2 "

On the outside of the tunnel the sills and braces are larger. The nails in the bottom are 30 penny; for the sides, 20 penny. The side lining, composed of worn blocks when available, is 3 inches thick, 18 to 20 inches deep, and is set 2½ to 3½ inches above the bottom. The riffle strips, between the blocks, are 1½x3 inches and 5 feet 11½ inches long. The blocks are 13 inches deep and 20½ inches square, and aver-

age about 19 to the box. When stone riffles are used, the bottom of the sluice is lined with rough plank. The top sluice on one side is for carrying seepage water when the blocks are being set. It is 13 inches wide and 14 inches deep, and is made of 1½ inch plank.

At the LaGrange mines, Tuolumne county, in this State, a sluice-box 4 feet wide, 32 inches deep and 16 feet long, is built as follows:

4 sills.....	4 inches x 6 inches x 7 feet.
2 end posts.....	4 " 6 " 8 " 2 inches.
6 intermediate posts	4 " 4 " 3 " 2 "
16 braces.....	1 " 6 " 3 " "
2 bottom planks..	1½ " 24 " 16 "
4 side planks.....	1½ " 16 " 16 "
2 side linings.....	1½ " 8 " 16 "
2 top rails.....	1½ " 8 " 16 "
12 riffle bars.....	1½ " 2 " 4 "

This aggregates 420 feet of lumber. There were 36 blocks, 14 inches square and 8 inches deep.

To each box 15 pounds of nails are used, viz.: 12 nails, 10-penny, side lining to sides; 160 nails, 12-penny, braces to posts and sills; 40 nails, 20-penny, posts to sills; 76 nails, 20-penny, sides to bottoms; 36 nails, 20-penny, blocks to riffle bars; 32 nails, 20-penny, bottom sides to posts; 64 nails, 20-penny, top sides to posts; 50 nails, 30-penny, bottoms to sills; 50 nails, 30-penny, top rails to posts and sides.

The cost was, per box:

420 feet of lumber, at 3 cents per foot.....	\$12 60
36 blocks, at 35 cents.....	12 60
15 pounds nails, at 4½ cents.....	64
Labor, at \$1 to \$2.50 per day.....	2 50
Total.....	\$28 34

## Magnesium for Lighting Mines.

Magnesium is an element which has several times been tried and abandoned as a source of artificial light. It now, however, appears likely to come into use again, as a process has been discovered whereby pure magnesium can be economically prepared by electrolysis. At the works in Bremen, where the manufacture is conducted, prizes have been offered for the construction of a magnesium lamp, with clock-work attachment.

Light from this source is perfectly steady, unlike the arc electric lights. By its means colors—even the dark blues and blacks—may be distinguished at night. If the new process of preparing this metal is as successful as promised, it may before long be used for lighting mines, for which it is much better adapted than electricity. Wires in mines are bad, and if any accident happens to the dynamos or main wires, the whole mine is suddenly left in darkness. Moreover, there is danger to the men from the wires.

The magnesium light approaches very much nearer the color of daylight than that from oils, candles or gas, though it does not equal the electric light. It gives off no noxious vapors. Several kinds of magnesium lamps are made. In some a wire or ribbon of the metal passes through the flame of a spirit-lamp to insure continuous combustion. In others the magnesium is used in the form of dust and fed to a flame. The light has been used for photographic purposes, both in rooms and underground.

THE Hasting 20-stamp mill, on Queen creek, three miles from Pinal, Arizona, cost about \$75,000, and was bought recently for \$3000, by the Walker Bros., who will utilize the machinery at their Vekol mill.

SOME selected ore from the Drum Lummon mine, M. T., milled out \$13,000 the other day.



## Wood River.

## Deep Mining an Assured Fact—The Minnie Moore.

[Written for the Press by our Traveling Correspondent, FRANK W. SMITH.]

Wood River has been written up "sky-high," time and again, and many and marvelous are the "yarns" that have been "spun" on this wonderful country. Notwithstanding the fact that many and able writers and not a few artists have spread Wood River over the face of the earth, as it were, it is peculiarly a country that to be appreciated it must be seen. The mineral resources of the Wood River country have proved to be of a deep and lasting nature, and the grade of the bulk of its ores has been of an excellent and paying character.

## Diversified Resources.

It would take pages to properly portray the many resources of this great district. Briefly: The leading industry is mining, followed next by stock-raising and agricultural pursuits. Mining, of course, receives the most attention, and the blame for the neglect of many profitable ventures in agricultural interests can be laid at the door of this greatest species of gambling man ever was prone to indulge in—mining. Stock business, being easier and faster in making returns than farming, has been taken up by many, and to-day Wood River, as a stock range, is claiming a share of the notoriety heretofore accorded to mines and mining only. The soil, climate, and other advantages of Idaho in general, and Wood River in particular, are equal and, in many cases, superior to numerous otherwise more favored localities. While the mining districts of this much-talked-of and widely-advertised country have produced and are producing millions, yet there are large districts of unexplored and many poorly prospected regions that will pay well to locate and develop.

## The Mines.

To describe the mines of this district would be to write a book, and a big one at that. The ores are principally argentiferous galena, with some gold and copper-bearing formations discovered, but as yet the two latter minerals have not been either properly or extensively developed. Silver being the first mineral found, every prospector and mine-owner has sought for that metal, ignoring indications of gold that elsewhere would have created booms and paid big for legitimate working. It was "go with the crowd," as it were, notwithstanding the falling silver market and the expensive working of these ores. To-day there are a number of "gold districts" in the Wood River country that would pay handsome returns for less money than silver mines require. Among the leading mines of Wood River is the

## Minnie Moore Mine.

This property is "the belle" of Wood River silver producers. It is situated about one and one-half miles from Bellevue—the most promising mining camp of Alturas county. The lode is argentiferous galena, exceptionally large in size, rich in grade, and more depth and regularity than any silver mine of the West. The property is now managed by Thomas Charimical, who appears to thoroughly understand the situation, and is pushing work in a manner gratifying to miners and mining men. The development of the Minnie consists of levels, winzes and inclines on the dip of the ledge. Many of these are in on ore, the greater part of which is first-class. During four months the mine produced \$140,000 doing only development work, taking out jigging ore, leaving the first-class standing in the mine. To-day there is estimated, and I believe correctly so, over 600 feet of ore body standing in the many levels that will average from two to four feet in thickness and will run \$160 per ton. The concentrates run \$130 per ton. Adjacent to the mine a large concentrator has been erected and is running day and night on jigging ore. A visitor to this fine property seeing the vast and rich ore body standing in nearly every level is impressed with the idea that the mine is either on dress parade or that the management is making the low-grade ore pay expenses and holding the richest till there is a raise in silver. The deeper the Moore has been driven the more firm the vein has become and the richer the ore. The development of this mine has proved beyond all doubt that Wood River mines go down with a better showing than on the surface, and that deep mining in these deposits will stand the test. The fall in silver only will keep Wood River from being a great silver district and the Minnie Moore from being the biggest mine of the kind in the United States. To properly describe the Minnie and credit the present management with the praise merited, would require more time and space than can here be given. The latest assays on ore taken from the lower levels show an improvement in grade that is highly gratifying, as follows: Five assay 83.68-100 per cent lead and 133.68-100 ounces silver.

## Bellevue Concentrates.

The Minnie Moore ships 15 tons concentrates daily to Salt Lake.

The Bellevue Herald is a paper worthy of the support of the camp.

The Queen of the Hills ranks as the second best mine of the district.

Hailey, the county seat of Alturas, is only

four miles distant. Hourly stages make trips. Fare, 50 cents each way.

Other mines and camps will be treated in these columns in due course of time.

The "Short Line" runs a train daily, except Sunday, on the Wood River branch.

The International hotel is presided over by a most popular hostess, Mrs. Collins, late of Iowa.

There are some 12 or 15 saloons in camp, and every one of them is located on one side of the street.

Hailey, the county seat, is jealous of Bellevue, and well it may be, for the latter is not only making friends, but business, daily, and it is so situated that it bids fair to outstrip the former should its present prosperity continue.

## Arbitration.

To the average mind nothing seems more strange and inexplicable than the conflict between law and common sense in the law courts of the land. Submit any question of dispute to a few practical business men and they will settle it promptly on just and equitable business principles. Submit the same controversy to the arbitrament of a court, and common sense is straightway turned out of doors. The whole case is soon entangled in such a mesh of inscrutable technicalities of pleading and evidence that the parties to the controversy can scarcely recognize their own case. It is a well-known fact that justice does not always insure a verdict. The whole case may go off on an absurd technic. Judge Edward A. Thomas, in an article contributed to the *North American Review*, says: "Justice should be meted out with certainty, economy and promptness. Under our present system this cannot be done. The system itself is antiquated and unreliable, expensive and cumbersome. Litigation is feared and avoided by merchants, bankers and others on account of the delay, uncertainty and great expense which it entails."

The advantages of arbitration as a mode of settling disputes among business men are great and many. The arbitrators are the immediate choice of the parties and may be selected for their known integrity and intelligence. They hear a statement of the case, the evidence, and analyze and decide with the habits, instincts and tact of business men aiming to do what is fair and just between the parties. There need be no tedious delay, no unnecessary expense. The advantage of arbitration is no theory. The Boards of Trade in all our large cities have their courts of arbitration for settling disputes among the members. It is the rule among the Grangers, and the report is that troubles are promptly and satisfactorily settled in this way. A large class of cases may always have to be adjudicated in courts of law, but it is nevertheless true that many controversies may be settled more promptly and with less delay and expense out of court. Litigation is too slow, too expensive, too vexatious, too uncertain and too unjust to satisfy the average business man of to-day, and it is a good sign of the times that arbitration is growing in favor.

**ANOTHER SAFETY DEVICE.**—John Williams, a practical miner on the Comstock for years, as well as in Candelaria, California, Montana, Idaho and the old country, has invented a safety device to be attached to mining-shaft cages. It is intended as an improvement upon the safety clutches now in general use to prevent a cage from falling in case of breakage to the cable, causing the same automatically to act, especially in case of an unclutched reel, or a long line of broken cable lashing from side to side in the shaft, keeping up the tension on the kingbolt. In this device a stout chain placed over a set trigger holds the safeties in place independent of the kingbolt, so long as only the regularly required speed is used, but should it suddenly attain an extraordinary speed through breakage of the cable, a heavy hammer hits the trigger, knocking it and the chain loose, forcing the safeties to act immediately, arresting the fall of the cage. This hammer is hung on a pivot or upright shaft whirling around above the crosshead of the cage after the style of a "governor" of an engine, caused to do so by rollers of its own operating against the cage guides. Thus an undue rate of speed will cause the hammer to swing higher by centrifugal force, and strike the trigger, releasing the spring of the safety clutches and forcing them to operate instantly in arresting the fall of the cage. The device is a new and interesting one, works perfectly and commends itself to all mining engineers or others interested in such really important matters. Mr. Williams has a working model of his invention. —*Virginia Enterprise*.

**A BIG DAM.**—The Santa Cruz Sentinel says: "From A. F. Green, of Milbrae, who is in charge of the working forces of the Spring Valley dam, located up the San Mateo creek and back of the town of San Mateo, we learn that the work is being crowded ahead. The dam will be 161 feet high, cost \$1,250,000, and be five years in course of construction, forming a lake seven miles long and in one place a mile and a half wide. Excavations are being sunk to the bedrock across the creek and from point to point, and a bed of composition will be laid from the rocks to the water level of the lake that will make leakage next to impossible."

## American Industries—Their Future.

There is no sentiment in business—"business is business," the world over. Individuals transact business with each other from a purely business standpoint. Nations, in their transactions, are governed by the same universal principle. A New Zealand correspondent of the London *Ironmonger*, in explaining why the people of that island prefer Yankee-made iron and steel goods to those of English make, says:

"We should prefer to do business with you, but you must not ask us to take badly-finished, old-fashioned goods, which, no matter how they satisfied our forefathers, will not do for us. Would you be surprised to hear that no carpenter in New Zealand will use from choice an English hammer, saw, brace, or auger-bit? No buggy-builder will use English coach bolts and tire bolts if American ones can be obtained, even at 10 per cent more money than the English, because he can pick up a Yankee bolt and apply it immediately to his work, and with its nice square out thread there is less chance of nuts becoming loose. What is the case with the English bolt? He will search a gross over and find every nut 'jammed' so hard on the bolt that it has to be taken to the vise and there oiled and eased. This takes time, and as time is money, he cannot be blamed for preferring the Yankee article. I shall not touch upon the American axe question more than to say that the loss of trade to England is through sending rubbish out at first, and not caring to be gulled by our own kith and kin, who ought to have known better, we went elsewhere for what we wanted 'and got it.'"

The above furnishes a most excellent business lesson. It shows the advantages of doing business "on the square." Just, honest and upright dealing is always the most profitable in the end. Whatever you do, do it well.

American mechanics, as a class, have no superiors anywhere, either as designers, creators or workers. They are also the most intelligent and ingenious. Common observation at home and abroad and the well-known workings of our common-school system furnish abundant proof of the former. The records of our patent office, which record more inventions annually than all the other patent offices in the world put together, give ample proof of the latter. If more is wanted, the telling fact may be stated that at the recent International Electric Exposition at Paris, five gold medals were awarded for the five greatest inventions or discoveries, and all five crossed the ocean to the United States!

Mr. Herbert Spencer, a man strongly wedded to his country, which has greatly honored him and which he in turn has greatly honored, says that the United States has the best mechanical appliances and turns out the best mechanics in the world.

With all these advantages, added to that of "square work," as shown in the above extract from a New Zealand letter, published in a leading English technical journal, is there any reason why we, as a nation, should not ultimately attain to supremacy in the world's industries? Are we not already fast approaching that point? Let us examine a few figures:

From 1870 to 1880 the manufactures of France increased by the valued amount of \$230,000,000; of Germany, \$430,000,000; of Great Britain, \$580,000,000; of the United States, \$1,030,000,000. In ten years we had increased the total value of our manufactures \$450,000,000 in excess of the increase in Great Britain, hitherto the imperial mistress of the industrial world! Is it any wonder that Mr. Gladstone's keen forecast should have led him, years ago, to prophesy that the United States "would eventually become the world's head servant in the world's great household"? Notwithstanding the progress we have already made, we are, in fact, but just beginning to develop our resources.

The Cleveland Plaindealer, in this regard, most eloquently and truthfully says: "We are just beginning to develop our resources while many of the nations find theirs well-nigh exhausted. Even now, the superior intelligence of our mechanics can compete against the cheaper labor of Europe. Even now, in spite of their cheap labor, we can lay down our steel in Sheffield, our certain lower grades of cotton in Manchester, our electroplate in Birmingham, our watches in Geneva, and undersell European manufacturers at their own doors. If this is the beginning, what, then, of the possible future? And then add to this how just now our markets are being rapidly extended under the impulse of electricity and steam as never before."

"We are next neighbor to all the nations; to South America, just quivering with its new life; to Japan and China, just waking up from the sleep of ages; to Africa, with its wonderful and mysterious future greatness. Within these 20 years it was as if the dead bones of the nations had been flying into place and a living soul had entered them. It is the dawning of Christian civilization for a billion of people who do not yet enjoy it. And Christian civilization means higher, nobler material, as well as intellectual and spiritual wants. After the missionary always goes commerce. Five hundred American steel plows went to the native negro Christians of Natal, South Africa, last year. All the millions of Asia and Africa are going to have their civilized cravings, as we do, some day. India, just beginning to be a little Christian, took \$12,000,000 worth of cotton goods last year. What may all Asia want 100 years

hence? What may Africa want 100 years hence? With those vast continents added to our market, and all our natural advantages realized, what is to prevent our country from becoming the mighty workshop of the world?

"Realize the resources of our agriculture, equal to feeding 1,000,000,000 souls! Fully develop our mining and manufacturing industries, which would be enough to sustain the whole billion, gain the pre-eminence in every market around the globe, and become the handmaid of the nations. Did not Mr. Matthew Arnold say aright in his lecture to us a year and a half ago, that 'America holds the future'?"

**KIMBERLEY GOLD FIELDS.**—A Brisbane special in the New Zealand Herald says: "An old miner named Webb, who has just returned to this city from Kimberley, gives a most disheartening account of the gold field. He says that when he left Wyndham there were 700 men there waiting to take return passage by steamer." A Cooktown letter of the same date is as follows: "The steamer *Catterthun*, from Foochow (August 22d), via Port Darwin (September 3d), which arrived here yesterday, brought nearly 200 diggers from Kimberley. Of this number, 40 are proceeding to Sydney. These men all give bad accounts of the gold fields." A letter from a storekeeper in East Kimberley to his brother in Sydney gives the following details of the rush to the mines: "The route from Cambridge gulf to the mines is 50 miles shorter than that from Derby, but it is not so good, being only traversable by packs, drays being useless on account of the hilly and rocky nature of the country. Thirty drays had to return lately, being unable to go by that route. Now, to give you an idea of the Derby route—men are starting off from here daily with wheelbarrows. The road is like a bowling green all the way. All the barrow wheels I had in store have been sold, and I now have a hundred weight of provisions for the diggings upon each. Just fancy an array of men with barrows starting for a journey of 350 miles! Twenty-six camels have just arrived, which we will utilize for taking supplies to the fields. I intend to form depots along the route at intervals of about 100 miles. \* \* \* The steamer *Triumph*, which arrived here yesterday, has brought 280 diggers and 170 horses, with the necessary equipments. The men, as usual, are of all kinds of trades and callings. There are at present 1000 men on the field, and 1000 more at Cambridge gulf and 800 at Derby ready to proceed there."

**THE LARGEST MANUFACTURING CONCERN IN THE WORLD.**—America can boast of having the largest manufacturing concern in the world. The *Bulletin* of the Iron and Steel Association has been "sizing up" the large iron-making concerns of the world, and comes to the following conclusion: "We often see items floating around the papers about the 'largest manufacturing concern' in the world. Various establishments in this country and abroad have been accorded that honor, but it now seems to belong to the Carnegie interests in and near Pittsburgh. In the month of March the Carnegie establishments made 38,698 gross tons of pig iron and worked it into finished forms themselves, their products ranging from steel rails to wire nails and exceeding in that month a total of 35,000 tons. If any manufacturing concern in the world can even approach this production we would be glad to hear of it. The Carnegies are to-day adding more largely to their works than ever before in their history. By this time next year they will have a capacity of 50,000 gross tons of pig iron a month. As late as 1865 the entire State of Pennsylvania did not make so much pig iron."

**DIFFERENT SORTS OF GOLD DUST.**—In the early days buyers and sellers did not for a long time recognize any difference in the value of different classes of gold dust. The first gold discovered by Marshall and his associates was sold for \$8 an ounce, but ere long rose to \$16, and remained at that figure for years. Then no more difference was recognized in gold dust than to-day in different sands. Buyers would mix their dust when sent to the Mint and were paid an average price for it, but they afterward learned that some dust was worth \$9 and other dust \$20 or more. The difference in value is now known to be due to the fact that a greater or less amount of the baser metals—silver, copper, etc.—is always found in alloy with gold in its native state. —*Wood River Times*.

**THE PELTON WHEEL.**—A large force of men are constantly employed at Geo. G. Allan's foundry, this city, in manufacturing Pelton hurdy-wheels, the demand for which is rapidly growing as the merits of the invention become more widely known. They are now in use not only throughout most parts of this country, but in many foreign lands as well, and everywhere they are giving the most perfect satisfaction. One was sent a few days ago to parties in London, England. —*Nevada Transcript*.

**NEW GLASS WORKS.**—The new works of the San Francisco and Pacific Glass Company, at the corner of Seventh and Townsend streets, are nearly finished. The proprietors expect to start up the furnace by the first of November, when they can turn out eight tons per day.

**TAHOE LUMBERING.**—Another steamer for logging purposes will be built this winter by the Tahoe Lumber Company.



### Progress in Iron and Steel Works in the United States.

The "Directory" of the American Iron and Steel Association for 1886, just published, furnishes some interesting facts in regard to the growth of this great leading industry during the last two years. We summarize as follows:

#### Standard Bessemer Steel Works.

In September, 1884, the country contained 20 standard Bessemer steel works, with 45 converters and one new plant in process of construction. In August of the present year the number had increased to 27 steel works and 58 converters. These figures indicate a great advance in this important industry for the short term of two years. The ingot capacity of these works had increased in even a larger ratio—from 2,490,000 tons to 4,102,000 tons. This increase is due more to improved practice and increased machinery in old works than to the increased number of works.

#### Clapp-Griffith Works.

The erection of the Clapp-Griffith works has also made remarkable progress during the same period, viz., from only one in September, 1884, to six in 1886, with two in process of construction. The capacity of these works increased from 5000 to 200,000! The Clapp-Griffith process is first cousin (so to speak) to the Bessemer process, and was quite fully described and illustrated in our last issue. Its advantages over the former are very important. These works require but a very small outlay, as compared with the standard Bessemer works, and are capable of being economically operated on a much smaller scale. The steel made by them is mostly used for nail plates, wire rods and the smaller classes of steel manufactures, although it is capable of being carried on upon the largest scale and its products applicable to anything for which the standard Bessemer steel is applied.

#### Open Hearth Steel Works.

Two years ago this month there were 35 completed open hearth steel works in the United States and three others in process of construction, embracing 63 furnaces. At the present time there are 42 completed works and seven in process of construction, embracing 91 furnaces. The ingot capacity of these works in 1884 was 550,000 tons, and in 1886, 660,000 tons. Open hearth steel works are manifesting more activity than at any previous time since the commencement of the present decade.

#### The Crucible Cast Steel Industry

Is now scarcely holding its own in the present struggle with the cheaper modern methods of steel-making. In fact, it appears to be slowly retrograding, as will be seen by the following figures: In September, 1884, there were but 41 works of this description, with 3594 steel-making pots having a capacity of 115,000 tons of ingots. In 1886 there were only 40 works, with 3391 pots of 110,000 tons capacity. Open hearth steel is the leading rival of crucible steel. Many of our crucible steel manufacturers are adding open hearth furnaces to their crucible plant. For locomotive boilers and fire-boxes, locomotive and car springs and agricultural machinery, the use of open hearth steel is rapidly growing; but for all the more delicate purposes for which crucible steel has heretofore been used, especially fine springs and fine tools either with or without cutting edges, it will always be in demand.

#### Rolling Mills.

The number of rolling mills in September, 1884, was 434, with 4 in process of construction; but in 1886 but 425 are reported, with 13 in process of construction. The slightly-decreased number of rolling mills, notwithstanding the increase of steel production plants, is accounted for partly by the fact that a number of rolling mills built to roll iron rails have been abandoned, in consequence of the increased demand for steel rails. The number of trains of rolls has also decreased from 1555 in September, 1884, to 1475 the present month of 1886. But the aggregate capacity of the rolling mills has slightly increased—7,600,000 tons in 1884 to 7,613,000 tons in 1886. The increased capacity of some of the rolling mills has more than made up the deficiency in the number of mills.

#### Nail Manufacture.

Statistics show a large increase in the number of establishments devoted to the manufacture of nails and spikes, from 1882 to 1884. But only a slight increase from 1884 to 1886 is now noted in the number of such works, from 81 to 83, but there has been in the same time a large increase in the number of nail machines. From 1882 to 1884 these machines increased from 5030 to 5695, and in 1886 there was an increase to 6355. Many of the new machines erected since 1884 were built to make steel nails.

The new dredger being built at the foot of Sixth street for the use of the United States Government in the Bay of San Pablo is nearing completion. This boat will be of the best description with all the latest improvements in the way of dredging machinery, etc. The hull is 130 feet long and beam 46 feet. Messrs. Hinckly, Spiers & Hays have the contract for the machinery, which includes engines, boilers and all the dredging apparatus. The boilers are of steel and are a fine specimen of San Francisco work in that line. All the machinery will be placed on board before the boat is launched.

### Yerba Santa.

Many of our readers will recognize in the engraving on this page a very good representation of a twig of the native plant, Yerba Santa, known to the botanist as *Eriodictyon glutinosum*. This plant is well distributed over considerable areas of the State, and its healing virtues widely lauded. Dr. Vasey, botanist of the U. S. Department of Agriculture, from whose report we reproduce our illustration, gives a description of the plant, which will be read with interest.

The Yerba Santa is a low shrubby plant of California, growing from 3 to 5 feet high. The stems and twigs are smoothish and generally showing more or less of a resinous exudation, particularly on the vigorously-growing twigs. The leaves are thick and rigid, alternate, lanceolate in form, usually 3 or 6 inches long, acutish at the point, and tapering at the base into a

### Tuolumne Marble.

In commenting on a recent article in the PRESS on California marble, the Tuolumne Independent says: The sidewalk in front of the Palace hotel, San Francisco, is Tuolumne marble, as also the Broderick monument in the cemetery in that city. Unfortunately we have no railroad so that we can compete with inferior marble from other localities, and the wagon freight is a tariff not to be overcome. Another fact is, that Tuolumne marble is so hard that manufacturers below will not use it when they can work up the soft cheese they import from Italy and the Eastern States. Customers do not know this or they would insist, even at increased cost, to have their monuments, etc., manufactured of Tuolumne marble. Stones in the Columbia cemeteries, set over 30 years ago, are as polished and perfect as when first cut. The same can be proved in San Francisco by



THE YERBA SANTA—A NATIVE CALIFORNIA SHRUB.

short petiole, the margins irregularly toothed, smoothish on the upper surface, the lower surface with a prominent fine reticulation, whitened between the veins by a fine and close, woolly pubescence. The flowers terminate the branches in a panicle, and are collected in numerous small, rather crowded, cymes or clusters. The individual flowers are about half an inch long, the calyx small and deeply divided into five sepals, the corolla of one piece (monopetalous) rather trumpet-shaped, with the border five-lobed, its color varying from purple to white. Attached to the inner side of the corolla near the base are the five stamens. There are three thread-like styles nearly as long as the corolla, and at the base a roundish, two-celled pod containing the seeds. The plant belongs to the order *Hydrophyllaceae*. The upper surface of the young leaves and twigs are covered with a resinous, balsamic exudation. The under surface presents a beautiful network of veins with a fine, whitish pubescence between them. The leaves have a balsamic taste, and have long had a local reputation among the old Spanish settlers in diseases affecting the mucous membranes, as in chronic coughs, catarrhs, consumption, etc.

the Broderick monument. The stone-cutters make more money by using soft stone, and care little for durability—and their patrons know no better.

A CABLE RAILROAD SUSPENDED.—The Telegraph Hill cable road is being taken up. It has been in operation for about two years and a half, but has not paid since the first three months of its existence. The road relied chiefly for patronage on the visitors to the resort on the crown of the hill. The directors of the company, seeing that the expenses were greater than the income, reduced the hours of running the line from 13 to 6 a day, about six months ago, thus cutting down the outlay from \$750 to \$400 a month. But even with this reduction the road still did not pay. It was finally decided to suspend the operation of the road entirely, and the cable and other machinery of the line are now being taken up. The cars of the road are to be stored in the Valencia-street carhouse. The track will be left where it is. It was said yesterday that the traffic on the road might be resumed at some future day.

### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

PRESERVING PILES.—James Cass, Cayucos Landing, San Luis Obispo Co. No. 349,853. Dated Sept. 28, 1886. This is a novel means of preserving piles and other submerged wooden structures from the ravages of marine worms and insects. The process consists essentially in coating the pile or timber (after the bark has been removed) with a compound; next surrounding said compound with a covering of ship-felt, then nailing longitudinal battens on the timber outside the felt, and finally securing the battens by hoops or holding-bands.

ANTI-FRICTION THILL-TIP.—R. W. Simpson, S. F. No. 349,817. Dated Sept. 28, 1886. A tubular tip or ferrule, preferably of metal, has on its under surface, near its outer end, a roller which is mounted on a journal or pivot which can be readily oiled and cleaned if necessary. These tips are secured on the ends of the shafts or thills in any suitable way. The rear ends of the tips are formed with circumferential grooves to provide for the attachment of the usual leather sheaths. The shafts, when not in use, rest on the rollers or the tips, and there will therefore be no wear upon them to sharpen them down.

MOLDING MACHINE.—Richard Savage, S. F. No. 349,815. Dated Sept. 28, 1886. This apparatus is for making molds for castings. It consists in a directing chute having front and rear walls, into which the sand is received from above; a joint or joints at some portion of the length of the chute, so that it may be deflected to direct the sand into different parts of the flask beneath; a means for supplying sand to the hopper, and regulating gates by which the supply may be cut off from any one or more of the sections. The sand is kept in a compact body by this chute, and is not scattered by the resistance of the air; moreover, the chute may be moved from one side to the other over the flask or mold below, and may incline to either side of the perpendicular, as the sand is guided by either side of the chute. There are certain other improved details in the apparatus.

MOVABLE ICE-CHAMBER.—Ignazio Allegretti, West Berkeley. No. 349,831. Dated Sept. 28, 1886. The invention relates to the class of compartments or chambers which are adapted to contain ice or other cooling substances, for the purpose of keeping cool the temperature of a room or other compartment, and which are specially adapted for use in fruit cars. It consists of an ice-chamber of peculiar construction, whereby it may be readily handled or moved about and used in various places, said box being sectional and readily divided into its several parts for transportation when not in use, and easily set up again. In connection with this box or chamber the invention further consists in a novel skeleton frame or casing, adapted to contain the box and to be readily and effectively secured to the apartment in which it is used, and removed when not in use, said casing and ice chamber being located in such manner as to afford access from without.

LABOR-SAVING MACHINES.—What would be the condition of this country without its labor-saving machinery and processes? To more clearly understand and better appreciate the advantages afforded, we direct the reader's attention to the fact that to perform the work accomplished by power and power machinery, in our mechanical industries and upon our railroads, would require about 35,000,000 men, but which is now done with the aid of only 4,000,000 persons! Look what an enormous loss this would be, economically and commercially. This encouraging condition of industrial affairs is of course largely attributed to the ingenuity of our inventors, who quickly recognize the needs and supply improvements. Nor is it likely the time will ever come when invention will have naturally outworked its mission, for it is now in a more prosperous condition than ever, and many improvements of unusual importance are continually produced.

MINING SUIT.—The heirs of John B. Gray have filed notice of a suit pending in the United States Circuit Court against the Quicksilver Mining Company, whose mine is at New Almaden. The averments declare that the object of the action is to obtain a decree adjudging that the complainants are lawful owners of three-eighths of all the mines, minerals and ores on the land and premises of the defendant, and that the defendant holds this three-eighths in trust for the complainants, and it is asked that the defendant be required to account to complainants for all the money realized by it or its predecessors in interest in the Quicksilver Mining Company, of Pennsylvania, from this three-eighths, and that general and equitable relief be granted. It further recites that the premises affected by this action are the Rancho de los Capitancillos, in Santa Clara county.

A LARGE LEDGE of coal has been discovered on the land of E. P. Fellows, on Stevens creek, Santa Clara Co., averaging six feet wide. Croppings, it is said, have been traced for more than a mile. The surface specimens are of an inferior quality.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 13 Front St.

W. B. EWER.....SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter.

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Oct. 16, 1886.

## TABLE OF CONTENTS.

EDITORIALS.—Sluices, 245. Passing Events; Unsuccessful Deep Mining; Gold Dredging in Rivers; The Iron Trades; Miners' Valuation of Mines, 248. Dredging Machinery; Prices of Claims, 249.

ILLUSTRATIONS.—Sluice for Gravel Mining, 245. The Yerba Santa—A Native California Shrub, 247. Dredging Machinery, 249.

MISCELLANEOUS.—Wood River; Arbitration; American Industries—Their Future, 246. Progress in Iron and Steel Works in the United States; Yerba Santa; Tuolumne Marble; Notices of Recent Patents, 247.

MECHANICAL PROGRESS.—Aid and Encouragement which Inventors Need; Illustrating Machinery; Interesting Experiment in Casting Steel; Heat-Indicating Paint; Wire Nails vs. Cut Nails, 250. SCIENTIFIC PROGRESS.—Coloring Matter from Cotton-Seed Oil; Oil From Corn; A New Glass for the Microscope; How Incandescence is Produced, 250.

ENGINEERING NOTES.—A Gigantic Feat; New Water Ways for Russia; Electrical Navigation; An Endless Railway; From New York to Boston, 251.

USEFUL INFORMATION.—The Magney Plant; Cheapening Embroideries; A New Joint Material; To Clean Glass and Silverware; Flexible Glass; "Naught" and "Nothing"; Iron Rust in Dry Goods; The Animal Life Cost of our Ivory, 251.

GOOD HEALTH.—A Word of Caution to Woolen Mill Operatives; Boys and Cigarettes; Tetanus Treated by Rest; The Throat, 251.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 252-53.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 256.

## Passing Events.

The proposed cessation of deep mining on the Comstock will result in the discharge of many miners and be a serious set-back to Virginia City. The effect on the stock market here will probably be disastrous, as without the possibilities of bonanzas in the lower levels, transactions in mining stocks will amount to little.

The starting up of the Holcomb valley gold mines in this State, after years of abandonment, is but another indication of the increase of interest in quartz mining in California.

The new magnesite mine at Livermore, Alameda county, now being worked, adds another product to our mineral yield.

Explorations for oil and natural gas are going on all over the State, and in several places success has been met with of late.

A number of good mining strikes are reported this week from different parts of the coast, the details of which will be found in our mining summary on another page.

A MINE-OWNER near Sheridan, M. T., reports the discovery of a new metal. It carries considerable gold in places, but the latter cannot be separated from the strange material by any process of working gold ores. The mineral when melted is as white as silver, but much harder.

PREPARATIONS will soon be made for the resumption of work at Bullionville. A new process for the working of the rebellious tailings will be tried and it is hoped will prove successful.

THE Paradise valley mine was the only mine in Nevada that paid a dividend last month, and the amount was only \$20,000.

THE Iron Hill mine of Dakota is doing well, having produced 275,000 ounces silver to date.

## Gold Dredging in Rivers.

We have before stated in these columns that all attempts to mine in river-beds in California by means of dredging appliances have been failures, though many trials with various devices have been made. The English appear to have made a success of the system, however, especially in New Zealand, where river dredging has been carried on for 16 or 18 years on the river Molyneux (or Elutha), in the Provincial district of Otago. A correspondent writes us that the dredges are built, as a rule, in the city of Dunedin (the chief city of the district), but some of them are also built on the banks of the river. So successful is the dredging proving that three or four new dredges were built last year and put to work on the river.

The Molyneux is a very rapid-flowing river, taking its origin from three lakes, separated by a large tract of country—the Wakatipu, Hawea and the Wanaka. The former is 70 miles long by 2 to 10 broad, and has never been bottomed. The other lakes are not so large, and are connected. They are all three snow-fed, and the two rivers join at about 30 and 40 miles from the respective lakes and travel mostly through steep, rocky gorges another 120 or 130 miles to the seaboard.

A large amount of alluvial gold has been taken from the whole of the districts, and some rich quartz ledges have been partly developed, but have, in many cases, been abandoned in consequence of the want of the best modern machinery. Business might be done by some of our manufacturers here if endeavors were made to introduce some of our best and most recent quartz-crushing machinery. A number of American business firms have been established in Dunedin for many years. Since the discovery of gold in New Zealand (1861) the mines have yielded no less than \$240,000,000—a very handsome return from a country with only half a million inhabitants.

## The Iron Trades.

Business with the iron trades in this city has continued dull for a long time, the absence of large contracts having been greatly felt by the foundrymen and machinists. The increase of prices in the East and the enlargement of business has not been felt here as yet, though the signs of its approach are apparent in a much more hopeful feeling than has prevailed for a long time past. It usually takes some months for a revival of business East, to influence matters here. Though there is an abundance of money here it is not circulating as rapidly as those without it could desire. Still, should a revival of business occur, as appears likely, this money will seek new enterprises and enlarge old ones.

While business has been dull here there has been much competition, and work has been accepted at prices that paid no profit. This has been done to retain men employed and keep large works running, a fact that mechanics and laboring men do not always appreciate. The superintendent of one of the largest establishments in this city told the writer recently that he had several hundred men at work to no profit to the company, but with prices a little better he could work 200 more.

Though the foundries and machine shops report no special improvement in their lines, they are more encouraged than for some time past. The increase in quartz-mining operations in this State ought to benefit them eventually; and the gradual but rapid settlement of much vacant land in California is bringing new customers also. The Southern Pacific Company's rolling mills, in Sacramento, are now manufacturing 30 tons of iron every day, in all shapes, for railroad work. The roads now being built are causing a great demand for it. If one of our large foundries succeeds in getting a contract for one of the new cruisers the Government is about to build, it will be a great step in advance for our home industries, and there is a possibility of this being done.

JOHN COYLE writes to the Grant's Pass Courier from Galesville that in one blast in their ledge they broke and threw out upward of \$7000. He said that some of the ribbon rock from one to four inches was almost solid gold.

THE old Raymond & Ely mine, at Pioche, has been started up after a shut-down of several years.

## Unsuccessful Deep Mining.

The topic of interest among mining men at present is the proposition to cease prospecting on the lower levels of the Comstock lode, which is now under consideration. The pumping at the Combination shaft has been done by the Chollar, Hale and Norcross and Savage Companies, but the Savage Company has refused to pay its quota any longer. This action by no means involves the abandonment of the lode, but simply the lowest levels, which will be allowed to fill with water should no arrangement to continue work be made. Mr. W. S. Hobart, the well-known mine-owner, has stated that he did not think the shaft would be shut down at present to the 2400-foot level, but that the bottom of the shaft would be abandoned by stopping the pumps at the 3000-foot level immediately. After a little while, he thought, the next set of pumps at the 2600-foot level would be stopped, and eventually, in all probability, the shaft would be stripped to the 2400-foot level. When asked what he thought would be the effect of abandoning the lower levels in that way, Mr. Hobart said he was afraid it would have a very bad effect on mining in the Comstock. It would, he said, put a stop to the collecting of assessments, as he feared it would put a stop to all speculation in Comstock shares. The public, he said, have hoped for and have been educated to look for very large developments below the 3000 level. There is, he said, a great deal of unexplored ground in the upper levels, but no one looks for any great developments there.

The immediate cause of the shutting down was the refusal of the Savage people to bear their proportion of the cost of keeping the pumps going. This threw all the burden of the expense on the other two mines, and they did not care to carry it.

There was, he said, at one time a project for driving a long drift through the lower levels to drain the middle mines through those at the south end, and maps and plans of the proposed work were made; but the scheme fell through because no arrangements could be made which would be satisfactory to all the parties to be benefited by the drainage.

As to the statement that the pumps at the Yellow Jacket new shaft would probably be started up for the purpose of draining, so as to prospect the 2700 level of the Belcher mine, Mr. Hobart said he knew nothing, although he did not consider it improbable, as he had always been given to understand that the showings were very good in that mine when it was shut down.

Among other things it is now rumored that an attempt will be made to get Congressional aid to work a shaft to the 5000-foot level.

A curious feature of the proposed cessation of pumping is the fact that W. S. Hobart, one of the Chollar trustees, is also a large shareholder in the Virginia and Gold Hill Water Company. The shutting down of the hydraulic pumps at the Combination shaft will curtail the monthly revenue of the latter incorporation \$10,000. To offset this the rumor is revived that the pressure heretofore required to operate the hydraulics will be utilized to drive stamp mills to be erected in the canyon east of the Chollar old works for crushing ore from the mine, the extraction of which it is alleged will be resumed on an extensive scale. Repairs to the old hoisting works now in progress lends a shadow of plausibility to the rumor.

BANK OF CALIFORNIA.—At the annual meeting of the Bank of California this week it was reported that the aggregate movement of the bank for the year was \$598,319,559, equal to an average monthly movement of \$49,859,963. The amount of exchange reported was \$45,109,049, and the amount of bullion received \$7,701,800. The gross and net earnings for the year were as follows: Interest, \$462,705.41; other sources, \$80,359.85; gross earnings, \$543,065.26; expenses, \$136,438.86; net earnings, \$406,626.40. From the net earnings four quarterly dividends of \$75,000 were paid and \$55,085 was added to profit and loss account. The increase in business for the past year is in round numbers \$1,250,000. The real estate owned by the bank outside of the bank premises is put down at \$441,562, but is valued by experts at \$1,000,000.

A MILL is to be put up at Wright's Creek on the ridge north of Ashland, Oregon.

## Miners' Valuation of Mines.

By reason of the depression that exists in the agricultural, manufacturing and most of the other leading industries of the world, there is being manifested a more general desire than ever before to embark capital in the business of mining for the precious metals. This disposition is apparent on every hand. The English have of late been putting a great deal of money into the mines of India, Australia, Africa, Mexico, and of South and Central America, their investments in our own Western States and Territories having, meantime, been less than formerly. Why these British investors should have ventured their means in these other foreign and even more distant countries rather than in the great metalliferous fields of the United States is not at first glance apparent.

It becomes pertinent, then, to inquire why it is that these people go looking after mines in the jungles of far-off India, on the hot and malarious coast of Africa, and in the still more deadly districts of South America, into which every pound of machinery and most other supplies have to be imported, instead of coming to a region noted for the excellence of its climate, possessing every facility for the manufacture of machinery, and equally as rich in its mineral resources as these pestilential and savage lands. The reason we conceive to be this: In these other countries it is possible to secure a large extent of mineral-bearing territory at comparatively small cost.

These regions, though remote and, for the most part, hot and unhealthy, are sparsely populated, and that by a semi-barbarous and lethargic race, who either lay no claim to the mines, or, if they do, set little value upon them—knowing that if they retain their ownership they will not themselves ever derive much benefit from them. And so the English and other Europeans, with their superior energy and intelligence, their more ample means and better acquaintance with the business of mining, arriving in these countries find no difficulty in getting hold of all the mineral deposits they want—buying them for a trifle where they acquire them by purchase, or taking possession of them without this formality, as they very often do. Whichever course is pursued, there is apt to be little or no trouble about title—there being, at the same time, no occasion for middle-men, nor for the expenditure of much money at the start. If these mines are a long way off and in a country with which it is difficult to communicate, these are not, by the speculator and promoter at home, looked upon as insuperable obstacles, and may, even by this class, be considered an advantage—as affording means for preventing shareholders from becoming too familiar with what is going on abroad.

Turning now to California and the Pacific Coast, how different the conditions. The agent of Eastern capitalists or of a foreign syndicate coming here finds everything in the shape of a mineral deposit taken up and claimed. Every outcropping of quartz has been located, notices, during periods of excitement, having very often been placed on detached boulders, showing that they also had been reduced to ownership. Even promising "float" has sometimes been honored in the same way. In hardly more than one case out of ten have these locations been proved, upon only a few of them has anything determinate been done, nor do they, either through exploratory work or natural exposure, give positive evidence of a large or even a moderate wealth. That many of them will develop into paying mines is probable enough, but to accomplish this will take time and money, and in most cases a good deal of both. So far they are mere prospects; and yet let a stranger, or, for that matter, any old stager, approach one of these claim-holders with a view to buying his proprietary interest in these shadowy properties, and what is the result? Are they offered to him on anything like reasonable terms, or at a moderate figure? Hardly ever; a price is almost always asked for them that confounds the would-be buyer at the outset. Our claim-holder is a man of large ideas—hopeful and sanguine, yet hard and exacting withal. His talk is of thousands and tens of thousands, and he feels like chiding himself if he restrains it from running into the millions. His claim, he assures you, contains a veritable bonanza. The story of Monte Cristo seems tame compared with what he tells



you. The wealth of an Astor is poverty beside the treasures that lie buried right under your feet. The vaults of the Bank of England would be insufficient to hold them; he contemplates their enlargement. And so, adhering to these excessive prices and pursuing this extravagant style of speech, this class of claim-holders soon succeed in convincing buyers and promoters that it is useless to attempt negotiating with them for mining properties; hence the little that for some time past has been effected in this direction either here or elsewhere on the Pacific Coast, and if our miners expect to market their grounds or to get money to help open them up they will have to change their policy as above outlined. Many of these mountain men seem unconscious of the changes that in this regard have taken place during the past six or eight years, going on in the expectation that mere indications and partially-developed mines can be disposed of just as in the days of reckless investment and wild speculation, when these properties were bought for stock-jobbing purposes. They ought to know by this time that a halt has been called all along the line, capitalists being no longer willing to take all the chances—paying big money for mere possibilities.

Already the mining countries lying along and to the west of the Rocky mountains, California included, have been greatly retarded owing to the causes here indicated, and this notwithstanding their great store of mineral wealth and other natural advantages. Even moneyed men in the Eastern States, tiring of their unavailing efforts to get hold of mines and mining properties in these west-lying regions on suitable terms, are beginning to look south for better opportunities than offer here, Mexico, Central America and the United States of Colombia being the fields most attracting attention off that way. We are advised of several schemes that have recently been set on foot in New York and other cities on the Atlantic seaboard for operating on a large scale in one or more of these countries, some of these being directed to vein and others in hydraulic mining.

It is well understood that the mines there are no better, if as good, as we have in this country, and that they must be worked under many disadvantages. But these latter are supposed to be more than offset by the cheap labor obtainable and the little expense with which large mining properties can there be procured, the cost of these items being as three to one in favor of these foreign countries. The vender of mines, when reminded how often these mining ventures turn out badly, is apt to reply that this want of success is due to bad management, to a faulty choice of machinery or of processes for working the ores, or to other mistakes. Admitting such to be the case, this amount of failure may very properly be taken into the account by the investor when buying a mine, since it seems to be incident to the business. This is the rule adopted in all pursuits. The average of loss must be charged to the business as a whole. If the locator of a claim keeps and attempts to open and work it, he may himself commit these same mistakes and come out loser in the end. It is not our purpose to especially condemn the course pursued by this well-deserving class of men, nor yet to discourage them from exacting for their claims all they are worth, and all, in fact, that they can fairly get. Yet it would be well for them to remember how conditions have changed, how great have been the losses sustained by investors in mines, how seldom these properties turn out as expected, and how generally it has happened that the locator who sold when he had an opportunity has had reason to felicitate himself on having done so.

H. D.

### Dovetailing Machinery.

Machinery for cutting dovetails must of necessity be of a very ingenious nature, and when this is so arranged as to cut at any desired angle or size, it becomes most useful in the wood-making trades. The engraving on this page shows improved patent steam and hand dovetail machines which fulfill these requirements.

In the engraving, Fig. 1 represents a machine for cutting dovetails, invented by L. P. Garcin. The cutter is a circular saw mounted upon an ordinary arbor, whose bearings are upon a rocking iron frame, and the trunions of which are considerably above the plane of the saw arbor. The frame is caused to oscillate or recip-

rocate on these trunions by means of a connecting rod and eccentric, the stroke of which may be changed so as to make a narrow or wide dovetail. By lowering or raising the bearings of the saw, and the further lowering or raising

attachment for the exclusion of dust and wind on the edges of window-sashes and doors, as shown in Fig. 2. This cut illustrates the position of the rubber tube as inlaid on window sashes. It consists of a dovetail groove cut on

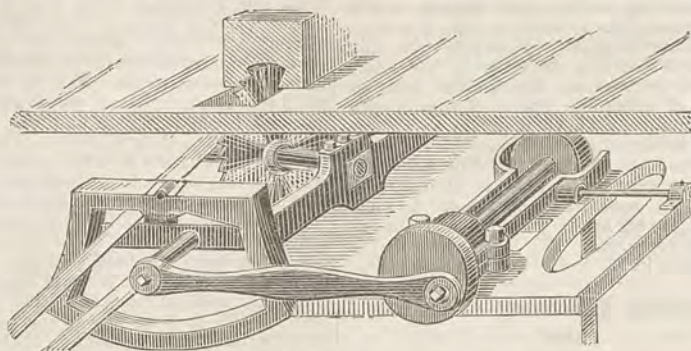


FIG. 1. Round-Bottom Dovetailing Machine.

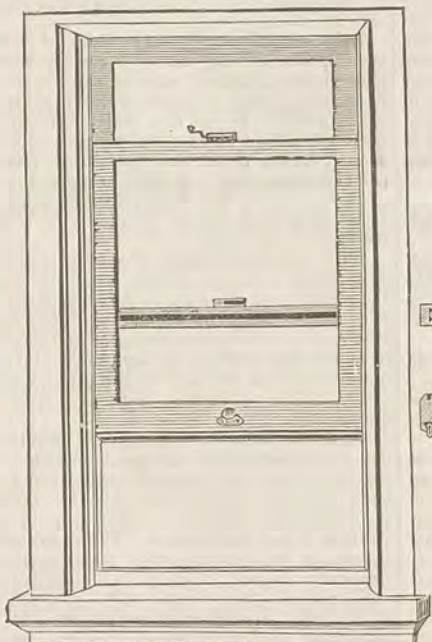


FIG. 2. Application to Window-Sash.

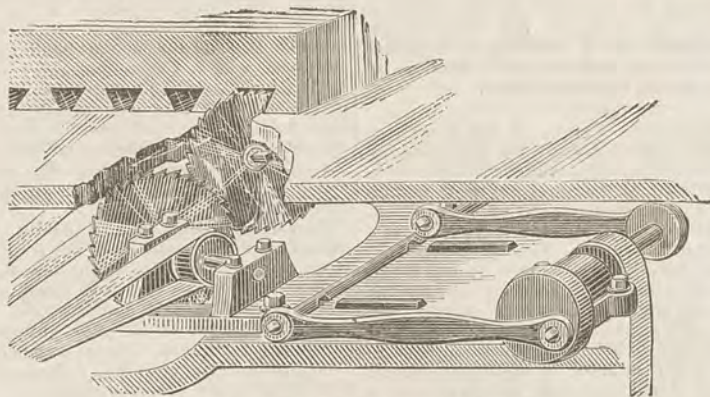


FIG. 3. Straight-Bottom Dovetailing Machine.

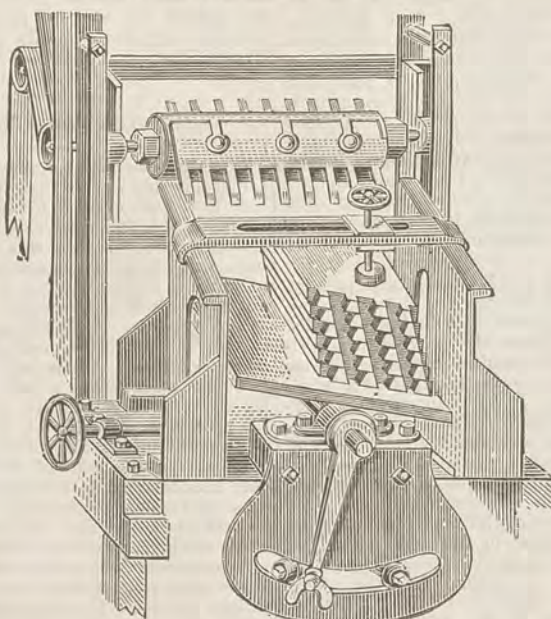


FIG. 4. Dovetail Tenon-Cutting Machine.

### IMPROVED PATENT STEAM AND HAND DOVETAIL MACHINES.

of the table, the depth of the dovetail is varied. Several applications of the saw are made; by disconnecting the rod a cut may be made square, or at any angle to the table.

One of the applications of the groove cut by this machine is the insertion of the rubber-tube

the lower sash, and on the meeting rail of the upper one. Its adjustment on doors is equally simple. The rubber tube protrudes from the edges, so that the hermetic joint is effected by means of the compression which is obtained, on doors by simply closing them, and on windows

by means of the fastener shown in Fig. 5. Fig. 3 shows an adjustable straight-bottom, dovetail-cutting machine, by the same inventor. This machine is supplied with two saws, one in the rear of the other, and set at opposite angles. The arbors being mounted on a frame which rests on slides, a reciprocating motion is given to the frame by a device similar to that described in Fig. 1. By this motion each saw cuts one-half of the dovetail through a number of pieces, which are secured to an automatic feeding apparatus. The most important of the advantages of this machine is that it is provided with mechanism necessary to vary the size and distance apart of the dovetails.

Fig. 4 shows a dovetail tenon cutting machine devised by the same inventor. The dovetail tenon to suit the above machine is produced by revolving knives set on a horizontal square arbor whose bearings run in slides on the frame of the machine so as to allow, by means of a lever, the lowering of the knives through the pieces to be tenoned and their being raised back to their original positions. The work to be tenoned is fastened to the table beneath, entirely independent of the knives. This is inclined alternately to the required angle, first right and then left; the knives cut one side of the tenon at each of the two angles presented so that they are passed through the work twice to make the tenons. The machines are constructed to receive pieces from one foot to two feet wide, the ends of which are completely tenoned at two cuttings.

The size of the tenons are varied by changing the inclination of the table and their length by a gauge against which the pieces are set. The distance between the tenons is adjusted by changing the knives. Ciprico & Marais, manufacturers' agents, 104 Market street, are the agents for the above machines.

### Prices for Claims.

There is scarcely a more difficult thing to do than to put an exact valuation on a mining claim—one that will be fair to both owner and purchaser. The purchaser is apt to depreciate and the owner appreciate the property. It is different from ordinary commercial transactions. In purchasing an article of commerce there is a certain value at the time, which may be higher or lower afterward, but when bought is governed in valuation by other articles of the same character. But a mining claim may be worth millions or nothing when purchased. If the exact contents could be determined, a price could be set, but this is impossible. No one claim is exactly like another.

The miner has to search the mountains and find his claim; then he has to open it to some extent, and then he wants to sell. It is a characteristic of this class to be hopeful and sanguine. Small wonder, then, if they ask more money for their "prospects" than they are really worth. To them it represents so much time, labor and skill, and they think the capitalist who wants to buy should pay a good price for what to them seems of great value.

"H. D.," in an article on "Miners' Valuation of Claims," in this number of the PRESS, holds that because miners ask high prices, capitalists are being driven away from our border to other countries to buy mines. There are probably cases of the kind, but there are also hundreds of cases which might be cited where capitalists have got hold of good, rich mines, for a mere trifle compared to the ultimate yield. Miners remember these things, of course, and try to get the best prices they can for their properties.

There are hundreds of men in this State who have been made rich from mines that other people found, and which they bought. Of course if a man pays \$30,000 or \$40,000 for a mere prospect hole he lacks judgment, but one can scarcely blame the miner for getting all he can for his mine. There is a middle course in all such transactions for both owner and miner. But because a few foolish men charge exorbitant prices, it by no means follows that they can get them or that it prevents people generally from investing in mines. There are plenty of good prospects and mines in California today which may be purchased at reasonable prices.

The foreman of a mine at Indio, on the Colorado desert, was recently escorted to the railroad by the miners and told to leave that section of the country.



## MECHANICAL PROGRESS.

## Aid and Encouragement which Inventors Need.

O. Chanute, Esq., of Kansas City, gave some valuable hints on the progress of mechanical science in an address delivered before the American Association at its recent session in Buffalo. In regard to the true objects of the section of mechanical science, and the means of increasing its usefulness in the future, he said that, in marked contrast with the past, the present age is one of pronounced material development. Formerly the brightest and most gifted men devoted themselves to religion, philosophy, politics, exploration, art; but for the past hundred years the attention of leading men of the civilized world has been directed to increasing and cheapening those products which minister to the daily life and comfort of man. Farmers, mechanics and laborers live now more comfortably than did the middle classes of feudal times; the duration of human life has been materially lengthened, and all portions of society recognize the importance of further progress, and the advantage of organization and invention in securing it.

This era of material progress may be said to have commenced with the final perfecting of the steam engine, which, together with the various attendant machines, takes the place of hand and animal labor, which has increased and cheapened the production of the necessities and luxuries of life; and it has pushed the inventor and the engineer to the front rank in modern society. It may be useful to point out the absolute necessity of verbal and written intercourse between investigators and inventors, that the speculation and curiosity of the former may ripen into the effective invention of the latter. Nothing is more remarkable than the multitude of minds and facts which are required for the perfecting of even a simple machine, nor how little the last man may need to add to complete the invention. Facts and natural laws, known for years as curiosities, are taken up by some inventor, who fails in the attempt to render them of practical use; then a second genius lays hold, and, profiting by the mistakes of the first, produces, at great cost, a working machine. Then comes the successful man, who works out the final practical design, and, whether making or losing a fortune, he yet permanently benefits mankind.

The faculties of invention and discovery are generally separate. One set of men observe facts and deduce laws therefrom, and another set endeavor to turn the results of this observation and deduction to practical account in the production of labor-saving appliances. This section should be the place where these men may meet one another and profit by the interchange of ideas.

Ordinary technical societies usually discourage speculative papers and discussions, and prefer to hear of accomplished facts; but the busy men who are developing this country need something more—they need to keep up with discovery before it is reduced to practical account, and they need that personal contact and sympathy with men of science which nothing can replace. Engineers, as well as other practical men, owe it to themselves to come to these meetings, bringing accounts of what they have done and *hope to do*, and especially what they have *failed* to do, and why; and some speculative papers may well be allowed providing always that they are on a sound basis and tick to facts, for how often is it that the imagined things of to-day become the accomplished results of to-morrow!

## Illustrating Machinery.

The importance of using illustrations that will convey a correct idea to the mind of the construction of the machine or machinery is often overlooked. Some have thought that anything that in part represents the construction is sufficient; that parties interested will write making inquiry and then there will be an opportunity to present the facts. But this is an unwise conclusion, for the reason that our first impressions of mind about anything are difficult to change. A new machine is advertised; we are interested in such machinery, and examine it as far as we can from the illustration, and largely make up our mind as to its merits or demerits. If our impressions are unfavorable, we most likely never look after it further, unless something comes in our way to attract our further attention. Our unfavorable impression may be in part the result of a poor illustration; it may be rough, crude, dim or blotched, so as to be repulsive to us; otherwise, if the cut illustrating it had been well executed, we would have formed a very different impression, and possibly we might have become a purchaser of the machine. Those having any line of goods to sell will do well to spare no expense in having the very best work done in the engraving of their illustrations.

A woodcut engraving (well done) is best, showing a finished machine ready for the market. These woodcuts should be engraved from photographs of the machine. Photos may be photographed upon the wood direct the size desired and the engraving done from the latter. There is a wide difference in the skill of engravers; one is able to bring out every line and shade so distinctly that any one examining the illustration can almost see it in operation; another makes an indistinct illustration—one that might in some way serve to remind us of the machine if we had before seen it. The latter cut probably costs less money, but it makes fewer sales.

A woodcut should not be used to print with, if it is intended to preserve it for future use; but electrotypes should be taken from the wood engraving, and the woodcut preserved for other electrotypes to be taken from if they are needed using the electrotypes to print from only.

We have been thus particular for the reason that many persons are not familiar with the methods of obtaining cuts to illustrate with. We very frequently have inquiries to answer, and not infrequently the charges for engraving the woodcut are thought to be high and the electrotypes very cheap, whereas all the labor is expended upon the engraving. A rough sketch engraving can be done for half the cost of a fine engraving. The latter, however, is the cheapest in the end.—*The Clay Worker*.

## Interesting Experiment in Casting Steel.

In a recent discussion before the British Iron and Steel Institute, Sir Henry Bessemer gave some interesting particulars of an experiment he made 30 years ago, suggested by observing the difference between French and English lump sugar. The English sugar has a much larger crystal than the sugar made in France, and in the latter the material is cooled quickly and stirred while cooling, while English sugar is allowed to stand and crystallize slowly. Some kinds of sugar candy stand for days while in the process of crystallization, the operation being retarded by heat. In that case the crystals are very bold and pronounced.

It is also known that in heavy iron castings, where the heat is kept in a long time by the mass, large crystals are apt to be formed. The experiment above referred to was made in the following manner:

A hole was made in the earth and lined with sand; into this a mold, which would produce a spherical casting, was placed. Between the mold and the sand a quantity of charcoal was packed. The mold then had a quantity of malleable iron made on the Bessemer process poured into it, and the whole was covered up for 10 days. The metal had a heavy dose of phosphorus— $\frac{1}{2}$  to  $\frac{3}{4}$  per cent—but no carbon. At the end of the 10 days the globular mass was dug out. A smart tap with a two-pound hammer had the effect of sending off a shower of crystals, and there appeared to be no cohesion among the particles of the mass. On hammering one of the crystals on an anvil, it could be flattened down, thus showing that each individual crystal was a particle of malleable iron, although the cohesion of the crystals to each other was so slight. Sir Henry thought this experiment worth detailing, as it tended to show the great importance of the time allowed for cooling in iron and steel.

**HEAT-INDICATING PAINT.**—A few years since we noticed in *Iron* a paint for indicating, by change of color, a rise in temperature in objects painted with it. History repeats itself, and to-day finds another pigment, having the same object, introduced by Mr. Henry Crookes, of 4 Westminster Chambers, Victory street, London. We have tried a sample of this paint, which is of a brilliant red color and has the property of gradually becoming darker when heated, until, at about 160° Fahr., it attains a very dark brown color, and when allowed to cool for a few minutes it regains its original red. It is stated that this change of color is not affected by age or use, the paint being as good after 100 changes backward and forward as it was when freshly made. This property of indicating a rise of temperature in such a striking manner would appear to render this paint very valuable to engineers; for, if applied to the bearings of any machine or engine, it should act as a tell-tale of the temperature. As long as the paint remained red, the man in charge would know that the bearings were all right, without having constantly to go round and try them with his hand; while a change of color would warn him that the bearing was getting hot and required attention.

**WIRE NAILS VS. CUT NAILS.**—The impression generally prevails that the cost of manufacturing wire nails is greater than that of cut nails. A cotemporary thinks that a visit to a first-class wire-nail mill would readily enlighten the cut-nail adherent as to the possibilities of wire-nail manufacture. "With an output averaging 80,000 pounds of No. 5 rods per day, with but two furnaces and about a dozen men and boys, wire rods can be made cheaper than nail plate. Between the wire nail and the cut nail, so far as quantity is concerned, there can be no comparison. It is singular that there has been so little improvement in the cut nail. The change from iron to steel is a step in the right direction, but a change in the form of the nail is imperative. The bluntness of the cut nail is its chief defect, and it is a weighty one. The blunt nail destroys the fiber of the wood through which it is driven; in fact it usually punches a rough hole through it, thus materially lessening the holding power, and by leaving an open space around it, moisture enters and hastens the destruction of the nail by rust. But in all probability, in the near future the improvement of the cut nail will be compulsory, if it is to hold its place against the encroachments of the wire nail."

## SCIENTIFIC PROGRESS.

## Coloring Matter from Cotton-Seed Oil.

The uses of cotton-seed oil are leading to a rapidly-increasing industry. The total manufacture of this article in the United States has already reached to nearly 3,000,000 tons annually, of which about 300,000 are annually exported to Great Britain, and perhaps as much more to other countries. This oil has been applied to a great number of uses in the industrial art, and is constantly finding new sources of appliance. The latest and perhaps the most interesting application is to the dyeing industry, where it bids fair to find a large and most valuable use for mixing with the aniline dyes.

Crude cotton-seed oil is of an intense ruby—nearly black color, due to its holding in solution a powerful vegetable coloring principle, by which peculiarity it is most decidedly distinguished from all other oils. The oil-cells appear in the seed as brown specks dispersed through the albuminous matter. Hitherto the oil has been practically useless for many commercial purposes, for the reason that it communicated an ineffaceable stain, due to this active and persistent coloring principle.

By a recently-discovered method of refining the oil, this coloring matter is readily isolated, thus giving additional value to the oil, and also furnishing a most valuable addition to the list of dyestuffs. In its dry state, this coloring matter is a light powder, of pungent odor, of a brown, earthy color, and possessing powerful coloring properties. A small proportion is soluble in water; but the principal bulk dissolves only in alcohol or alkalies. It is quite insoluble in all acids.

With the whole range of aniline colors, the cotton-seed coloring matter seems to possess the property of forming definite chemical compounds, the nature of which is not yet fully investigated. It acquires the color of the aniline used and only a small proportion of the latter is necessary; in this way an infinite variety of brilliant dyes of perfect fastness may be obtained.

The above facts were first made public in a paper read before the Liverpool section of the English Society of Chemical Research in March last. Samples of cloth dyed by this material were exhibited, ranging in color from a light straw to a rich dark-brown. The entire paper, as read, is published in the *Paint and Drug Reporter*, which journal, in criticising the same, remarks that "there is a desire to learn some of the experimental foundations for the statement that the coloring matter formed chemical compounds with nearly all aniline dyes. If the nature of these compounds were known, the chemical nature of the coloring matter would manifest itself. It is yet questionable whether the real dyestuff can be isolated and whether it is capable of industrial application, the instances given being only experimental. Persons who attach any importance to this feature of the cotton-seed oil industry can satisfy themselves on this point by extracting the coloring matter from soap stock which is almost given away. Soap stock contains most of the dyestuff."

Considerable time has evidently been occupied in the investigation, but it is thought by some that much labor could have been saved if the experiments had been conducted in a more systematic and philosophical manner. English criticism of the paper has been anything but favorable. As a member of the Chemical Society remarked, "The age of random experiment was now past, and practice must be guided by theoretical knowledge in order to attain success." However, the author has opened the way for further investigation and has suggested a means of developing the dyestuff feature of trade, which should, and no doubt will, receive proper attention.

## Oil From Corn.

Chemical research is ever busy in looking for things new and useful from sources in which they have been hitherto hidden. In these two adjoining columns, which are always devoted to scientific progress, we this week note three important chemical discoveries, each of which promises to exert a marked influence upon industry and further research.

This present writing is to make a brief reference to the fact that a new source of oil has been discovered. Oil is now being extracted from corn at St. Louis, a bushel of corn yielding about half a grain of oil as a by-product in the process of distilling for alcohol, or in that of manipulation for glucose or starch. The oil is taken from the germ of the kernel, and in both instances, while furnishing a useful and important article of commerce, its isolation is of a decided advantage to the production of either alcohol, glucose or starch.

Experiments were made, some years ago, to obtain other than fusel oil from corn, but with trifling success. The attempt, however, was not forsaken, as recent results have demonstrated. Chemical researches have brought about a process in the manipulation of corn for its various products, which extracts, as a by-product, a clear, sweet, amber oil, suitable for culinary as well as for various other purposes. The true worth of this new oil has not yet been fully placed before the public; but if its manufacture, which has already been commenced on a large scale, is continued, as it doubtless will be, it will no doubt be found applicable to a

great variety of uses. Being a by-product, its manufacturers will be able to place it on the market at a lower figure than competing oils. If the various distilleries throughout the country possessed the improved process of extraction, the production of corn oil would be extensive; but we understand that the secret is in few hands, with the probability of remaining so for some time at least. The progress made thus far prompts the question, If corn produces a commercial oil other than fusel oil, why should not other cereals do the same by a similar process? It is said, also, that the cake is an excellent food for cattle, and that it will soon be placed upon the market, but not under the name of corn cake.

The oil is already being produced at St. Louis, Mo., and at Harlem, near New York. It is also said that the Toronto Glucose Company have acquired the right to use the patent in Canada, and are prepared to work up 700 bushels of corn per day.

It is claimed that the process is of special benefit to the distiller, from the fact that it removes the fusel oil, which is a great detriment in the production of alcohol.

A correspondent of the *Canadian Pharmacy Journal*, who has carefully studied the process, says that by the process of grinding, which constitutes the peculiarity of the patent, the albumen or starchy portion of the grain is thoroughly disintegrated, while the hull, with the embryo, are completely separated.

The germ is obtained in the form of a flattened, white, horn-like substance, and is with difficulty pulverizable. On being subjected to pressure it yields a quantity of fixed oil, and a similar product can be obtained by the use of appropriate solvents.

The oil has for some time been known to chemists, but has not been made the subject of investigation. It is of a pale yellow color, which quickly becomes greenish by contact with copper. Its consistence or viscosity is greater than that of olive, and is similar to that of almond oil. The taste is at first bland, but is followed by some acidity, and the odor is sourish, recalling the smell of a baker's workshop or distillery. The specific gravity of the oil obtained by pressure is .92.

It is readily soluble in chloroform, carbon disulphide, and oil of turpentine; mixes less readily with petroleum ether and fusel oil, and is sparingly dissolved by cold alcohol, but more soluble in boiling alcohol, from which it is separated on cooling.

The germ yields to cold alcohol a small quantity of oily matter containing a volatile odorous principle, of a very decided and penetrating grain-like smell, strongly resembling that of crude spirit. The separation of the germ from the corn, prior to the mashing process, would probably enable the distiller to secure a purer ethylic alcohol than at present possible. The experiment is one well worth making. The corn does not contain any alkaloidal body which responds to the ordinary reagents.

**A NEW GLASS FOR THE MICROSCOPE.**—Some five or six years ago Prof. Abbey and Dr. Scott commenced a series of elaborate experiments, at Witten, in Westphalia, to devise some new description of glass by the increased refractory powers of which additional power might be given to the microscope. After two or three years of work their funds gave out; but as they had already met with marked success in their experiments, the Prussian Government was induced to extend sufficient aid to enable them to continue their work, which they did until the fullest success finally crowned their efforts. With the best glass as heretofore made, the full power of the microscope has been equal to the distinct discernment of less than the one-thousandth part of an inch; while with the new glass it is claimed that over less than the one-millionth part of an inch is plainly discernible. The microscope has always been regarded as a most wonderful instrument, but if this alleged discovery should prove all that is claimed for it, its powers will have been advanced to an almost incredible degree. Ordinary glass usually contains six substances. The new glass made by Prof. Abbey and Dr. Scott is said to contain 14 different substances, the most essential of which are phosphorus and boron, neither of which has ever before been used in such manufacture. The difference between the new and old glass consists in the difference of the two in their powers for the refraction of light. As the discovery was made by government aid, it has been given to the world free of any patent restraints.

**HOW INCANDESCENCE IS PRODUCED.**—Incandescence is a white heat, or the glowing whiteness of a body caused by intense heat. The little glass bulbs, says an exchange, with their brilliant horseshoe of glowing filament, attract no more attention than the flickering gas jet. But the facts about the gas jet are easily and generally understood, while the electric lamp is still a puzzle to many people. Both produce light by incandescence. The molecules of gas are rendered incandescent by the heat generated by the combustion of other molecules. The blue portion of every gas flame is where combustion is taking place, and from there comes the heat which keeps the rest in a state of incandescence. With the electric lamp it is the heat produced by the friction of an electric current compelled to go through a fine carbon filament, which raises that filament to a condition of incandescence and produces light.



## ENGINEERING NOTES.

**A GIGANTIC FEAT.**—Probably the heaviest operation in moving architectural structures was recently performed by hydraulic means in the city of Boston. The Hotel Pelham, at Tremont and Boylston streets, was in the way of the process of widening Tremont street. The hotel is built of freestone and brick, 96 and 69 feet frontage. The Boylston-street wall is supported on eight granite columns, 12 feet high, three and four feet square. There is a basement and seven stories above the sidewalk. Eight above tramways on which it was moved, 96 feet. Weight, 5000 tons, exclusive of furniture, which was not disturbed during the removal, as also were not the occupants of the stores on the first floor and some of the rooms, the various pipe connections being kept up with flexible tubes. The building was forced to its new position by 56 screws, two inches in diameter,  $\frac{1}{2}$ -inch pitch, operated by hand against timbers arranged to uniformly distribute the pressure against the building. Much care and ingenuity were displayed in the details, in the arrangement and work. Two months and twenty days were occupied in preparation. The moving itself was begun on August 21 and finished on August 25, but the actual time of moving was but 13 hours and 40 minutes. The hotel moved about  $\frac{1}{2}$  of an inch at each quarter turn of the screws. The whole distance moved was 13 feet 10 inches. Four thousand three hundred and fifty-one days' labor was required for the work. The whole cost was about \$30,000. This is the largest building that has ever been removed, although larger ones have been raised, which latter is a much simpler and much less risky operation. The complete success of this undertaking is shown by the fact that cracks which existed in the walls prior to removal were not changed by the operation. Paper was pasted over them, before commencing, that any change might be seen.

**NEW WATER WAYS FOR RUSSIA.**—Active preparations are being made for the construction of a canal to connect the White sea, in Northern Russia, with Lake Onega, which is already in water communication with St. Petersburg. The length of the canal will be only about 37 miles over a favorable country. Besides opening direct water communication between the Arctic ocean and the Baltic sea, vast forest, agricultural and mineral regions will also be rendered available to Russian industry and commerce. Vast fishery enterprises will also be called into activity. Another project which will undoubtedly be carried out at an early day is the junction of the Dwina with the Viatka, an affluent of the Volga; the other, that of the Kama with the Vyteghda, in the direction of the canal, now abandoned, called "Catherine of the North." The department of railways is also charged to estimate the cost of the lines of junction between Archangel and the northern system, this port being destined as the entrepot of Siberian products. It is contemplated to prolong the Louniew line in the direction of the Dwina, and also to connect the beds of the Kama and Vyteghda. In both cases the construction would be on a cheap and simple plan, adapted to the light traffic of these thinly-peopled regions.

**ELECTRICAL NAVIGATION.**—A boat propelled by electricity, with which experiments have for some time been made on the Thames, recently made a successful trip across the English channel, from Dover to Calais and return—24 miles each way. She is called the *Volta*, is 37 feet long, has 7 feet of beam, can accommodate 40 passengers, and is propelled by 61 accumulators 8 inches square, placed as ballast under the floor and connected with a pair of electro motors. The advantages claimed for this means of propulsion, compared with steam, are economy, absence of noise, simplicity of management, saving of space, absence of smoke, etc. It is stated that the whole cost of the electricity sufficient for the 24-mile trip to Calais was only \$2, and that a speed of 12 miles an hour can be obtained. The principal obstacle in the way of more general use of electricity on boats appears to be the necessity of frequently replenishing the accumulators.

**AN ENDLESS RAILWAY** has been invented—a jointed polygon composed of 13 wooden bars with rectangular bases, each attached by a hinged joint to its two neighbors. A short piece of rail is carried by bar. By shifting spokes the whole is connected to a common central pinion. The wheel of the vehicle has a U-shaped tire which turns inside of the articulated polygon. As the wheel, under the effects of traction, advances, the polygon also rotates. Comparative tests were made on smooth pavements, over which gravel was gradually spread. With heavy loads, running as high as five tons, the polygon had an advantage of 25 per cent over the common car.

**FROM NEW YORK TO BOSTON.**—A project is on foot to cut a canal across Conanicut island, at its narrowest point, to run a steamer direct from Newport to the Narragansett shore, and thence connect with the Shore Line by way of Kingston. This would shorten the route to New York nearly an hour, and would be of great advantage to summer travel.

## USEFUL INFORMATION.

## The Magney Plant.

The way in which the Mexican liquor, known as pulque, is collected from the magney or century plant is described by a recent traveler in Mexico as follows: "The magney is one of the most useful plants in Mexico. From the fibers of its leaves the Mexican makes his ropes and cordage, weaves various articles of domestic use, makes paper, and, what to him is equally important, from it he extracts his pulque and from this he distills his tocala, a liquor about as strong and intoxicating as fourth-proof Ohio strychnine whisky. To his credit be it said, the Aztec does not use it, for we saw not a drunken man among them all the time we were in Mexico, only seeing it once or twice in the hands of his Spanish rulers. When the plant has about arrived at maturity it shows a central stalk about to shoot up 10 or 12 feet and bear flowers and fruit. This the Indian cuts off, finding quite a large cavity below. In this the sap intended by nature to feed the stalk and produce the flowers and fruit is collected. This the Indian watches and tends carefully. On his back he has a pig-skin which has been taken from the animal as nearly as may be whole, as one skins a rabbit. Of course all the orifices but one small one are securely tied up. He inserts a tube into the small hole of the pig-skin and makes it air-tight by tying it securely. With his mouth he then exhausts the air from the skin and tube, and holding the end tightly he inserts it into the sap below in the reservoir of the plant, and the weight of the atmosphere forces the fluid up into the pig-skin. When full, he trots to the depot and empties it into a large cask, and it is ready for shipment and for use. As it is best when fresh, trains of cars run out of the city every night and return every morning loaded with large casks of pulque. It is distributed all over the city, and for a few cents per glass and a real (dime) per bottle everybody who likes is served with it from scores of shops in all the streets. It looks like buttermilk, tastes something like it and is scarcely any more intoxicating. Physicians recommend it for kidney and some other diseases. Attempts have been made by carefully bottling it to ship it to other countries, but as yet it is an experiment of doubtful success."

**CHEAPENING EMBROIDERIES.**—A machine which will create a material change in machine embroidery has lately been exhibited in Germany. One cause of great expense to embroiderers has been the necessity of engaging threaders, women or girls, who would thread the needles preparatory to their being placed into the machine. This new machine will, it is claimed, thread 18,000 needles in 10 hours, including all necessary delays, at a cost of about 50 cents, which amount of labor, under the present system, occasions an outlay of not less than \$3.50. It is stated that embroideries, with needles threaded by the machine, have turned out in every way satisfactory. Another apparatus has lately been constructed by a German inventor which is of great interest to Swiss machine embroiderers, inasmuch as it enables them to have the most difficult designs enlarged by less experienced hands than heretofore. The design is placed into a slide, and by means of a scripton is reflected on a table in its properly enlarged form, from which it may be very easily traced by one possessing only ordinary artistic abilities. The apparatus is so arranged that the frame holding the reflecting lens and the design may be regulated at will by means of a string suspended from the same, and the whole affair has the additional advantage of occupying but little room and being easily moved, owing to its light construction.

**A NEW JOINT MATERIAL.**—Portland cement mixed with a solution of calcium chloride rapidly acquires considerable hardness. Setting begins in three or four minutes, and is attended with an elevation of temperature that may attain to 70° C. A slight expansion is also produced in the course of setting. Cement mixed with calcium chloride softens, if it is plunged immediately into water; but after having been air-dried for eight or ten days, it may be so immersed without inconvenience or detriment to its cohesion and hardness. Ordinarily damp air has no influence upon the mixture. The fact that, according to the *Journal du Ceramiste*, the runners of cement mills are repaired with this chloride cement mixture is a sufficient indication of the great strength which the compound is capable of acquiring. The stones are put to work within an hour of repairing and the cement is perfectly resistant, and wears less than lead, which is commonly employed for the same purpose. All joints can be made with great facility, and acquire in a short time extreme solidity with this chloride cement mixture. The slight swelling during setting is very useful in filling the hollows and making good adhesion. The cheapness of calcium chloride permits the using of the mixture for numerous purposes. When great hardness and quick setting are desired, the cement may be used pure; but in general an equal mixture of sharp sand will be found to answer every purpose.

**TO CLEAN GLASS AND SILVERWARE.**—Eggshells crushed into small bits and shaken well in decanters three parts filled with cold water,

will not only clean them thoroughly but make the glass look like new. By rubbing with a flannel dipped in the best whiting, the brown discoloration may be taken off cups in which custards have been baked. Again, all of us are aware that emery powder will remove ordinary stains from the white ivory knife handles, and that the luster of morocco leather is restored by varnishing with white of egg. Nothing, it is said, is better to clean silver with than alcohol or ammonia, finishing with a little whiting on a soft cloth. When putting away the silver tea or coffee pot which is not in use every day, lay a stick across the top under the cover. This will allow fresh air to get in and prevent the mustiness of the contents familiar to boarding-house sufferers.

A BARREL contains 10,752 cubic inches. A box 24 inches long by 16 inches wide and 28 inches deep—that is, on the inside—will hold just a barrel. For half a barrel, make a box 24 inches by 16 and 14 inches deep. This will contain 5376 cubic inches, or just half a barrel.

**FLEXIBLE GLASS.**—Paper of proper thickness is rendered transparent by soaking in copal varnish. When dry, it is polished, rubbed with pumice-stone, and a layer of soluble glass is applied and rubbed with salt. It is stated that the surface is as perfect as glass.

**"NAUGHT" AND "NOTHING."**—Many seem to think that "naught" means "nothing," whereas "naught" actually means anything. This is to explain that it is wrong to say "naught" for the "cipher" (0), the proper term for which is "naught."

**IRON RUST IN DRY GOODS.**—Iron rust is readily removed by equal parts of common salt and cream of tartar moistened with water and applied to the stained spots and placed in the sunshine. Moisten as it becomes dry for two or three hours.

**THE ANIMAL LIFE COST OF OUR IVORY.**—It requires the annual slaughter of 100,000 elephants to keep the world supplied with ivory. England alone uses up the product of 30,000 elephants, or 1,200,000 pounds.

**POWDERED CAMPHOR**, added to oil or turpentine varnish, will allow it to spread more easily.

## GOOD HEALTH.

## A Word of Caution to Woolen-Mill Operatives.

Woolen mills are, as a rule, healthier places to work in than cotton or jute mills, because in the former the wool is kept carefully oiled throughout the various processes from the time it goes into the picker-house until it is spun into yarn or woven into fabric, when the oil is washed out; while cotton is worked without oil, on machinery that runs at a high rate of speed, so that the dust and fiber is much of it thrown into the air, where it floats continually, and getting into the eyes and nasal and bronchial passages of the operatives, causes irritation of these parts and often more serious inflammation.

Yet the very oil with which the fibers of wool are oiled in woolen mills may become a source of danger not less serious than the cotton flyings in cotton mills. It is still customary with owners of small mills located in the western and less populous eastern districts to take common soap-grease from the neighboring farmers and wool-growers in exchange for goods, or at a low cash price. This grease is sometimes very nice, sweet and pure, but more often it is such grease as the farmers' wives would not even make soap of, and is full of putrefaction and microscopic germs of disease. If this were all made into soap for scouring the cloth its unwholesomeness would be greatly diminished, if not destroyed altogether, for the strong lye acts as a deodorizer and purifier; but more often a large portion of this grease is used in its raw state for oiling the wool, and is thus brought directly and intimately into contact with the hands of the operatives.

It also penetrates into their clothing, and by the natural act of rubbing the face and scratching the head is distributed about the eyes and nose and into the scalp, so that hardly a portion of the body escapes contact with this foul grease. This refuse grease always contains more or less fatty acid, productive of humors, and frequently the fat of animals that have died of disease. If this comes into contact with the blood through cuts or abrasions of the skin, it is likely to produce blood poisoning, with its distressing and frequently fatal results.

Sickness would occur more often if it were not for the fact that the hands of the operatives are generally more or less covered with machine oil, which is most always largely, if not wholly, a petroleum product, and is a skin curative and preventive of humors and poisoning.

The safest way, and the cleanest way, is to use only mineral oils on wool, or at least an oil which shall be composed principally of petroleum fat, and to make all the soap-grease directly into soap. Mineral fats are now made with such care and skill that they are equal, if not superior, to the finest animal oils for oiling wool, and will lubricate and wash out perfectly. They are absolutely free from fatty acid or anything injurious to the skin. Indeed, they

are the bases of most of the ointments for healing skin diseases.

Much of the "breaking out" on the hands, arms and face, and much of the itching of the scalp, now so common among woolen-mill operatives, might be found to cease with a change from animal to mineral oil.

Manufacturers will consider the health and comfort of their employees, as well as their own health, now that this matter has been brought to their attention.—*Hall's Journal of Health.*

## Boys and Cigarettes.

The city council of Oakland has recently done two very wise things: First, in passing an ordinance making it a misdemeanor for boys under the age of 16 to smoke cigarettes in any public place; and second, in passing a "curfew" ordinance, requiring the city hall bell to be rung at nine o'clock every evening, after which hour every young person under the age of 16 must go directly home and keep within doors until morning. The first ordinance, we understand, is promptly enforced; but we do not hear of any arrests for those ignoring the "curfew," and those whose business keeps them on the street after that hour are very much surprised at the great number of quite young-looking boys and girls whom the police seem to regard as having passed the proscriptive age.

Cigarette smoking, by young boys, has become an alarming evil in both Oakland and this city, and the ordinance referred to, if properly enforced, cannot fail to have a good sanitary effect, while it will also accomplish much moral good otherwise. In nine cases out of ten the boy who gets the habit of cigarette smoking well fixed upon him will have his days largely shortened and never amount to much in any way. An inveterate cigarette or cigar smoker gives very little promise of any very extended or useful future. A large portion of that class fall into the ranks of dillards, while all are more or less affected with a weak brain and decided lack of stamina.

The German Government understands this matter fully and has placed its interdiction upon the habit with boys of under age, giving as the reason that a young man who thus abuses himself can never make an effective or useful soldier; and all male Germans are required to give at least three years of their lives—from the age of 21 to 24—to active duties as a soldier in camp. To be serviceable to the Government it is considered necessary that they should not allow their intellect and physical strength to be undermined with the pernicious habit. And yet the Germans, as a nation, are the greatest smokers in the world. But under present laws they are not allowed to incur the habit until the physical system has become fully developed and in a better condition to withstand the poisoning and debilitating influences of tobacco. Is Oakland to be alone in taking care of her embryo citizens who are going to the bad? Will not San Francisco also assert herself in this direction? Just what the moral difference is in the act of smoking one day short of 16 and two or any number of days after, we cannot see, but as that question is not just now a matter of discussion, we should try to be thankful for even the small modicum of good sense that might be evinced by our city fathers if they would follow in the good way, only so far as the Oakland council has gone.

**TETANUS TREATED BY REST.**—Dr. De Renzi states, in the *Rivista Clinica*, that by treating patients with traumatic tetanus by means of perfect rest, he has been able to restore four out of five to health; whereas when treated in other ways these patients usually die in two or three days. He places the cases in a special room, where absolute silence reigns. Even in the passages leading to it, and in the neighboring wards, care is taken to lay down carpets so that no sound shall penetrate the tetanus ward. The door of the latter is, of course, well oiled, so as to open and shut noiselessly, and the patient's ears are stuffed with cotton wool, he himself being strictly enjoined not to make the slightest noise. He must, of course, be fed. This has generally been considered impossible, the teeth being clinched and the spasmodic contraction being increased by attempts to masticate. The obstacle may, however, be easily overcome; by parting the jaws and introducing liquid food, swallowing is accomplished without difficulty. This method of treating traumatic tetanus has been tried with success by several Italian practitioners—Drs. Pisani, Maragliano, Riva, etc.

**THE THROAT.**—The throat is a wonderful instrument of music. Place the fingers upon it, and every time you speak you can feel the vibration of the musical organs. Anything that ever touches the throat impairs the purity of those sounds. Throw a cloth over the strings of a piano or violin and get music out of it if you can. So every piece of cloth which surrounds the throat impairs the sweetness of the voice. Women go with necks bare; men have theirs swathed and bandaged, and 10 women have sweet voices where one man has. A man's voice should be as pure as a woman's. Why not? He is shaved and choked. God has provided a covering for a man's throat, light and soft. It clothes the neck and preserves the health. But man gets a sharp iron, scrapes his neck and face, ties a rag around the former, takes cold, has a sore throat, bronchitis, consumption, and dies.—*Christian Advocate.*



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Alameda.

**MAGNESIA MINE.**—Livermore *Herald*, Oct. 7: Seven men are now employed by Messrs. Stanley & Bartlett in the Cedar Mountain magnesite mine, and the rate of production has correspondingly increased. John Hayes has now eight pack animals in his mule train. The first carload leaves for New York to-morrow.

**NEW CLAIM.**—Ab. Mendenhall, James Mendenhall, and Douglas Mendenhall have discovered and located magnesite claims on section 2, on the west side of Cedar mountain, just below the peak known as "Sugar Loaf." There are several slides, and apparently a number of good veins. They will begin prospecting them this week.

## Amador.

**FRENCH CAMP.**—Cor. Amador *Ledger*, Oct. 9: We have got an enterprise in our neighborhood which is attracting some attention in the way of quartz mining. Doc Marshall has fitted a quartz mill on the old Markley mine, which he runs by mule power; works splendidly; not very wearing on stamps, as one stamp goes up in the morning and comes down in the evening. The mill is at a standstill at present on account of having the mules take the bullion below.

**SUTTER CREEK.**—Amador *Ledger*, Oct. 9: As predicted in my very last, operations at the Lincoln have come to a standstill. Everything above water level has been worked out, and until some adjoining mine is started and the water lowered, the mine will have to remain idle. A few men have been put to work at the Mahoney, and the tunnel they are running is being pushed with a double shift. They are now running north to intersect the opening made by Mr. Stewart, and in all probability a track will be laid to the Lincoln mill, which they will most likely use for crushing rock, as there is no pipe connection from the Mahoney mill to the Amador canal.

**SUNNY SOUTH.**—Amador *Dispatch*, Oct. 7: The Sunny South mine near Mace's mill, owned by C. C. Garner & Co., is now being worked, with flattering prospects ahead. They have their shaft now down about 40 feet, at which depth they have some very good ore.

## Butte.

**HELLTOWN.**—Cor. Butte *Record*, Oct. 9: Mr. Bowman, one of our persistent miners who has been driving a tunnel into the hill on the east side of the creek for the past 18 months without finding pay, was, a few days ago, rewarded partially for his labors by striking into gravel that pays \$6 per day to the man, and a good prospect for a continuance of the same pay. Such men deserve the smiles of Him who is ever mindful of our deserving wants. At, or near Helltown, Messrs. Hawley & Gale have opened up an old ravine that was worked in the days of '49. It was, as they used to term it, "guttured." That is, running a narrow cut up the ravine and paying no attention to outside dirt, which has often proven very rich. Such was the case with the ground upon which the above-named gentlemen have located. They were at much expense opening up their claim and getting it in working shape, having to clean out the ravine, cut down bedrock preparatory for their flumes. Another impediment was the crossing of the traveled road. This they have bridged in a substantial manner, making the crossing much better than before, and for which I think the county ought to remunerate them. Their claim is now in working order. They have 500 feet of flume, consequently they will save nearly all their fine gold. Where it was supposed to be but six feet to the bedrock they found it 20 feet, and the bottom strata well charged with gold of a very fine quality. A side drift was made and the drift dirt paid \$6 per day to the man. They are highly pleased with their prospects. I visited their diggings and judge they have a rich and lasting claim.

## Calaveras.

**ANGELS.**—Cor. Calaveras *Chronicle*, Oct. 9: The mines in this section now closed down for lack of water will all start up shortly. The water will be running in the Union Water Company's ditch within three weeks. A large number of the men employed on the ditch returned to Angels during the week, having completed their work. The carpenters and a few local hands are all that have been retained to finish up. The Utica Mining Co., in this place, cleaned up the batteries of their mill last Saturday, after a run of three weeks, the result of which was 38 pounds and 7 ounces of pure gold amounting to about \$8000. A recent rediscovery of an old-time gravel mine on Old Gulch, situated between this place and San Andreas, has been made. The gravel mine in question was worked about 27 years ago by R. B. Rhodes, who recently made the rediscovery. At that time what gravel was mined paid handsomely, but through lack of practical mining knowledge the course of the channel was lost, and being unable to find it the mine was abandoned. Mr. Rhodes returned to his Eastern home in Ohio in 1857, where he resided until within the past few weeks, having returned to the scene of his early mining operations, and instituted search for the property he had so long ago abandoned. During the years of his absence, a large landslide covered the entire spot where his work had been performed. After a careful search Mr. Rhodes has found the mine and will begin operations thereon immediately. During all the above-named years, this mine has been concealed from the gaze of the critical prospector, Messrs. L. A. Grim and Jas. Harris, of Angels, have been selected as partners in the above-named property.

## El Dorado.

**DOGTOWN.**—Cor. El Dorado Co. *Republican*, Oct. 7: Tony Vaughn and Louie Sheiber have located the deep gravel placer mine joining Henson on the north and Lane & Fitzgerald on the west, and are preparing to drive a tunnel in from the north side at Henson's line, a distance of 800 feet. Rich gravel on all sides justifies the belief that a rich chamber is inside, and Tony and Louie are going to take a look. Frank Becherer and Joe Myer have located the Barney Gulch claim, which was famously rich 30 years ago. General activity prevails throughout the district. Miners are preparing to

work their claims, and the farmers are putting up hay and building stock sheds.

**GARDEN VALLEY MINING NOTES.**—The Slate Mountain mines are still turning out gold in paying quantities, and the courteous superintendent informed me the mine never looked better. They are sinking below the 200-foot level and progressing favorably. The New York mine adjoining the above mine on the south is opening up splendidly. The Grover boys have sunk a shaft 70 feet and driven a tunnel 150 feet, showing a two-foot ledge of good ore the entire distance. This mine will yet prove a worthy rival of the Rip Van Winkle, as the Slate Mountain is called. The Darling mine, west of Slate Mountain, is showing well. This mine is not opened to any great depth—about 50 feet or more. A level has been run north 120 feet, showing good milling ore. I have been informed that an Eastern company are to commence operations on this mine at once. It is reported that there has been a good strike made in the Alhambra mine. Work on the Alpine mine continues. A ten-stamp mill is to be erected in a short time. The California Jack mine is looking well, and if owned by a party who was able to operate it as it should be, would soon turn out bullion in paying quantities. The Taylor mine, under the management of Supt. Wickham, is being pumped out and being retimbered where required; will soon be clear of water, and expects to have the mill in operation at an early day. The Lone Jack mine has its mill nearly completed and will commence crushing next week. The ledge is large and easily worked; the ore is called low grade. The ore can be mined and milled at an expense not exceeding \$1.50 per ton. The ore will pay \$6 or \$8 per ton. The ledge is 23 feet in width at a depth of 40 feet, and is, no doubt, on the main mother lode, the rock being what is known as ribbon quartz. Sinking on the Esperanza mine is to be commenced next week and not suspended until the 200-foot level is reached. This mine is on the same ledge as Lone Jack and is prospected to a depth of 150 feet; at this depth the ledge is 30 feet wide and all carries gold, and could be worked profitably, but requires not less than 40 stamps to handle the ore as it should be.

**ANOTHER STRIKE.**—Record-Union, Oct. 6: A correspondent, writing from Coloma, El Dorado county, says that a miner by the name of Jacob Warf struck a pocket in a porphyry ridge, a few miles beyond that town, recently, which promises to make him rich. It is on the summit of a hill, two miles east of the mouth of Dutch creek. He has to carry the pay dirt, or rotten porphyry, on his back, two miles, over a steep hillside; but it pays him \$100 a sack. He has taken out over \$6000, and, like Colonel Sellers, he thinks there's "millions in it" yet.

**NEW YORK.**—Placerville *Observer*, Oct. 9: We were shown some exceedingly rich quartz specimens by L. Landecker the other day, taken from the old New York mine. The ore is heavily charged with sulphurets and fine gold, besides being of the specimen quality. Mr. Landecker also informed us that the ore body was coming in better in quality and quantity, and gave every assurance of its permanency.

**TUNNEL.**—Georgetown *Gazette*, Oct. 9: The contract let by Mr. Morton about six weeks ago for running 250 feet of tunnel on the Hart mine will be completed in a few days. It was let for \$1.96 per foot. Tom Williams and Owen Roberts, of Placerville, and John Poor, of this place, are the contractors. Tanksley & Austin, of the Mount Hope mine, one-quarter mile south of the Alpine, have been prospecting their claim during the past few months with highly-encouraging results, and are now engaged in running an open cut to sluice on a larger scale this winter. We have it from reliable source that two more quartz mines in this district have been, or are about to be, taken hold of by capitalists who mean business. The mining outlook is good.

## Fresno.

**WIDENED.**—Fresno *Expositor*, Oct. 11: The Golconda mine in Fine Gold district has widened out to a six-foot ledge that runs from \$30 to \$40 per ton. This mine is about a mile north of the Hildreth mine, and is now believed to be next in importance to the McNally mine.

## Mono.

**BULWER CON.**—Bodie *Miner*, Oct. 11: We found a tunnel driven on the surface, on the Washington vein, 190 feet into the hill. The face of the tunnel is within 75 feet of the Bulwer shaft. From this tunnel there is a winze to the 200 level on this vein. Along the course of same vein, the last 100 feet has two feet of ore in it which assays as follows: \$22.35, \$13.07, \$44.79, and \$13.16. We have commenced work at this place. We are now taking ore from the surface tunnel letting it down to the tunnel level, also from the 100, 200, 300, and 400 tunnel levels; assays from all these points will give a good profit over all expenses. The mill will commence to-morrow on Bulwer ore.

**THE STANDARD CON.**—The Bulwer Company requiring their side of the mill, a cleanup was made during the week, also of the tailings on the Standard side, and the crushing of ore was resumed on Saturday, 9th.

**THE BODIE.**—South upraise from 700 level is extended 24 feet. Winze from 700 level is extended seven feet in fair ore. North drift from west cross-cut on 700 level is extended nine feet. South drift on 800 level is extended 30 feet.

**THE MONO.**—We are taking out rich ore below the 700 level.

**THE DUDLEY.**—The south drift 700 is extended 10 feet with no change.

## Napa.

**SHIPMENTS OF QUICKSILVER.**—Napa *Reporter*, Oct. 8: During the month of September, 347 flasks of quicksilver were shipped from Calistoga. Of this, 156 flasks were from the Sulphur Bank mine, 116 from the Great Western, 54 from the Napa Consolidated, and 21 from the Bradford. The Sulphur Bank mine, since a couple of assessments have been paid on its stock, is doing well, and is making money for its stockholders. The increase in the price of quicksilver has had a direct tendency to increase the productions, as the above shipments from Calistoga last month are largely in excess of the shipments of former months for some time back.

**ÆTNA AND OAT HILL.**—Napa *Reporter*, Oct. 6: The Ætina and Oat Hill quicksilver mines are both running full blast. At the latter mine they are

working for the most part on the 200-foot level, where they recently discovered good pay rock. Mr. Newcum, the new superintendent, has made a number of improvements at Oat Hill since his arrival, and seems determined to work this mine for all it is worth.

## Nevada.

**MEADOW LAKE.**—Cor. Placer *Herald*, Oct. 9: The work of repairing the Excelsior mill and attaching the new machinery is about completed. The rock-crusher has been in operation at intervals during the past two weeks, but no continuous working in connection with the more complicated parts of the works has been done, so as to fully demonstrate the complete practicability of the plan, nor the yield or cost of mining per ton. One test of the crusher showed a half ton of rock reduced in 29 minutes. From the fact that large preparations are being made to increase the working facilities in many ways, gives evidence of satisfaction. They have a small force getting out rock, with about 1200 tons or so mined within a quarter of a mile of the mill. They have 200 cords of wood cut and teams are at work hauling at \$10 per day each team. Proposals are offered for hauling the ore. We have had a few visitors during the last week and a few claims were located. There were represented during the week one English company, two Eastern companies, one Colorado and one San Francisco company, and from the interest taken it is no more than reasonable to suppose that this will be a lively camp another season. Each of the companies referred to has its own theories and peculiar methods of working. There are immense deposits of mineral wealth within a space of ten miles, and it is confidently expected that within the coming year a new life will be infused into this district. Certain it is that there will be a revival of mining industry here the coming year, which will determine the future of this district. There have been so many failures that it is but natural to suppose a great deal of doubt and skepticism should be manifested. On the other hand, there is great faith and confidence, and the vigilant eyes of the capitalists are keenly scanning the surroundings, as there are many enterprises incidental to a prosperous camp, besides mining. Every day's examination of the mining region shows more and more to me its vast extent.

**CROWN POINT.**—Foothill *Tidings*, Oct. 7: Very extra rich quartz is now coming out of the Crown Point. Yesterday six boxes of specimens were taken out of the 220 level, and last night two boxes of quartz filled with gold came out of the 300 level. The ledge where this rock comes from is about three feet thick. The Crown Point furnishes good milling ore all the time, and about every two days sends out ore that is almost bullion.

**LONE TREE.**—Grass Valley *Union*, Oct. 8: The new steam pumping and hoisting works of the Lone Tree mine are now running in good style, and the shaft has been sunk to the depth of 180 feet. The vein of ore in the shaft prospects well in free gold and carries plenty of sulphurets of good quality. Everything looks favorable for the development of a paying mine. The underground work of the Gold Point mine has been well advanced this season, and a large amount of drift run, above which stopes will be opened up. The ditch for the North Star pipe line has nearly reached Wolf creek from the Empire line. The pipe line will pass close to the Larimer mill and the hoisting and pumping works of the New York Hill Co. There is a large force of carpenters at work preparing the timbers of the new North Star mill. The stone work for the foundations of the mill is in a forward state.

**A PROMISING MINE.**—Nevada *Transcript*, Oct. 6: The Washington Mining Co. have recommenced operations on their ledge in Washington mining district, and have a first-rate showing. The ledge runs nearly due north and south and is almost perpendicular. It has been developed 650 feet on its course to a depth of 80 feet, showing the vein to vary in width from one to seven feet. The chute in the vicinity of the shaft has been developed over 100 feet in length, and will mill \$20 per ton. The company have started a tunnel on the course of the ledge to undercut the shaft 100 feet. Already good milling rock has been struck in the tunnel where the ledge is two feet in width. The ledge is in slate and carries a gouge on the footwall. Sinking has been started on the vein from the bottom of the shaft, and the ore being extracted therefrom is full of free gold and galena sulphurets.

## Placer.

**CLEANUP.**—Placer *Herald*, Oct. 9: Shurtleff, Robinson & Co. have just made a cleanup of crushings of a portion of the rock taken from their recent strike in the Doig mine, just below Ophir. The amount realized by this cleanup is a little more than 1259 ounces, or nearly \$20,000. Only a portion of the rock already taken out, and it is said probably not the best of it, has been crushed.

**QUARTZ MINING AT AUBURN.**—Grass Valley *Union*, Oct. 6: Wm. and Sampson Hales, of Grass Valley, are operating the Baltimore quartz mine near Auburn, which they have been developing for the past nine months. The mine is now opened sufficiently to keep a ten-stamp mill going nearly constantly, and in a few weeks more the stopes will yield a full and steady supply of quartz for the mill. The quartz is of fair milling quality, and of late the ores have shown decided improvement.

**GOOD PAY.**—Foothill *Tidings*, Oct. 8: The Watts brothers at Iowa Hill, Placer county, with only four men at work, took 250 ounces of gold from their claims during the last month. That is about \$875 to the hand. Stop mining; there is muddy water in the brooklet that disturbs the troutlet.

## San Bernardino.

**HOLCOMB VALLEY.**—San Bernardino *Index*, Oct. 9: Hundreds of old prospect holes, with here and there some old dilapidated rocker, attest the vast amount of placer mining that was done in the valley long years ago, and the old settlers all remember the large bucketfuls of dust that were taken from the earth. At present the attention of those who are at work in the valley and surrounding country is turned exclusively to quartz mining. For some years only a few arastas were worked by the Mexicans. But as it became apparent that a war was to be waged against silver over which politicians and financial magnates would contend for mastery, then the many gold mines of this region that had so long remained idle sprang swiftly into notice. An *Index* reporter visited Holcomb Valley recently and found among the most notable of the mines that are now being

worked were the old Baldwin mine, now the property of Samuel Beard. About the first of June, Major Dignon entered into an arrangement for the development of the mine, and since that time has had a force of men constantly employed running drifts and sinking upon the mine. The result so far has been satisfactory, and the Major and his associates are now at the mine. The probabilities are that active operations will be begun at once for the erection of a mill and extensive working of the mine. Col. Loveland has commenced operations on the old Mammoth mine, one of the group that was formerly the property of the Holcomb Valley Mining Company. This mine is said to be the oldest location in the valley. Many years ago a mill was erected near the mine. When the reporter was in the valley the old stamps had just dropped for the first time in 12 years. Considerable work was done on the mine. The ore at the surface was free, and so long as that lasted, paid well. But water was encountered, and the ore began to carry a large per cent of sulphurets, thus rendering it necessary to adopt other modes of treatment. Col. Loveland has recently made a short run with Mammoth ore with satisfactory results.

The Metzgar Bros. have had about 12 tons of ore from the Zaragoza mine worked at the mill, and we understand the cleanup was very good. The Metzgar Bros. have one of the finest prospects in the county for the amount of work done on their property. Besides the Zaragoza they own two mines adjoining, which are looking exceedingly well. To the north of the Mammoth mine, about 1½ miles, Ed. Golliday is at work developing a mine that bids fair to be as good as the best. The ore is rich and the croppings extensive and well defined. James Ward, of Los Angeles, has been at work for several months on the old Osier mine; also Mr. Burnap on a mine in that vicinity. These mines are also among the earliest discoveries in the valley, and we believe only require the application of new and improved machinery to make them pay a handsome profit. About ten miles to the westward of Holcomb valley lies the Green Lead, once the property of William Wozencraft, but now owned by Richard Garvey, of Los Angeles, and under the management of a Mr. Godfrey. This mine for several years past has been worked at intervals, the ore being reduced by arastras run by water-power. It has always paid a profit, and now the company propose to work the ore at their mill at Cox's ranch, some three miles distant, and where they have several other mines. There are scores of undeveloped gold mines in this immense region, and many opportunities and inducements for the investment of capital.

## Santa Clara.

**LIGNITE.**—San Jose *Herald*, Oct. 7: A large ledge of coal has been discovered on the land of E. P. Fellows, on Stevens creek, about five miles northwest of Saratoga. It averages six feet in width, is of unknown depth, and the croppings have been traced for a mile or more. A pit has been sunk to the depth of 12 feet, and a specimen of the coal taken out at that depth has been brought to town. The specimen is taken from so shallow a depth that it would be difficult to form a reliable opinion of the value of the coal. It appears, however, to have the general character of the Pacific Coast coals—that is, it is lignite. The surface specimen under notice is light and is inferior to other Pacific Coast coals, but a deeper shaft may develop a good article. Its unusual lightness is due to a lack of the average amount of bitumen; but as the Santa Cruz mountains are charged with bitumen, asphalt, petroleum and kindred substances, it may be naturally expected that deeper digging will discover a heavier bituminous coal. The lignites are inferior to other coals for general use, containing less carbon and more water and generally leaving a large percentage of ashes. There are many special purposes for which they are useful. The value of the ledge near Saratoga, if the coal proves good, will depend on the facilities for getting it to market.

## Shasta.

**IRON MOUNTAIN.**—Shasta *Courier*, Oct. 9: Iron Mountain will soon boom again, and the next boom will be permanent. There is enough paying ore in sight on that mountain to keep a dozen big mills and 1000 men employed for a quarter of a century. The \$120,000 expended on useless but costly machinery in the mill there was one of the many stupendous blunders made in new mining districts on this coast.

## Sierra.

**ANOTHER STRIKE.**—Tribune, Oct. 9: We hear that Van Trump & Co. have struck a fine lode out near Packer lake, about eight miles north of Sierra City, and are now running a tunnel on the vein. The ore is said to be worth about \$30 a ton. We believe Sierra City is the center of the richest gold quartz belt in California. Capitalists who won't look at mines now offered at \$50,000 and \$100,000 will be begging for stock in the same mines when they are selling at a million.

**THE PHOENIX STRIKE.**—The striking of the ore vein in the Phoenix last week made everybody look smiling. Reports from those who have visited the mine say that there is between three and four feet of very high-grade ore in the drift they are now running on the vein. Had this strike been made two months ago a fine mill would have been built this season, but we expect the owners will put in the winter in developing the mine.

**GOLD VALLEY DISTRICT.**—They are going to work at the Gold Valley mine with a will. Mr. Turner went over Monday to take charge of the brick-making, and there has been a constant demand for more men. The superintendent is determined to have his furnaces up this fall and as much done on the new works as possible. We hear that a contract has been let to deliver 2000 cords of wood and a supply of timbers for the mine. The company will build and operate a sawmill near the mine. Such companies as this is what makes a country. Reports come from Gold Lake that the old incline on the Forest Queen is cleaned out and they are now running south on the vein, with four feet of splendid ore in the drift. The cleanup at the Young America for the month of September amounted to \$37,500. The Sierra Buttes cleanup for September was \$27,000.

## Trinity.

**NEW RIVER MILL.**—Humboldt *Times*, Oct. 6: A new stamp for the custom mill of Toms & Dean, at New River, was sent up by the train from North Fork yesterday. The gentlemen above named have been running with one stamp, having a capacity of



two tons a day, but orders were coming in so fast that they could not fill them all. The rock that is being run through now comes from the Ridgeway mine, and it is asserted the company has in sight a sufficient number of tons of the ore to keep the mill busy for over a year. The rock is said to be of more than average grade.

## NEVADA.

## Washoe District.

**CHOLLAR.**—The work of removing car tracks, air-pipes and stripping the 3100 level was begun yesterday. The water is now up to the roof of the station on the 3200 level. The valves of the hydraulic pumps on the 3000 and 2600 levels will be left open in the retreat. By so doing the pumps can be started under water if the management should reconsider their resolve to abandon the levels below the 2400. The hoist engine and building at the old works have been put in thorough repair preparatory to reopening the upper levels. The 1100 will be the first attacked. A west drift will be sent in to tap at that depth the vein which yielded a vast amount of low-grade ore between the surface and 250 level.

**CON. CAL. AND VA.**—During the past week 1057 tons and 1945 pounds of ore were shipped to the Morgan mill. The average value of the ore milled during the week, according to assays from battery samples, was \$19.53. Bullion of the assay value of \$18,645.54 was shipped to San Francisco since last statement.

**HALE AND NORCROSS.**—The flooding of the 3200 level has caused a total suspension of operations. If a satisfactory arrangement is consummated with the Chollar management, operations will be transferred to the 2800 level. The ore deposit cut at that depth in sinking the main incline winze may develop into importance when explored.

**UTAH.**—*Virginia Chronicle*, Oct. 11: Have completed cutting a station on the south side of the shaft, 472 feet below the surface, which corresponds with the 520 level in the Sierra Nevada mine, and have started a west drift which is out 44 feet.

**OSBISTON SHAFT.**—Repairs to the timbering of the main shaft are completed. A station is being excavated in the southwest drift on the 2500 level, 450 feet from the shaft. A winze will be sunk at this point.

**SAVAGE.**—The south drift on the 600 level is out 350 feet beyond the north line, and will be pushed to a connection with the Savage shaft as speedily as practicable for the purpose of securing an air supply.

**BEST AND BELCHER.**—From east crosscut No. 1 near the face a south drift was advanced 33 feet. This drift is run for the purpose of draining the water from the main east drift.

**MEXICAN.**—Operations confined to extending the joint Union Con. crosscut.

**OPHIR.**—On the 1465 level the timbering of the south drift from the Ophir shaft is being repaired.

**YELLOW JACKET.**—Ore shipments for the week ended Oct. 9th aggregate 1100 tons.

## Gold Mountain District.

**A PROMISING COUNTRY.**—*Dayton News-Reporter*, Oct. 5: A. B. Williams, the well-known millman and metallurgist of Reno, passed through Dayton last Saturday on his way to Candelaria. From there he goes to Gold Mountain to erect and take charge of a Huntington quartz mill for B. F. Leete & Son. It will be remembered that those gentlemen went to Gold Mountain less than two months ago on a prospecting trip. They have been very successful. They now employ about 20 men on tribute work, and are developing several very promising gold-bearing quartz ledges. The ore is free milling and easily extracted, and the Messrs. Leete feel confident that they are the pioneers in a country which will soon receive a genuine boom.

## Highland District.

**BODY OF ORE.**—*Pioche Record*, Oct. 2: Col. Baxter, supt. of the Arizona mine, at Highland, reports a fine body of ore in the mine. The Colonel expects to leave at an early day for Philadelphia, for the purpose of conferring with the owners of Temple mining property as to the advisability of erecting a mill in that district. The Colonel estimates that a 10-stamp mill can be placed there for \$60,000.

## Jackrabbit District.

**ONONDAGO.**—*Pioche Record*, Oct. 2: A half-dozen persons took a trip out to Jackrabbit during the week, and visited the Onondago mine. They saw a much better mining property than expected. All are of the opinion that a jumbo is at hand. The ore keeps improving in richness, and the day is not far distant when the 'Rabbit country will elevate its ears and tail higher than ever.

## Pioche District.

**RAYMOND & ELY.**—*Pioche Record*, Oct. 2: They are not getting ahead with the timbering and getting down through the Raymond & Ely shaft anything like as rapidly as anticipated. Great trouble is experienced at certain points in keeping the dirt from sliding down so the work can be pushed ahead. Preparations will soon be made for the resumption of work at Bullionville. A new process for the working of the rebellious tailings will be tried, and is hoped will prove successful.

## Railroad District.

**HIGH-GRADE ORE.**—*Elko Independent*, Oct. 6: Geo. Williamson, of Bullion, informs us that the mines in Railroad District are producing large quantities of ore of high grade, upon which the furnace is now running successfully. The present run will include about 2500 tons of ore, the result of which will be a yield of bullion equal in quantity and value to all that has been heretofore produced during the present season. Stoker's big teams will soon commence the transportation of the bullion to this point for shipment.

## ARIZONA.

**WALKER DISTRICT.**—*Prescott Courier*, Oct. 8: N. L. Griffin, a pioneer of '63, has come down from Walker mining district. He brought with him a contribution of rich ores, which may be seen at Bones' ore rooms, alongside two or three sacks of very rich silver ore from the Silver Trail mine, Has-

sayampa district. Mr. Harris yesterday shipped a boiler and more lumber to Ellsworth district, where he is putting up a mill to reduce gold rock, of which there is abundance there. He has now sent down about 300,000 lbs. of machinery, lumber, etc. Mr. Baird is his superintendent.

**GRASS VALLEY.**—*Silver Belt*, Oct. 6: Fred Hefte, who was in from Payson this week, expresses a high opinion of that section as a mineral country. Gold-bearing quartz abounds and silver is also found in paying quantities. All that is needed to make it a good chloriding camp is a mill to work custom ores. The Golden Wonder mine, recently bonded by Dr. Trippel, is spoken of as a valuable property. From very small croppings and a narrow seam, for some distance below the surface, the ledge has opened out wide and strong in the lower levels and its permanency and value are established. The Ocoila, owned by Chas. Bacon & Co., is another good gold mine. The country toward the Verde is said to be rich in carbonate ores, running from 40 to 60 ounces in silver and 15 to 20 ounces in gold. Fred has been prospecting the Green Valley and Verde country during the past two months and is well satisfied with his work, having located several promising prospects.

**A NEW DISCOVERY.**—*Mohave Co. Miner*, Oct. 10: We have always maintained that this district, and, in fact, all the mining districts of the county, has never been prospected in the true sense of the word. As an illustration of this we have only to mention that a few days ago, while coming from his work on the Keystone mine, Dan Holloway picked up a piece of rock which had been broken off by some wagon wheel in the road, just above Judge Williams' house and found it to be good chloride ore. In looking for the place from which it had been broken off, he discovered indications of a ledge running across the road. He informed Mr. Moses, the owner of the ground, of his discovery, and a few hours' work with pick and shovel soon developed the existence of a large ledge of good chloride ore. Several pieces of the ore were then broken up and sampled, and the assay returned 172 ounces to the ton. Messrs. Holloway, Moses and Trimball have been working on this new discovery all the week and have several sacks of good ore as the result. The lead being largest where it crossed the road, a shaft has been commenced at that spot, previous to which it was necessary to make a new road. Several more samples have been sent to Kingman for assay, and the work of development is going right along. We wish the parties success in their new find.

**TOMBSTONE.**—*Epitaph*, Oct. 8: There is a better feeling in town than there was immediately after the mines closed down. This is evidenced by the fact that it is much easier to dispose of property now than it was then. Our citizens have recovered from their first scare, and on second thought have come to the conclusion that the present dull spell is only one of those incidents in the life of mining camps. The business outlook for Tombstone during the ensuing year is most encouraging.

**QUIJOTOA.**—*Tombstone Democrat*, Oct. 7: H. B. Murray, owner of the Locomotive mine at Quijotoa, has leased the Bonanza mill, and will commence running it on Locomotive ore in a few days. This will be the first move in starting up the Bonanza camp again.

## COLORADO.

**UTE CREEK.**—*Idaho Springs News*, Oct. 3: Among the prominent mines passed was the Humboldt, the owners of which had a mill run lately that gave 25 ounces gold and 40 ounces silver per ton, or at the rate of \$540 per ton. Next came the Ouida, formerly called the Cascade. Six or eight men are employed, and ore is being shipped which runs over \$200 per ton. Farther up and to our right is the Argosy group of mines, lately sold to Messrs. Hall, Ely and their associates. The Argosy is supposed to be an extension of the Argo and is a very desirable property, having produced some excellent ore. The Bald Eagle, owned by the same party, was discovered in 1865 by R. B. Griswold, and produced some fabulously rich ore—nothing like it was ever seen in the country. It is now being leased by some Italians, who pay the owners a royalty of 40 per cent. At the time of our visit a splendid quality of ore was being taken out. Almost on a line with this, but further east, is the famous Argo mine, with its substantial shaft-house and hoisting works, with ore-houses constructed out of hewn logs. The buildings are situated in a depression of the mountain, the upper stories being so constructed that huge timbers are slid in from the top, and under cover are cut up and made into framework for the shaft, which is a three compartment. This is a most convenient and economical way of doing that class of work. The engine is supplied with all the late improvements. The boiler is bricked in and the fire-grates have been built for the economical burning of wood, very little being required to keep up steam. The ore sorting-house is a long, comfortable building constructed of hewn logs. At the time of our visit about 10 men were busily engaged in sorting ore and putting it in sacks preparatory to shipment.

## IDAHO.

**CEUR D'ALENE NOTES.**—*Record*, Oct. 6: Good pay is being taken out of the Last Chance placer claim. There will be another cleanup at the Buckskin placer bonanza to-morrow or next day. Davidson & Meyers, at the mouth of Buckskin gulch, took out \$200 last week, only two men working. The gross cleanup on the Grove placer claim was \$880. This was the result of the labors of three men. The first iron ore car in the Ceur d'Alene mines was placed in the Small Hopes mine yesterday. It runs like a charm. Bennington & Waite have struck rich galena ore in the Cressus mine on the Belknap summit. The vein is 15 feet wide, Frank Olen-dorf, foreman of the Margaret mine, started out this morning with a wagon load of supplies and a force of eight men to work the mine. The Treasure Box arastra is grinding away at the rate of two tons per day. The rock looks well and the owners anticipate a good cleanup in a few days. The Gellatt placer claim is being surveyed for the purpose of obtaining a patent. X. S. Burke has the job, but has employed Loring & Lucas to assist him. Another good cleanup was made on the Mother lode arastra yesterday, and Uncle Billy is ready to put up his assessment to the Republican campaign fund. J. T. Rob-

erts has charge of a force of men at the Golden King mill, and is placing the new stamp mill in position. Only a part of the machinery has arrived; more is expected to-morrow. It is expected that within three weeks the mill will be in operation. Under the direction of Jim Hawes, work has been begun on the Henry Clay lode. This mine is on the mountain above the Golden Chest and is said to prospect high in gold.

**MINNIE MOORE.**—*Bellevue Herald*, Oct. 6: From the extra teams that are now hauling ore to the depot from across the river, one should surmise that just a little stoping is being done in the Minnie Moore mine. Two or three extra wagons are busy, and hauling is kept up till 11 o'clock, an extra force going on at 3 every afternoon, and, as a consequence, five carloads of first-class ore per day will be shipped from now on. Five carloads amount to about 70 tons, and 70 tons at an average of \$120 per ton amounts to \$8400 per day, \$58,800 per week, \$252,000 per month, and \$3,942,000 a year.

**THE CAMAS NO. 2.**—*Wood River Times*, Oct. 2: The Camas No. 2 property, on the Gold Belt, continues to yield steadily, notwithstanding the many disadvantages resulting from lack of water, scarcity of fuel, etc. But the yield is small, as only about 5 of the 20 stamps of the mill can be operated at a time. Arrangements are, however, being made to secure a water supply, and when these are completed the yield will be quadrupled. During the month of July the Camas No. 2 yielded \$5000, in August \$3600, and during September \$3000—this at a comparatively light expense—which demonstrates that, if worked on a larger scale, the output would be eminently satisfactory. Experience has shown that, with a proper supply of water, a yield of \$50 per battery can be depended on—a total of \$200 per day at a cost of \$70 or \$75. But a larger number of stamps could be operated without proportionally increasing expenses.

**THE OLD BAR.**—*Wood River Times*, Oct. 6: Judge V. S. Anderson returned yesterday from Rocky Bar. He reports that place booming, with 500 to 600 inhabitants, nearly one-half of whom are employed, directly or indirectly, by the Alturas Gold Mining Company (Limited), the new English corporation which recently purchased the Ada Elmore, Confederate Star, Objective, Republic, and Great Eastern. This company, which is represented at the Bar by Captain Beckford Anthony, an energetic and capable mining engineer, has gone to work with a will, and already keeps two ten-stamp mills running steadily, while building another one, of 50 stamps, which will be ready to run by the 15th of November. The men who keep the mills supplied are only 14 in number, and they are only drifting in the vein and getting ready to stop when the big mill needs ore. The ore pays \$30 to \$40 under the stamps, and the tailings are worth a good deal more. Captain Anthony feels confident that he will soon show the biggest mining property in the Northwest. The Vishnu mine is looking finely, and Captain Settle is getting a 12-stamp mill ready to crush its ores.

## DAKOTA.

**THE RETRIEVER AND CAMBRIAN.**—*Black Hills Tribune*, Oct. 6: The developments on the Retriever and Cambrian are very satisfactory to the stockholders of those companies. The principal work on the Retriever is near its southern end, where a force of men is engaged in stripping the loose rock and soil from a large body of ore. A cut in the shape of an immense "T" is being excavated, and will serve to expose the chute for a distance of 100 feet along its length, while the extensions to the right and left will crosscut the ore. A large quantity of ore will be taken out by this development. To the north of this cut several shafts have been sunk to the ore and in some places have penetrated it. On the north end several cuts and shallow trenches develop a good-sized body of silver ore in a chute some distance to the east of the gold chute. Unquestionably there are two separate ore bodies on the Retriever—one carrying gold and the other silver. On the line of the Retriever and the Cambrian good float has been discovered on the northern end, and a force of workmen will go to work and uncover the ore body in a few days. This latter chute extends into the Cambrian ground. Enough work has not been done to determine positively, but the indications are that at this point the gold chute is separated into two ore bodies, lying along either side of a porphyry dike. Still further west are the principal Cambrian workings. A cut has been run into the hill from which two drifts have been started. A body of remarkably fine ore has been developed in these workings. In this cut an excellent example of the intimate relation of an ore body to a porphyry dike is afforded. The force of miners on the Cambrian is now working in a new cut and expects to soon uncover another chute of ore. The prospects of both of these properties are flattering. A large amount of ore is on the dumps and actually in sight in these mines, and it is all of a good grade, while some is surprisingly rich. The ore shipments will soon commence from the Retriever.

**DEER MOUNTAIN.**—George Monroe, who came down from Deer Mountain this morning, reports that encouraging developments are being made on the north side of the mountain. At last accounts the Iron Hill smelter was still in operation. A new strike is reported from the Monarch mine, Two Bit. The work on their ditches continues.

## NEW MEXICO.

**TERIBLE.**—*Black Range*, Oct. 6: The assessment work on the Terrible mining property, which adjoins the Adirondack, situated about one mile from town on Chloride creek, is showing up that property in an excellent manner. The Terrible has a shaft of 20 feet and the mineral extracted from the pay streak is bornite ore which is almost identical to that of the Silver Monument. This mineral is disseminated through the rock to a width of about 20 inches and of shipping quality, and improves in quality and quantity as work progresses. This new find is not only valuable within itself, but demonstrates that there lies within the hills which surround the town of Chloride, within a stone's throw, a vast amount of mineral, which, when opened up, will surprise those most sanguine in the belief that there are millions for those who seek it. Heretofore this character of mineral, which is excellent, has only been found near the head of the range and was verily believed

that it existed in no other section. Mr. Geo. Turner is the owner of the Terrible and the Adirondack properties, and it is the opinion of those who have a knowledge of mining that those properties, if developed properly, would prove excellent producers and would greatly revive the mining interests in this section. All we need to bring our camp to the front is capital.

**SOCORRO.**—*Bullion*, Oct. 10: Manager Bates is dumping excellent ore out of the Imperial. John Bell inaugurated work on the Chloride mine last Monday. Bob Stuart, of Pueblo district, returned from Albuquerque Saturday. Anthony Joseph spent over \$30,000 on one group of mines in Taos county. The Sulphuret mine is preparing to ship mineral immediately to Socorro for treatment. The Graphic smelter is having enlarged dust chambers constructed, as well as a 90-foot chimney. The Kelly, Graphic, Grayhound and Juanita are all in full operation, and shipping mineral to Socorro. H. F. Brittenstine is raising gold and silver mineral out of his Hetzgar and Dick Slider mines, of the Pueblo district. The Bonaparte, Sulphuret, Silver Gem, Ruby, Ida and McKenzie in Ruby camp are all being worked and showing up well. All reports from Hermosa are to the effect that the mineral output of that camp is gradually increasing. Hermosa ranks among the best camps in the Territory.

## OREGON.

**GRAVEL MINING.**—*Marshfield Coast Mail*, Oct. 6: Hutcheson, Burrows & Co. have opened a gold mine on the south fork of the Sixes river which promises to be one of the best ever struck in this section. At the point of their location the river runs through a gulch in the mountains, on one side of the river rock rise almost perpendicular close to the stream, and on the other there is a flat piece of bottom land varying in width from 399 to 1290 feet before the mountain is reached. It is evident that the old bed of the stream was on the other side of this level land, although now it is covered with some 60 feet of debris, and has large trees growing over it. A mine was located on the bank of the stream, as it now runs, some years ago, and \$3000 was taken out in about 200 feet. Attempts were made to tunnel to the old bed, but the operators could not make the scheme work on account of the water. The present owners have run a tunnel lower down and a few days ago struck the old bed of the stream. To do this they were compelled to go through about 200 feet of soil lying between the old and new channels. As soon as they thought they had found the old river-bed they sent for Bob Hutcheson, of Marshfield, who is familiar with gold mining in all its phases, and Bob went over to inspect the diggings and direct the work, and he was satisfied they had a splendid showing. Since then the boys have worked 11 days, Dave Hutcheson digging all the dirt and two others doing the washing, and they have cleaned up \$180. They estimate that the old bed, which they can work, is about 50 feet wide and extends up about 3000 feet. Persons who have experience in such matters and have looked the mine over are anxious to buy an interest, and the impression seems to be general that it is a very valuable mine.

## UTAH.

**REVIEW.**—*Salt Lake Tribune*, Oct. 8: The receipts of bullion (excluding all ore receipts) in this city for the nine months of the present year have been as follows: January, \$328,852.66; February, \$456,024.03; March, \$469,722.63; April, \$519,666.08; May, \$387,891.49; June, \$527,036.97; July, \$585,644.38; August, \$480,141.49; September, \$491,129.32; total, \$4,246,158.05. From the Ontario for the month of September the output was 68,439.29 ounces of fine bullion, and ore sales to the value of \$57,931.28, an approximate total value of \$120,370.51, a total for the nine months of the year of \$1,273,964.11. The Daily produced for September 41 bars of bullion, 55,829.42 fine ounces; ore sales for the month, \$10,889.03, an approximate total of \$66,718.45, or an aggregate for the present year to the 30th ult. of \$556,897.65. During the week ending Saturday, October 2d, inclusive, the shipments out from this city were as follows: 38 cars bullion, 884,836 lbs.; 3 cars ore, 85,100 lbs.; 13 cars copper ore, 339,136 lbs.; total, 54 cars, 1,309,136 lbs.

**IRON ORE.**—*Black Hills Tribune*, Oct. 2: Iron ore seems to be in great demand at the Iron Hill, but to find ore of the proper character seems difficult. Four bricks were brought in by Superintendent Millett from Iron Hill last evening. They weighed 3754.50 ounces. A long train loaded with Buxton ore went out last evening. We like to note this. It means prosperity for all. Fall in. There's transportation for tons and tons more. The Iron Hill has sent in over 26,000 ounces so far this month. Counting to day and to-morrow, and also considering what may have accumulated in the amalgamators, which latter will be cleaned up about the first, the output for the whole month should reach, if not exceed, 30,000 ounces, or something over \$28,000. It will be remembered that on the third of September 12 bars were brought in, which weighed 11,455 ounces.

**BEAVER COUNTY.**—*Cor. Salt Lake Tribune*, Oct. 8: The mining interests hereabouts continue to improve, and a number of new strikes are reported as follows: Hidden Treasure, North Star, a fine body of galena; Talisman, West Camp, a body of high-grade lead-silver ores; Wild Bill, a large body of lead ores, over 30 feet in width, high in lead but low in silver, with a good trace in gold. The Adelia mine in North Star has now attained a depth of 300 feet, with drifts 600 feet in length along the vein, which is continuous and shows here and there deposits of very high-grade silver-lead ores. A large cave has been struck in the Golden Era mine foot-hills at a depth of 200 feet, and lead ore, assaying as high as 129 ounces silver, has been extracted. This mine is now worked by Mike Powers, who is a half owner. The Rebel continues to yield now and then a carlot of heavy lead ores—Mike Monahan, lessee. Work still continues good on the Florence mine and Chicago, with Dan Dacey as boss. The Wild Bill and Flora mines, with Harry Melville as general manager, continue to improve, and large bodies of low-grade lead ores are now in sight. The next thing in order here is a smelter. J. M. Goodwin has been giving the camps a run over and left for the North with a box or two of fine specimens. The Star Mining Co. properties still continue to improve.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

UTAH OFFICE—SALT LAKE CITY, UTAH.

Huntington Centrifugal

QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,

JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

## Metallurgy and Ores.

**SELBY**  
**SMELTING and LEAD CO.,**  
416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY**  
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

**Standard Shot-Gun Cartridges,**  
Under Chamberlin Patent.

C. H. AARON,

**ASSAYER AND METALLURGIST,**  
NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

**WM. D. JOHNSTON,**

**ASSAYER AND ANALYTICAL CHEMIST.**

514 Kearny Street,

SAN FRANCISCO, CALIFORNIA

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

## JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

**ASSAYERS' MATERIALS, MINE**  
**AND MILL SUPPLIES,**

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

## Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,  
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt,)

Mining Engineers and Metallurgists.

J. KUSTEL.

H. KUSTEL.

## METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.  
Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.



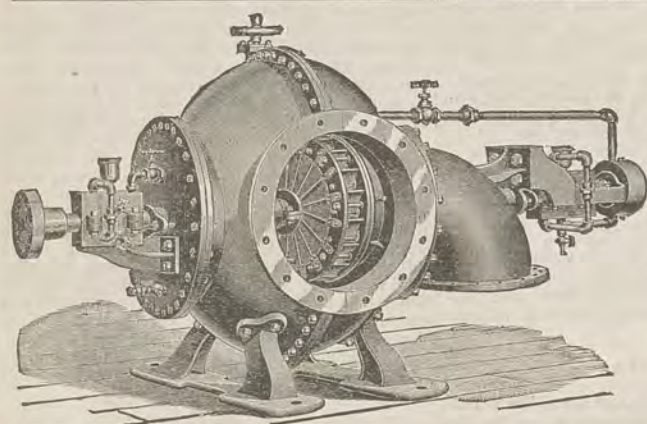
The California  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

**FLOUR AND OTHER MILLS.**

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.



## JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,

Springfield, Ohio,

or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents,  
Chicago, Ill., and Denver, Col.

PARKE & LACY, General Agents, San Francisco, Cal.

## Dewey & Co.'s Scientific Press Patent Agency:



OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

DEWEY & CO., Patent Agents.

No. 252 Market St. Elevator 12 Front St.

S. F. Telephone No. 658.

A. T. DEWEY. W. B. FWER. GEO. H. STRONG.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices - 47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast - Joseph H. Dorety, 529 Commercial St., S. F.



## THE CONSUMERS' COMPANY.

## VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**

218 California Street, San Francisco, Cal.

## CHILLED CAR WHEELS.

Medal Awarded Mechanics' Fair, 1882.

**STEIGER & KERR, Occidental Foundry,**

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

## THOMAS PRICE'S ASSAY OFFICE,

CHEMICAL LABORATORY,

## BULLION ROOMS and ORE FLOORS,

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.





SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

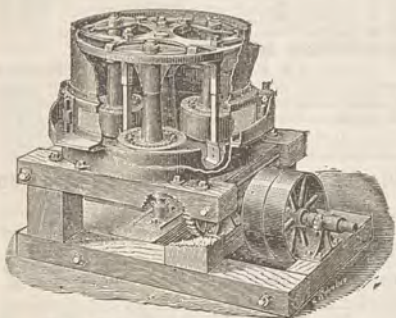
**BEST SOFT LAKE SUPERIOR COPPER USED.**

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.**  
**E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR &amp; CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



Centrifugal Roller Quartz Mill.

**F. A. HUNTINGTON,**

MANUFACTURER OF

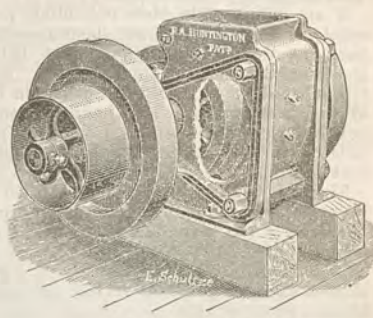
**Centrifugal Roller Quartz Mills,  
CONCENTRATORS AND ORE CRUSHERS,**

Mining Machinery of Every Description,

**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

**H. P. GREGORY & CO.**

Nos. 2 and 4 California St., - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

**MACHINERY**

SOLE AGENTS FOR

J. A. FAY &amp; CO.'S WOODWORKING MACHINERY.

FRANK &amp; CO.'S WOODWORKING MACHINERY.

NEW HAVEN MANUF'G CO.'S MACHINISTS' TOOLS.

BEMENT &amp; SON'S MACHINISTS TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND EXHAUSTS.

SHIMER MATCHER HEADS.

BRINARD MILLING MACHINES.

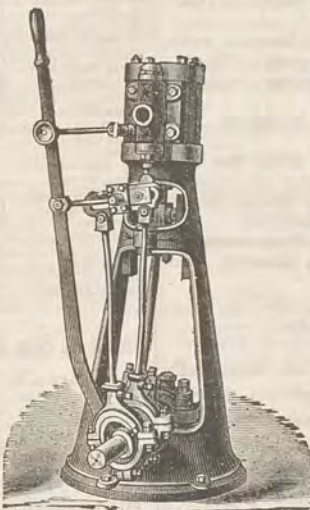
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS.

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISHERS.



YACHT ENGINES.

WILLIAMSON BROS' HOISTING ENGINES.

ATLAS ENGINE WORKS ENGINES AND BOILERS.

PAYNE'S VERTICAL AND HORIZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS.

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECTORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHN'S ASBESTOS PACKING, PAINT, ETC.

**ENGINES and BOILERS**

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

**MILL SUPPLIES AND LUBRICATING OILS.****THE GIANT POWDER COMPANY**

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

**GIANT POWDER or DYNAMITE,**  
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

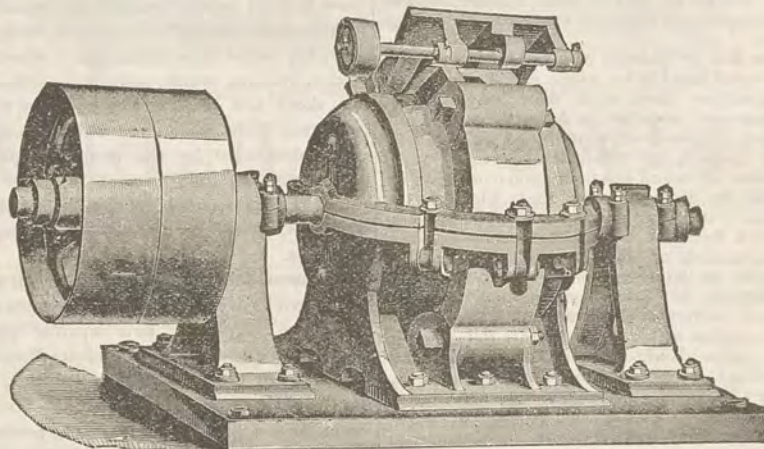
**JUDSON POWDER IMPROVED.**

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

**BANDMANN, NIELSEN & CO.,**

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

**THE FRISBEE-LUCOP MILL,****A CENTRIFUGAL ROLLER MILL**

—FOR WET OR DRY—

**Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.**

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.

Certificates as to performance of the Mills, and any information required, furnished on application.

**THE FRISBEE-LUCOP MILL CO.,**

Office, 104 &amp; 106 Washington St., NEW YORK.

OR PACIFIC IRON WORKS, SAN FRANCISCO.

**WANTED.**

To exchange one-half interest in three mining claims, in Montezuma District, Sonora, for a reasonable amount of money, to be used in developing said claims. One claim has paid a fair profit for over a year. The capture of Geronimo and band by Gen. Miles makes this the safest investment on this coast. For further particulars, address

J. E. BICKERTON,  
1069 Grove St., Oakland, Cal.**AUGUST LUTZ,****METAL SPINNER,**

10 Stevenson St., 3d floor, S. F.

The only custom work spinner in the city. Personal attention given to all work. Orders respectfully solicited.

**Practical Treatise on Hydraulic Mining.**

By AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dumps; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by Dewey &amp; Co., Publishers, 252 Market St., San Francisco.

**PRIVATE  
DETECTIVE,**

Collector and Insurance Broker. The undersigned respectfully offers his services in any of the above capacities. Correspondence solicited. Address C. M. RICHARDSON, care "Fraternal Record," No. 252 Market St., San Francisco, Cal.



## Centrifugal Pumps and Draining Machinery.

[Written for the Press by J. RICHARDS.]

NUMBER 4.

## The Progress of the "Art."

It is perhaps in all cases unfair to indulge in censorious opinion respecting the past history and rise of an engineering manufacture or the development of a new class of machinery; but if there ever was a case where such opinion was justifiable, that of centrifugal pump development is such a case.

For more than half a century the pumps remained practically where they began. "The last was like unto the first," and during this period there was mistake, retrogression and a failure to discern simple elementary principles that surpasses present belief.

I am not in this view obtruding personal opinions upon others—I ask them only to compare the first American pumps of 1818 with those now made in this country, and by Gwynne, Allen, Drysdale and others in Europe at the present day. This is enough to show how little has been changed or improved; but it fails to in any degree indicate the practice that has intervened.

The dynamical laws or principles involved in the operation of centrifugal pumping present but little of the complicity attendant on heat engines, or in dealing with expansive gases. The problem is simple in comparison with the mathematics of projectiles, the philosophy of turbine water-wheels, or a dozen things that might be mentioned that have arisen and been disposed of during the time. It has been a development by experiment through mechanical expedients, a method always slow and uncertain—not wholly so, however, because in 1848 we find Mr. Whitelaw making computations involving all the principal conditions of centrifugal pumping. Still further on, however, we find the celebrated Mr. Rankin suggesting curves for the vanes of such pumps as bore a very remote relation to those since determined as correct for average heads.

The disk or inclosed wheel has been one of the stumbling-blocks over which nearly all pump-makers have made their way. Blake, Gwynne and Andrews, in America, and Bessemer, in England, all contributed to this mistaken method, and within the last three years the same old round has been gone over again by a firm in Massachusetts that adopted the Gwynne pump in other respects, but at first employed a Bessemer or Andrews runner. In a recent number of the *Engineer*, London, appears in an advertisement various sizes and adaptations of centrifugal pumps, all constructed with the disk runners. The writer and two other makers in California followed the same course, and, as before remarked, this thing has been stumbled over, at some time, by nearly all makers.

The causes for this are not difficult to trace. There has always been a desire, for commercial and other reasons, to employ a single inlet at one side of the pumps. This simplifies the construction, saves a great deal in first cost, makes the water-ducts more direct and free, and all parts more accessible. To accommodate this construction, seen in Mr. Gwynne's pump of 1850, there was difficulty in balancing the inclosed wheel—that is, compensating for the draught on the inlet side. Open vanes, like those in the Andrews pump of 1839, avoid the thrust; but such vanes, to be made of cast material, require a web or diaphragm to support them, and as soon as this was introduced the thrust became destructive, not only equaling the indraught or suction, but the whole area of the back of the disk or diaphragm became subject to a pressure equal to that in the discharge pipe.

This is a somewhat intricate problem and has, no doubt, puzzled a good many in their experiments with single inlet pumps. It can be explained in connection with Blake's pump of 1831, Fig. 2 of the drawings. The runner or wheel in this case was, to use a technical term, shrouded on one side. The vanes were attached to a plate or disk like an Andrews or Bessemer runner with one of the side plates removed. On the open or receiving side of the runner, there was no pressure at the center except from the impact of the entering water.

The pressure increases from the inlet to the periphery between the disk and the casing, but would not amount to more than a fourth of the pressure against the back which was exposed to the maximum pressure in the discharge pipe. This pressure on a disk of 24-inch diameter, working against a head of 20 feet, amounts to 3000 pounds or more, after deducting for counter pressure on the front or receiving side. This, as before remarked, was destructive, and to avoid it the wheels were inclosed on both sides, as shown in Fig. 6, reducing the unbalanced area to that of the inlet.

There is a recognition of this matter by Mr. J. S. Gwynne in 1850, and his ingenious attempt to balance the inclosed wheel by a vacuum or free space at the back. This is very complimentary to his engineering insight at the time, and it is a question now whether there is any true understanding among engineers of the function to be performed by the balancing chamber described in his patent of 1851. It seems to be a vacuum chamber to balance the draught

of the suction, but is, in fact, to protect that much of the area of the back of the runner from the pressure within the casing.

The water friction between the plates of a disk wheel and the stratum of water contained in the casing is the same as when the water is revolved in contact with the casing by an open wheel or runner, with the difference in favor of the latter method that there are no running joints to maintain around the inlets, and also that no "circulation" takes place.

This subject was discussed in a paper read before the British Association at Norwich, England, in 1868, by John and Henry Gwynne, and has, since that time at least, been a determined feature of their practice, and is also no more than a return to the principle of the Massachusetts and Andrews pumps of 40 years before.

The adoption of open wheels or runners forced the employment of a double or balanced suction, as the single inlet forced the employment of an inclosed or double disk runner. It was a cycle of experiment running over a period of 40 years and ending where it began, if we do not include the form of the vanes.

## Bonanza Steel.

The Anglo-Pacific Steel Company, recently incorporated in this city, has been organized for the purpose of constructing a forge and rolling mills for the manufacture of a superior class of steel known as "Hammond's bonanza steel." Mr. Henry Woodcroft-Hammond, is the president and manager of the company, and the directors comprise such well-known men as W. H. Taylor, of the Risdon Iron Works; James Spiers, of the Fulton Iron Works; J. F. Sims, of the Western Iron Works; Thomas Carter, of the Carter Car Works, Newark. Melville Attwood is the consulting metallurgist, and the Nevada Bank the bankers. The articles to be manufactured from ingots, blooms, billets and slabs of imported "Bonanza" steel will be those in most general demand and which have hitherto been largely brought from foreign markets, viz.: steel rails, bars, plates, sheets, ties, angles, building beams, steam and marine shafting, shoes and dies, chains and wire rope for mines and cable roads, and other like requirements demanded by the various engineering and mechanical industries of the coast. The company has secured an eligible location for its works, as well as the services of competent workmen.

Numerous iron ore deposits of various grades are known to exist on this coast in more or less quantities, but of the two superior qualities necessary for the production of steel, only one has hitherto been discovered, and this, without the close proximity of a suitable coal, prevents, for the present at least, the probability of its production here with any degree of success. The intention of the new company is to import the "Bonanza" brand of steel in its crude state at a minimum cost and then manufacture it here into forms and shapes necessary for the various established industries. When such works as these are in operation they will assist our manufacturing industries here to cope with Eastern manufacturers, inasmuch as their finished supplies have had to be imported from distant sources of production, subjecting them to heavy freights, and compelling them to keep considerable stocks on hand. The hoisting foreman of the Consolidated Virginia mine certifies to the fact that hoisting ropes supplied by Mr. Hammond stood a better test and lasted longer than others; and the superintendent of the Eureka Con. mine considers the "Bonanza" steel specially adapted for drilling purposes. Both the tool and machinery steel of this brand have been put to severe tests, which have proven satisfactory.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports: Young America (for September), \$37,500; Sierra Buttes (for September), \$27,000; Moulton, Oct. 9, \$12,800; Silver Odessa, 10, \$12,000; Oro Grande Mill, 10, \$5598; Hanauer, Oct. 5, \$7800; Crescent, 7, \$5600; Stormont, 8, \$4035; Hanauer, 8, \$2720; Overland, \$8, \$1100; Queen of the Hills, 8, \$1400; Alice, 9, \$38,943; Hanauer, 9, \$5800; Queen of the Hills, 9, \$1420; Overland, 9, \$980; Alice, 10, \$7261; Daly, 9, \$7622; Germania, 6, \$1869. The metal shipments out from Salt Lake City for the week ending October 9th, inclusive, were 18 cars of bullion, 456,837 pounds; 5 cars of ore, 258,900 pounds; 10 cars copper ore, 274,700 pounds; total, 33 cars, 990,437 pounds. The Salt Lake banks report the receipt for the week ending the 6th inst., inclusive, of \$86,428.83 in bullion and \$85,583.71 in ore, a total of \$172,012.54.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.									
COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Andes S M Co.	Nevada.	30.	25.	Sept 15.	Oct 21.	Nov 10.	B. Harris.	309	Montgomery St
Bodie Con M Co.	California.	5.	50.	June 21.	Aug 23.	Oct 18.	G. W. Sessions.	309	Montgomery St
Bullion M Co.	Nevada.	31.	30.	Aug 31.	Oct 5.	Oct 26.	R. B. Grayson.	327	Pine St
Bedrock M Co.	Arizona.	2.	10.	Sept 13.	Oct 18.	Nov 8.	J. L. Hunt.	308	Montgomery St
Baker Divide M Co.	California.	11.	25.	Sept 24.	Oct 25.	Nov 17.	D. M. Kent.	330	Pine St
Best & Belcher M Co.	Nevada.	35.	50.	Sept 29.	Nov 4.	Nov 24.	W. Willis.	309	Montgomery St
Champion M Co.	California.	22.	40.	Aug 31.	Oct 5.	Oct 21.	T. Wetzel.	522	Montgomery St
Chollar M Co.	Nevada.	21.	50.	Aug 24.	Sept 29.	Oct 20.	C. E. Elliot.	309	Montgomery St
Golden Jacket M Co.	Nevada.	2.	10.	Sept 1.	Oct 14.	Nov 4.	R. G. McCallan.	331	Montgomery St
Gould & Curry M Co.	Nevada.	54.	50.	Sept 28.	Nov 3.	Nov 24.	A. K. Durbrow.	309	Montgomery St
Golden Fleece M Co.	California.	6.	15.	Oct 18.	Oct 23.	Nov 13.	W. J. Gleason.	412	Phelan St
Gold Point M Co.	California.	11.	01.	Aug 31.	Oct 2.	Oct 23.	A. B. Brady.	333	Grass Valley
Liberty Hill Con M Co.	California.	1.	15.	Sept 1.	Oct 7.	Oct 28.	F. E. Luty.	333	Pine St
Mount Cory M Co.	Nevada.	1.	1.00.	Aug 25.	Oct 2.	Oct 23.	G. Frier.	309	Montgomery St
Mayflower Gravel M Co.	California.	32.	25.	Sept 6.	Oct 15.	Nov 12.	J. Morizio.	328	Montgomery St
Nevada M & Co.	Nevada.	1.	1.00.	Aug 25.	Oct 2.	Oct 23.	G. L. Brander.	309	Montgomery St
Pilgrim M Co.	Idaho.	6.	01.	Aug 7.	Sept 17.	Oct 16.	A. Halsey.	328	Montgomery St
Potosi M Co.	Nevada.	10.	30.	Aug 31.	Oct 5.	Oct 26.	C. E. Elliot.	309	Montgomery St
Silver Lining M Co.	Nevada.	2.	12.	Oct 6.	Nov 11.	Dec 9.	H. Pickair.	320	Sansome St
Pneumatic M Co.	California.	1.	12.	Oct 14.	Oct 18.	Nov 5.	A. H. Clough.	431	California St
Sierra Nevada S M Co.	Nevada.	85.	25.	Sept 11.	Oct 13.	Nov 1.	E. L. Parker.	309	Montgomery St
Utah M Co.	Nevada.	53.	50.	Aug 24.	Sept 28.	Oct 18.	A. H. Fish.	309	Montgomery St

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Contention Con M Co.	Arizona.	D. G. Bates.	309 Montgomery St.	Annual.	Oct 25
Eschequer M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	Annual.	Oct 18
Eureka Con M Co.	Nevada.	E. H. Wilson.	338 Montgomery St.	Annual.	Oct 18
Mayflower G M Co.	California.	J. Morizio.	328 Montgomery St.	Annual.	Oct 18
Silver West Con M Co.	Nevada.	F. R. Bunker.	628 Montgomery St.	Annual.	Oct 19

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Martin White M Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	30.	Oct 11
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	20.	Sept 30
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Aug 16
Young America M Co.	California.			40.	May 20

## The State Mining Bureau.

The State Mining Bureau recently received a piece of rock from the deepest point on the Comstock ledge, and the deepest of any mine in this country. It was from the Mexican winze, 3561 feet below the croppings of the Gould and Curry mine, which is the datum point for depth measurement. A microscopic examination by Melville Attwood proves this piece of rock to be granular diabase.

Among other recent additions to the mineral collection of the California State Mining Bureau are the following:

*Iron pyrites*, in beautiful crystals with octahedral crystals of gold, California, Louis Garnett.

*Wulfenite*, in very large crystals, Pima Co., Arizona.

*Colemanite*, San Bernardino Co., Cal., fine case of ores from Copper Queen mine, Bisbee, Arizona, Ben Williams.

*Desclozite*, San Pedro, Arizona, Chas. R. Wores.

*Caliche*, Tarapaca Chile crude nitrate of soda, Liceo de Valparaiso.

*Gold quartz*, showing free gold, Hard Tack mine, New River district, Trinity Co., Cal. Presented by Ladd & Clement.

*Gold in calcite*, Minersville, Trinity Co., Cal., from Hubert Vischer.

*Gold quartz*, from the Young America mine, Sierra Co., Cal. From the company. This is a large and characteristic specimen weighing about 150 pounds.

*Topaz*, weighing 5 pounds 6 ounces, from Japan.

*Roscoelite*—Rich specimens from the Sam Sims mine, El Dorado Co., Cal.

*Calaverite*—Rich specimens from Neale's mine, near Sonora, Tuolumne Co., Cal.

*Malachite*—Remarkable specimen from the Copper Queen mine, Arizona, showing fossil plants, Ben Williams.

## Mining Accidents.

John Gustine had one of his legs badly mashed in the mine at Pennsylvania district, Nev., the other day. While engaged at work, a slab of hard blue-clay that lies between the ore and wall, slipped down, falling on his legs, and severely bruising one of them.

John Calanan, of Cherokee, while at work in the Delhi mine, Nevada Co., met with a severe accident. He was sliding down the chute, when some one threw a bolt of lagging in the chute to send it into the mine. The timbers overtook Calanan, threw him out of the chute, breaking one of his arms and badly wrenching his back.

Henry Miller, working in the Gorilla mine, at Lundy, Mono Co., Cal., was instantly killed last week. It is the custom of the men employed at the mine to ride up on the tramway until they arrive at a certain station, when they get off. It seems that Miller failed to alight at the proper time, and his face and chin caught on the upper edge of the chute, nearly tearing the head from the body.

A miner named Childs fell 125 feet, down the shaft of the Camas, No. 2, Idaho, and received fatal internal injuries.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Sept. 23.	WEEK ENDING Sept. 30.	WEEK ENDING Oct. 7.	WEEK ENDING Oct. 14.
Alpha.	.65	.70	.55	.60
Alta.	1.25	1.50	.85	1.75
Andes.	...	...	.10	.10
Argenta.	...	...	...	...
Belcher.	1.25	1.35	1.25	...
Belling.	1.00	1.10	.85	.65
Best & Belcher.	...	.10	.05	.35
Bullion.	...	...	...	.35
Bonanza King.	...	...	...	.45
Belle Isle.	.30	.60	.25	.40
Bodie Con.	2.40	2.65	2.60	2.80
Benton.	.30	.35	.15	.40
Bodie Tunnel.	...	.60	...	...
Bulwer.	1.65	1.75	1.70	.85
California.	2.70	2.90	2.70	2.80
Challenge.	...	.25	.30	...
Champion.	...	...	...	...
Chollar.	.45	.55	.85	.95
Confidence.	...	2.50	2.50	2.55
Con. Imperial.	...	.10	.10	.15
Con. Virginia.	2.70	2.90	2.70	2.80
Con. Pacific.	...	...	...	...
Crows Foot.	1.00	...	1.10	.95
Day.	...	...	...	...
Eureka Con.	3.20	3.75	...	3.75
Eureka Tunnel.	...	...	...	...
Eschequer.	...	.10	.15	.10
Grand Prize.	...	.45	.35	.40
Gould & Curry.	.65	.75	.55	.65
Goodshaw.	...	...	...	.65
Hale & Norcross.	1.10	1.20	.95	1.15
Holmes.	...	1.75	1.90	...
Independence.	.20	.50	.25	...
Julia.	...	...	...	.40
Justice.	.70	.80	...	.70
Martin White.	...	...	...	...
Mono.	2.45	2.50	2.50	2.50
Mexican.	.45	.55	.40	.50
Mt. Diablo.	...	...	2.50	2.50
Northern Belle.	...	...	...	...
Navajo.	.95	1.05	.70	.80
North Belle Isle.	2.35	2.85	2.25	2.70
Occidental.	1.20	1.30	1.15	1.30
Ophir.	1.25	1.35	1.09	1.25
Overman.	.35	.45	.31	.40
Potosi.	.25	.35	.25	.30
Pinal Con.	1.95	2.30	...	2.00
Savage.	...	1.70	1.90	1.85
Seg. Belcher.	.35	.40	...	...
Sierra Nevada.	...	.15	.35	.40
Silver Hill.	...	...	.15	.15
Silver King.	...	.05	...	...
Scorpion.	...	...	...	.05
Syndicate.	...	...	...	.15
Tonga.	...	...	...	...
Union Con.	.35	.50	.35	.25
Utah.	.35	.50	.80	.65
Yellow Jacket.	.85	.90	.90	1.00

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., Oct. 14.	300	Gould & Curry.	55@60c
350 Alta.	50	Hale & Nor.	80c
200 B. & Belcher.	75c	500 Mexican.	10c
100 Bullion.	40c	310 N. Belle Is.	3.45@3.60
200 Belle Isle.	40c	50 Navajo.	85c
100 Bodie Con.	2.65@2.70	1950 Ophir.	95c@1.10
40 Bulwer.	1.95	60 Potosi.	40c
40 Chollar.	75c	500 Savage.	2.10
1120 Con Va. & Cal.	2.35@2.50	300 Sierra Nevada.	60c
100 Confidence.	1.95	100 Union Con.	30c
150 Challenge.	20c	100 Yellow Jacket.	80c

## San Francisco Metal Market.

[WHOLESALE.]		THURSDAY, Oct. 14, 1886.
ANTIMONY—French Star.	...	91 @
BORAX—San Bernardino.	...	@ 8
Armstrong.	...	@ 6 1/2
IRON—Glengarnock ton.	...	@ 22 50
Eglinton, ton.	...	@ 21 50
American Soft, No. 1, ton.	...	@ 24 00
Oregon Pig, 100.	...	21 00 @ 23 00
Clippard Cap, No. 1 & 2.	...	22 00 @ 23 50
Clay Lane White.	...	21 50 @
Shotts, No. 1.	...	23 50 @
STEEL—English, lb.	...	16 @ 25
Black Diamond, ordinary sizes.	...	10 @
Plow.	...	4 @ 5
Machinery.	...	5 @ 6
Sanderson Bros.	...	10 @
COPPER.		
Braziers' sizes.	...	20 @ 26
Bolt.	...	19 @
Sheeting.	...	30 @
Ingot.	...	12 @ 13
LEAD—Pig.	...	4 75 @
Bar.	...	5 25 @ 5 50
Pipe.	...	8 @
Sheet.	...	8 @
Shot, discount 10% on 500 bag.	...	Drop, 9 bag, 1 65 @
Buck, 90 bag.	...	1 85 @
Chilled, do.	...	2 05 @
ZINC—German.	...	9 @ 10
Sheet, 7x3 ft, 7 to 10 lb, less the cask.	...	7 @
QUICKSILVER—By the flask.	...	39 00 @ 40 30
Flasks, new.	...	1 05 @
Flasks, old.	...	1 85 @
TINPLATE—Coke.	...	5 00 @ 6 50
Charcoal.	...	6 75 @ 7 25

A NUMBER of Comstock mining men have spent \$100,000 and several years' time on the Centennial mine, Nevada Co., Cal., developing it. The new hoisting machinery is now ready to start up, and the owners expect to realize from the heart in the old blue lead.



## Mining Share Market.

The fact that the deepest workings on the Comstock are to be abandoned has exerted a decidedly bad influence on mining stocks. Many operators are of the opinion that this will be the deathblow to mining stock transactions here, as without the hopes of a possible Comstock bonanza there is nothing to create interest. The people at Virginia City are hopeful, notwithstanding the determination to stop deep mining. The *Enterprise* says:

"The upper levels of the Comstock at various points contain vast undeveloped resources of low-grade ore, which only within the last two or three years have been made available, keeping hundreds of men at work in both mines and mills, as well as keeping our local railroad much better employed than it would otherwise be, and sustaining a live, energetic, wide-awake community.

"The recently developed deposit of ore on the 600 level of the Savage mine, from which a shipment of bullion to the extent of nearly \$25,000 is about to be made, with others to follow, is a simple illustration of how similar deposits have been passed in the earlier workings in going after deeper and richer deposits. Several years ago, after the Chollar shaft and incline had been carried to the depth of 1400 feet, a deposit of ore was discovered higher up on the mountain-side than the top of the shaft, from which some millions of dollars were taken. This was known as the 'Belvidere body,' and extended from the level of D street upward about 200 feet, or up to Howard street and the sagebrush. These points are merely mentioned in illustration of the possibilities and resources remaining in the upper portion of the Comstock lode.

"The chief mining operators and men who control the heaviest interests of this section understand fully all this, and the real future of the Comstock, in illustration of which the Virginia and Gold Hill Water Company, as is already known, have been engaged for several months past remodeling their flumes and arranging to bring in an increased supply of water for mining and milling purposes, a large 12-inch pipe across the head of Washoe valley, in addition to those they already have, being a portion of the program, giving more than double the supply that we now have of the best water in the world, direct from the heart of the Sierra Nevada mountains."

## New York Metal Market.

Telegraphic advices dated Oct. 14th give the following New York prices:

BORAX—6 3/4 @ 7 1/4 c.  
BAR SILVER—97.50 per oz.  
COPPER-LAKE—\$11.11 1/2.  
IRON—No. 1, \$17 @ 18.00.  
LEAD—\$4.85 @ 4.95.  
QUICKSILVER—43 @ 43 1/2 c.

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Firm, spot closing 11.00 @ 11.50c. Transferable Notices (Lake) issued at 11.25; Transferable Notices (Chili Bars) issued at 11.42.

LEAD—Dull at \$4.37 1/2 @ 4.45c spot. Transferable Notices issued at 4.40.

TIN—Active at \$22.20 @ 22.30. Transferable Notices issued at \$22.30.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.60 @ 22.90; Billiton Tin, \$23.00 @ 23.25; Banca Tin, \$23.00 @ 23.50; Baltimore Copper, \$9.75 @ 10.25; Orford Copper, \$10.25 @ 11.00; P. S. C. Copper, \$10.25 @ 11.00; Foreign Lead, \$4.70 @ 4.85; Foreign Spelter, \$4.70 @ 4.75.

MAKER'S PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18.50 @ 19.00; No. 2, \$17.50 @ 18.00; Grey Forge, \$16.00 @ 16.25. Hudson River, Grade No. 1, \$18 @ 19.00; No. 2, \$17.50 @ 18.00; Grey Forge \$15.50 @ 16.00. Southern, Grade No. 1, \$18.00 @ 19.00; No. 2, \$17.00 @ 18.00; Grey Forge \$15 @ 16.

## New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

NEVADA QUEEN M. CO., Oct. 11.—Capital stock, \$10,000,000. Directors—G. W. Grayson, John E. Doyle, G. C. Hickox, S. Roberts and James T. Cassell.

PORT COSTA LUMBER CO., Oct. 11.—Capital stock, \$600,000, in 6000 shares. Directors—W. J. Adams, Charles Hansen, C. S. Holmes, John A. Hooper, F. P. Hooper, C. A. Hooper, A. W. Jackson and C. F. A. Talbot.

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
G. W. INGALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
R. G. HUSTON—Montana.  
FRANK W. SMITH—Nevada and California.  
GEO. McDOWELL—Fresno and Tulare Cos.  
O. F. BERGMAN—Tehama and Colusa Cos.  
S. S. LANYON—Nevada, Sierra and Plumas Cos.  
JEANNETTE HOUGHTON—San Mateo Co.

BACK FILES of the MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$5. Inserted in Dewey's patent binder, 50 cents additional per volume.

## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING OCT. 5, 1886.

350,181.—GREASE-TRAP—C. H. Ackerson, S. F.  
350,105.—VAGINAL SYRINGE—D. F. Bennett, S. F.  
350,242.—CARRYING VESSELS OVER OBSTRUCTIONS—W. A. Grondahl, Portland, Ogn.  
350,254.—WHEEL HUB—A. W. Lane, Janesville, Cal.  
350,205.—CLOD-CRUSHER, ETC.—D. Lubin, Sac., Cal.  
350,261.—ANIMAL TRAP—R. Matthai, S. F.  
350,390.—FURNITURE SUPPORT—C. M. Plum, S. F.  
350,446.—COMPOUND ENGINE—J. Richards, S. F.  
350,213.—DERRICK—Geo. Rounds, Vallejo, Cal.  
350,274.—CHAIR—Daniel Smith, Santa Rosa, Cal.  
350,470.—PILLOW-SHAM HOLDER—Souther & Taylor, Los Angeles, Cal.  
350,171.—SEPARATOR—A. Swingle, S. F.  
350,400.—REIN-HOLDER—L. S. Tambling, S. F.  
350,223.—PILE-DRIVER NIPPERS—H. v. d. Wulbecke, Arcata, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## DELINQUENT NOTICE.

Truckee Ice Company.—Location of principal place of business, San Francisco. Location of works, Martis Creek, Nevada county, Cal.

NOTICE.—There are delinquent, upon the following described stock, on account of Assessment (No. 1) levied on the 1st day of September, 1886, the several amounts set opposite the names of the respective Shareholders, as follows:

Names.	No. Certificate.	Shares.	Amount.
McAulay, F.	Not issued.	200	\$2000 00

And in accordance with law, and an order of the Board of Directors, made on the 1st day of September, 1886, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, in San Francisco, on Monday, the 25th day of October, 1886, at the hour of 1 o'clock p. m. of said day, to pay said Delinquent Assessment thereon together with costs of advertising and expenses of the sale.

GEO. W. SCOTT, Secretary.

OFFICE—202 Sansome St., room 4, San Francisco, Cal.

## DIVIDEND NOTICE.

OFFICE OF THE

Paradise Valley Mining Company  
San Francisco, California.

At a meeting of the Board of Directors of the above-named company, held September 29, 1886, Dividend No. 9, of Twenty Cents (20c.) per share, was declared, payable on Thursday, the 30th day of September, 1886, at the office of the company.

W. LETTIS OLIVER, Secretary.

OFFICE—No. 328 Montgomery Street, San Francisco, California.

American Exchange Hotel,  
SANSOME STREET.

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50 PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

DEWEY & CO  
PATENT  
SOLICITORS.  
252 MARKET ST. S. F.  
ELEVATOR 12 FRONT ST. S. F.

COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

THE RUSSELL PROCESS COMP'Y.

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

HEALD'S BUSINESS COLLEGE,  
24 Post St. S. F.  
Send for Circular.

JOHN A. ROEBLING'S SONS CO.  
**WIRE ROPE**  
GALVANIZED SHIP RIGGING, MINING, TILLER,  
ELEVATOR, TINNED, & COPPER ROPE, SASH CORDS.  
LARGEST WIRE ROPE WORKS IN THE WORLD.  
**IRON & STEEL WIRE OF EVERY KIND.**  
TELEGRAPH WIRE, HARD & SOFT COPPER WIRE  
INSULATED FOR ELECTRIC USE.  
SWEDISH IRON WIRE, CRUCIBLE STEEL WIRE,  
TRENTON, N. J. & 14 DRUMM ST. SAN FRANCISCO, CAL.



HERCULES SLAYING THE GIANTS.

## HERCULES POWDER

Derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE

THE CALIFORNIA POWDER WORKS,

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES Powder.  
ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street, - - - San Francisco Cal.

S. F.  
PHOTOGRAPHING CO.  
No. 659 CLAY STREET.  
**PHOTO SPECIALTY**  
GALLERY.

Engravings made from photographs, drawings and original designs, for newspaper, book, card and job printing. Engraved prints enlarged or reduced cheaply and quickly. Also copies of manuscript, legal documents, wills, contracts, signatures, portraits, buildings, machinery and printed documents reproduced with accuracy. Photographs, stereoscopic views, etc., duplicated, enlarged or reduced. Slides for magic lanterns made from photographs, lithographs, and steel or wood engravings, etc. Satisfaction guaranteed. Agents wanted in all cities and large towns. Address, for further information, S. F. PHOTOGRAPHING CO., No. 659 Clay St., S. F., or the office of this paper.



## Iron and Machine Works.

### CALIFORNIA MACHINE WORKS, WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,  
No. 119 Beale St., - - San Francisco.

BUILDER OF—  
Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines  
Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. **ORDERS SOLICITED.**

### UNION IRON WORKS, SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

Steam Engines, Boilers,  
AND ALL KINDS OF

MACHINERY FOR MINING PURPOSES.

Flouring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front St., bet. N & O Sts., Sacramento, Cal.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery  
of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON

THORNTON THOMPSON

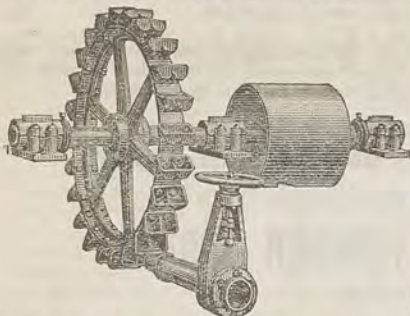
THOMPSON BROTHERS,

EUREKA FOUNDRY,

139 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

### PELTON'S WATER WHEEL.



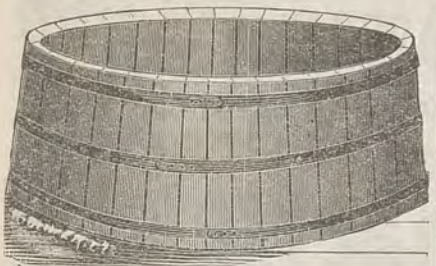
THIS WAS ONE OF THE FOUR WHEELS TESTED  
by the Idaho Company at Grass Valley, Cal., and  
gave 90 per cent., distancing all competitors. Send for  
Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street  
San Francisco, Cal.

### Mining Vats and Tanks.



LEACHING VATS with FALSE BOTTOMS.

PRECIPITATING VATS,

SOLUTION and WATER TANKS

For Mining Purposes.

WELLS, RUSSELL & CO.,

Mechanics' Mills, San Francisco.

NATIONAL ASSURANCE CO.,  
OF IRELAND.

ATLAS ASSURANCE COMP'Y,  
OF LONDON.

BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.

H. M. NEWHALL & CO.,

GENERAL AGENTS,

309 & 311 Sansome St., San Francisco, Cal.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold  
in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co.  
(Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting  
that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,  
Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded  
to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quanti-  
ties to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

## FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure  
or Compound, Stern or Side-wheel En-  
gines.

MINING MACHINERY—Hoisting En-  
gines and Works, Cages, Ore Buckets,  
Ore Cars, Pumping Engines and Pumps,  
Water Buckets, Pump Columns, Air Com-  
pressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for  
Dry or Wet Crushing, Amalgamating  
Pans, Settlers, Furnaces, Retorts, Con-  
centrators, Ore Feeders, Rock Breakers,  
Furnaces for Reducing Ores, Water Jack-  
ets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MA-  
CHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines  
and Boilers, Dredging Machinery, Pow-  
der Mill Machinery, Water Wheels.

## ENGINES AND BOILERS

OF ALL KINDS,  
Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

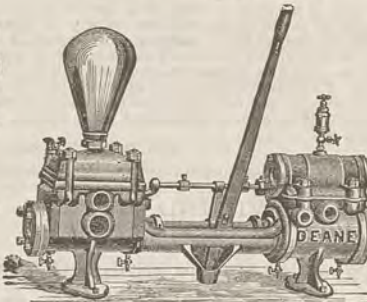
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

Deane Steam Pump.

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.

—ALSO—

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
Beams, Angle, Channel, and T Iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

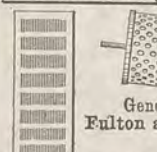
HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.



### FRASER & CHALMERS.



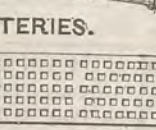
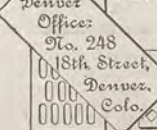
CHICAGO, ILL.

U. S. A.

General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

PERFORATED METALS FOR  
REVOLVING and SHAKING-SCREENS,

JIGS & STAMP BATTERIES.



UTAH OFFICE—SALT LAKE CITY, UTAH.

### NOTICE TO

**MINING MEN,  
ENGINEERS, CONTRACTORS,**  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.

Engineers' Tables of Progress

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.

SENT FREE ON APPLICATION.

For Catalogues, Estimate address:

INGERSOLL ROCK DRILL CO.,

REPRESENTED BY

BERRY & PLACE MACHINE CO.

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

## N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY  
Of all kinds made to order. Send for Descriptive Cata-  
logue. 17 and 19 Fremont St., San Francisco.



THE Sign of the Arkansaw Cough  
Syrup is looking you all square in the  
face.

Do you want a sure, safe and reliable  
Cough Syrup? Are you troubled with a  
Cough, Cold, Bronchitis or Lung Com-  
plaint? Do your Babies keep you awake  
all night with Hacking Coughs, Colds in  
the Head, etc. Do you want something  
reliable in the house to meet these  
emergencies? We answer to all: "Go  
to your Druggist and get a Bottle of the  
Arkansaw Cough Syrup, and be troubled  
no more." Price, 50 cents per Bottle!

For Sale by all Druggists.

RICHARD C. REMMEY, Agent,  
Philadelphia Chemical Stoneware Manufactory,  
1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of

all kinds of

Chemical Stoneware

—FOR—

Manufacturing

Chemists.

Also Chemical Brick

for Glover Tower.

### QUARTZ BREAKERS!

—AND—



Pulverizers Combined.

To Run by Hand or Power.

Mining Machinery of Every De-  
scription; Drawings, Plans  
and Specifications.

E. I. NICHOLS, 316 Mission Street, S. F.

INVENTORS, TAKE NOTICE

L. PETERSON, MODEL MAKER,

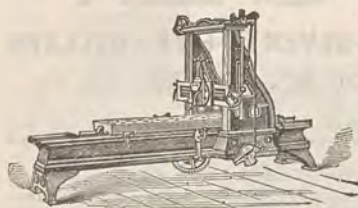
258 Market St., N. E. cor. Front (up stairs), San Francisco.  
Experimental machinery and all kinds of metal, tin,  
and Brasswork.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.

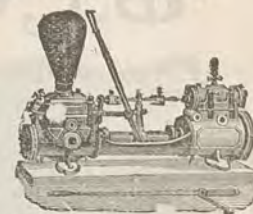


Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

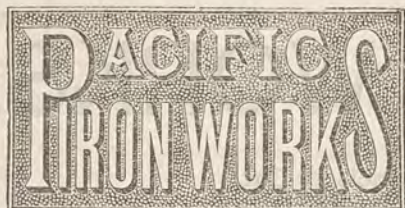
## MACHINERY AND GENERAL SUPPLIES,

Knowles Steam Pump  
The Standard.

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

### Mining Machinery, Steam Pumps, Wood and Iron Working Machinery ENGINES and BOILERS.

SEND FOR CIRCULARS.



1850. 1885.  
**RANKIN, BRAYTON & CO.,**  
BUILDERS OF...  
**MINING MACHINERY.**

San Francisco: 127 First Street.  
Chicago: 100 N. Clinton.  
New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

#### WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



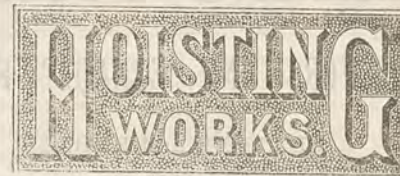
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



#### BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700 pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE of CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

## THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

### BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. NOTE.—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.

Send for Circular and Price Lists.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.  
J. C. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market &amp; Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

### STEAM, AIR, AND HYDRAULIC MACHINERY.

#### Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

### UNION IRON WORKS

Successors to PRESCOTT, SCOTT &amp; CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT &amp; MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 &amp; 131 Fremont Street,

San Francisco, Cal.

## CINCINNATI CORRUGATING COMPANY.

JOHN F. HAZEN, Pres't.

JAMES HICKS, Treas.

J. G. BATTELLE, Sec'y.

### Over 1500 Tons Iron in Stock!

FOUR WIDTHS OF CORRUGATIONS MADE!

#### STANDING SEAM PLAIN ROOFING!

#### All Paint Re-ground in Pure Linseed Oil!



Chicago Prices Beaten!

ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 &amp; 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).  
Orders Promptly Executed

#### A Good Opportunity for a Mechanic.

A variety of good Tools, Patterns, etc., with business for sale cheap by a party retiring from business. A splendid opportunity for an enterprising mechanic.

Address A. B. O., care of this paper.

#### San Francisco Cordage Factory.

Established 1858.

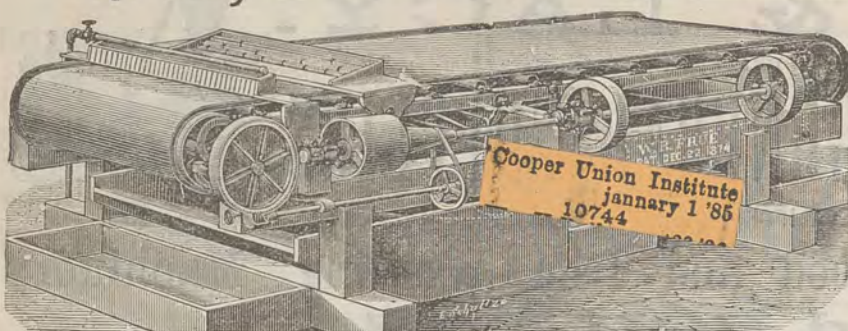
Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice  
TUBBS & CO.

611 and 613 Front St., San Francisco.



# \$1,000 CHALLENGE!



**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS (\$575.00) F. O. B.**

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

**THE FRUE ORE CONCENTRATOR**  
OR VANNING MACHINE.

**ADAMS & CARTER, Agents Frue Vanning Machine Co.,**  
Room 7, No. 109 California Street, **SAN FRANCISCO, CAL.**

## JOSHUA HENDY MACHINE WORKS.

(INCORPORATED SEPTEMBER 29, 1882.)

Nos. 39 to 51 Fremont Street,

San Francisco, Cal.

MANUFACTURERS OF

**NEW and Dealers in SECOND-HAND BOILERS, ENGINES and MACHINERY**  
OF EVERY VARIETY.

Steam Pumps of all Makes,

CENTRIFUGAL PUMPS,

MINING PUMPS.

BLOWERS AND EXHAUST FANS.

LEATHER and RUBBER

**BELTING.**

LUBRICATING COMPOUNDS and OILS

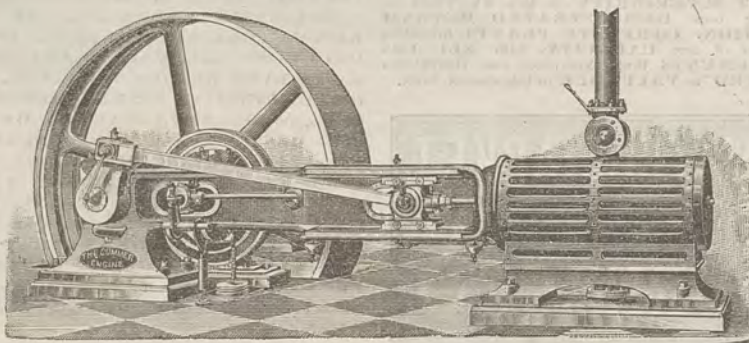
OF THE BEST MAKES.

PIPE and PIPE FITTINGS.

Brass Goods

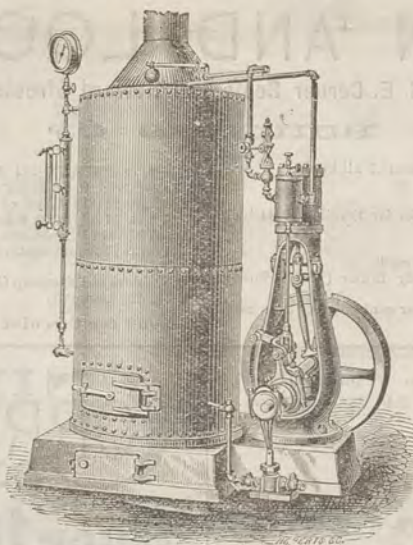
AND  
FITTINGS.

Hydraulic Mining, Quartz, and Saw-Mill Machinery, Hydraulic Gravel Elevators, Hydraulic Giants, "Triumph" Ore Concentrators, Automatic Ore Feeders.



SPECIAL AUTOMATIC ENGINES.

[Manufactured by the Cummer Engine Co., of Cleveland, Ohio.]



Upright Engines and Boilers Connected.

Stationary, Portable, and Hoisting

**ENGINES and BOILERS.**

Shafting,

Pulleys,

Boxes,

Hangers.

**WOODWORKING MACHINERY,**

—COMPRISING—

BAND SAWS, STICKERS, PLANERS, SHAPERS, SHINGLE MILLS, Etc.

IMPROVED

Single and Double Circular Saw-Mills.

AGENTS FOR THE SALE OF

"Cummer" Engines, from Cleveland, Ohio,

Porter Manufacturing Co.'s Engines and Boilers.

"Baker" Rotary Pressure Blowers.

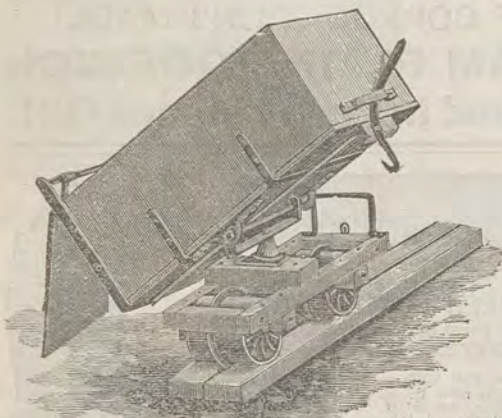
"Wilbraham" Rotary Piston Pumps

"Boggs & Clarke" Centrifugal Pumps.

The Volker & Felthousen M'fg Co.'s

Buffalo Duplex Steam Pumps.

P. Blaisdell & Co.'s Machinists' Tools.



JAMES' PATENT ORE CAR.

## TATUM & BOWEN,

34 & 36 FREMONT ST., Donahue Block, SAN FRANCISCO.

91 & 93 FRONT ST., PORTLAND, OREGON.

Ore Car,	.	.	.	\$ 40.00
Rock Breaker,	.	.	.	100.00
Quartz Mill,	.	.	.	350.00

## THE JAMES QUARTZ MILL

**Saves a Higher Percentage than any other machine.**

Its action is a reciprocating motion of four separate and distinct Dies attached to a heavy casting in such a way that the **WHOLE WEIGHT and FORCE OF BLOW ACTS ALTERNATELY ON EACH DIE.** In this respect it resembles the Stamp Mill, and in point of amalgamation is superior to any machine in use. There is no wear, except on Shoes and Dies, and there is no expense for setting. Weight, 3000 pounds. Capacity, 6 Tons in 24 hours through No. 40 Screen. Requires 4 H. P.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, OCTOBER 23, 1886.

VOLUME LIII.  
Number 17.

## The Mining Industry in California.

While it must be admitted that mining has, through the extensive growing of the cereal crops, been relegated to a secondary place in the industries of California, it is, nevertheless, the case that the production of the precious metals remains here a very important business. Not only so, but it is a business which, instead of having fallen into a state of hopeless decadence, as many suppose, is really in a very thrifty condition. It is, even at this time, growing quite rapidly—the product of gold and silver in this State having, for several years past, increased at the rate of a million or more annually, the total amounting now to something like \$19,000,000. And this increment is bound to be maintained for some time to come—the prospect being that it will, for the next decade, be somewhat accelerated.

While it is not anticipated that the yield of gold will be restored to what it was in pioneer times, there is good reason for believing that it will amount, in the course of the next 10 years, to very nearly half as much as was ever taken out in any one year—say \$30,000,000, at the least, and that something like that sum will, for an indefinite period thereafter, be maintained. The permanent, if not the more immediately productive, sources of our mineral wealth lie in our quartz lodes, which we are now only beginning to work in a large and effective way. That this branch of the business is capable of great enlargement, no one can doubt; within certain limits its expansion may, in fact, be said to depend on the amount of capital employed to that end. Under more thorough exploration, the field of practical operations is every year growing wider and wider, new deposits and new districts being discovered on every hand. Our main mineral belt, extending for a distance of 800 miles, is studied now with mining camps from one end to the other. If, among these, some are dead or decaying camps, they are not the centers of quartz operations, but of placer mining, much of which was necessarily of a temporary kind.

While there are instances in which quartz deposits have been abandoned because they had been worked out or failed to pay, not a case can be cited in which an entire district devoted to quartz mining has been permanently vacated or in which active operations have been wholly suspended. Meadow Lake, which comes the nearest to fulfilling these conditions, having been in a moribund state for many years, is again showing signs of life. The district is not dead; it was merely a case of suspended animation.

The vitality, as well as the vigor, of this class of mines is well illustrated by the case of Grass Valley, where quartz mining in California was inaugurated, and where, after having been prosecuted steadily for 35 years, the business is still being carried on largely and profitably, and with an outlook quite as encouraging as at any other point in the State. In French Gulch, a quartz-mining camp situated 250 miles to the north, the business, commenced in 1851, is flourishing to an extent unequalled in its past history and not excelled by any other locality in California. Look where we will, the oldest quartz-mining districts show themselves everywhere the best, evincing staying qualities that ought to commend the business to parties disposed to invest in mining properties of any kind.

## The Lick Telescope Object-Glass.

There were 19 failures in casting the lens of the Lick telescope before a glass was procured which was fit to be polished. At last, however, one that was satisfactory was cast and sent to Alvan Clark & Sons, of Cambridgeport, Mass., to be polished. It is now announced that the glass is completed and is ready for delivery. Prof. Newcombe, of the Washington

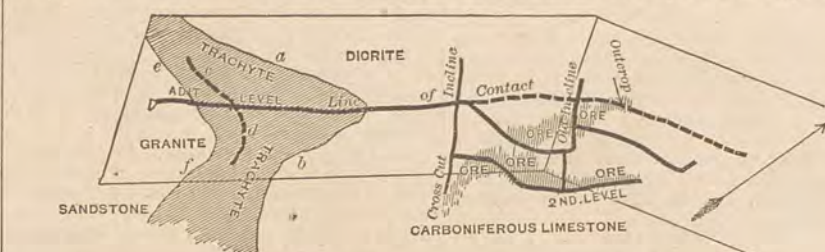


Fig. 1.—PLAN OF GLOBE MINE, ARIZONA.

Naval Observatory, has been selected as expert to report on the perfectness of the glass. It is scarcely probable, however, that fault will be found with the Clarks' work, they being the most expert people in the world in this line. The elder Clark, now a very old man, regards the glass as the consummation of his life-work,

## Copper Mines of Globe District, Arizona.

The copper bullion produced in Globe district, Arizona, which has made the Old Dominion Company one of the largest producers in the Southwest, has been mined on the Globe and Globe ledge claims, near the town of Globe. They are situated on the crest of a hill forming a spur of the eastern slope of the canyon along

and can be cut with a knife. Where the great ore-body is found entirely in limestone, the latter is discolored near the ore, and appears to contain alumina, silica, iron, and a little copper, as in the Bisbee district.

The diorite found on the surface of the Globe claims is undoubtedly of eruptive origin. It disappears below the overlying lime and sandstones a little to the north of the outcrop of the vein on the old Globe ledge claim, and does not again reappear for over a mile on the strike. Where it does again appear, a contact vein of iron ore has been found. No large amount of copper has been discovered at this contact. Where ore has been found entirely in the diorite the ore has been a copper glance, and has given out in this district, as elsewhere, after inconsiderable developments have been made in depth. For the Globe mines, as for the others already described, the theory of a deposit has been set up; but this mine, like all the others, is held by the writer to be a true fissure vein. The Globe mine has been, perhaps, the most regular of all the veins described. Fig. 2 is a section. The limestone on the right dips less steeply than is indicated—about 15° only.

While the Longfellow can be likened to a series of lenticular bunches connected by thinner branches, and the Queen and Prince to huge chambers connected by thin strings, the Globe has more the nature of a great chimney, dipping almost parallel with the contact of the diorite and limestone, and having a pitch of about 45° S. On the immediate contact of the diorite and limestone, a small seam of ore is occasionally found, but it is not a profitable source of copper.

Mining in the old Globe mines is done by square sets, 12' x 12' timber being used. Owing to the almost continuous character of the great chimney of ore, expense for dead-work has been, in a large measure, avoided in this mine; and the cost of mining the ore is undoubtedly lower than at any of the others described above. In 1883 labor was worth \$4 per day, and 12' x 12' pine lumber was worth \$35 per thousand, delivered. Some 2000 tons of ore were mined per month; and the cost of the ore did not exceed \$5 per ton at the smelter, which is located directly below the mine at the foot of the hill.

As elsewhere in the great ore-bodies in limestone, some of the ore found is moderately silicious and some very basic; and mixtures of the different ores are made and smelted without any notable addition of flux. Occasionally, a little limestone or sand is added, if one or the other character of ore should prevail.

A PORTION of San Pablo bay is being surveyed by the Coast Survey. The Government is giving particular attention to the improvement of navigation on the Columbia river. The work of constructing a canal at the Cascades is still in progress, and it is impossible to tell when it will be finished. Another canal will be dug at some time, above The Dalles.

THE Soledad extension of the Southern Pacific is being rapidly pushed forward, and the graders are now within a mile of Paso Robles. The proximity of the heavy winter rains renders it absolutely necessary to complete all grading operations before they set in. It has now been decided that Paso Robles shall be the winter terminus of the road.

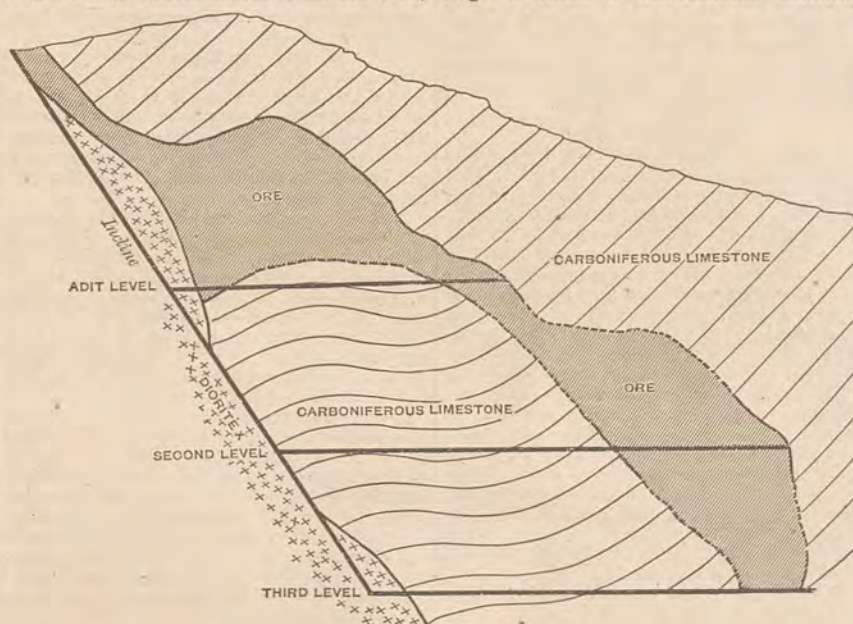


Fig. 2.—SECTION OF GLOBE MINE.

and has been extremely anxious to complete it while health and strength permitted him to pursue his labor. This object-glass is the largest ever made. It is 36 inches in diameter in the clear. The contract price was \$51,000. It is not probable that the glass will be brought to this coast before next spring.

Meantime work is going on at the observatory, Mount Hamilton, in completing the appliances. The large dome is being built by the Union Iron Works of this city, and the tube of the telescope is progressing also. Many of the appliances of this observatory are necessarily of original character in design and operation. The floor of the observatory soon will be operated by hydraulic power, and will be raised and covered to suit the observers' position at the eye-piece end of the tube.

THE September cleanup of the Young America mine of Sierra county was \$37,000.

proved to be such by numerous corals and fossil shells found in it; and the vein, which is undoubtedly a fissure crossing the limestone, is found near an upheaval of diorite. Near the face the diorite forms the footwall of the ore-body. Cutting the diorite and limestone is a trachyte dyke, having an east and west course. The exact location of this dyke is shown in Fig. 1. On the surface it covers a more considerable width, but underground it is found to narrow down to a dyke some 30 feet wide. These facts are from a paper by Arthur F. Wendt, read before the American Institute of Mining Engineers.

Approaching the great ore-body through the long adit-level run lengthwise the claim, conditions similar to those observed in the Longfellow mines of Clifton, and the Queen and Prince mines of Bisbee, are found to obtain. The rock becomes kaolinized, especially near the contact of the diorite and limestone. The kaolinized rock is extremely soft, has an unctuous touch,



## CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Ems.

## Cooke City, Montana.

[From our Traveling Correspondent, R. G. HUSTON.]

Some months ago I gave you a short letter from data furnished me by an acquaintance from this district, and on again canvassing the Territory, having a great desire to make a tour of the National Park, and that trip bringing me within 60 miles of Cooke, I included that place in my travel. The Clark's fork mines have been known for some 15 years, prospectors and hunters having located some claims here that long ago; but the rugged mountains and difficulty attendant on getting in and out deterred all of them from a permanent residence here. Moreover, hostile Indians were swarming over the fine hunting-grounds here at that time. Buffalo, elk, deer and antelope were here in abundance, and, in fact, elk and deer are here yet in large numbers, and a large portion of fresh meat consumed by the community is wild game.

The mines are in the extreme southeastern corner of Gallatin county, and the prospects that are most developed are on the spur of mountains lying between Soda Butte creek and Stillwater, on mountains named respectively Miller, Henderson, Fisher and Sheep. On the south side of Soda Butte creek is Republic mountain, on which is the Great Republic mine.

To return to the gradual opening of this camp, after the first discovery in 1871, nearly every year some new party would find their way in here and relocate the different claims, stay a short time and then seek a more congenial clime, intending at some period in the dim, misty future to return and develop a Comstock for themselves. All this time the whole of that portion of the Territory lay in the Crow Indian reservation. In 1877 a company was organized in Bozeman, and a smelter was built here—one of the old-fashioned Mexican stone furnaces. They had just started it when the Nez Percés war broke out. Everybody was driven out and everything that was combustible was burnt to the ground, so that, for nearly five years, nothing more was heard from the Clark's fork mines. In 1882, after the treaty with the Crow Indians had been ratified and this portion of their lands thrown open for settlement, the first permanent locations were made, and since that time, like all isolated quartz camps, it has been slowly coming to the front.

## The Great Republic Mine

Was sold the same year by Messrs. Huston, Dawing and Woody, along with three other properties, for \$60,000, to some gentlemen from Cheyenne and Chicago, and a close corporation was organized. A water-jacket smelter was built during the season of 1883 of a 50-ton capacity. This has been in operation ever since, except such a portion of the time as they were unable to keep up their coke supply. This has all to be transported about 70 miles in wagons over the roughest mountain road a man ever saw. To give an idea of how bad it is, it may be stated that some 20 miles out on the road up from the Mammoth Springs I met a number of large ox-teams that had then been 19 days on this 140-mile trip, and it would at least take three more days, or 22 days in all—a long time to make the distance. The only conceivable reason for this road being so bad is that the most of it lies from three to five miles within the National Park, and the authorities in charge will neither build a road nor allow the citizens of Cooke to improve it for themselves. This is another case where consistency is a rare jewel. To an unbiased outside mind the real way to benefit the 800 American citizens who are here located with the idea of bettering their condition in life would be to grant the right of way to the Cinnabar branch of the Northern Pacific and permit them to extend their road to Cooke. This would give them a chance to open up their mines and get their bullion product out without the immense tax it has now to stand.

The Republic Company run for the most part on ore from their own mine. They use some custom ore for fluxing, there being some in the camp that mixes to a good advantage with theirs. The Republic Company have a bond on the Homestake mine for \$100,000, six months to run, subject to a test up to 50 tons of ore. This is the most extensive surface showing in the camp, and I might say, without fear of contradiction, the greatest surface showing in the country anywhere, for it is really a mountain of ore.

The developments on the mine have not been properly managed to make the showing that mining experts wish to see when passing their opinion regarding the continuity of the property; yet there are thousands of tons of ore in sight, and probably fully as much patent to the observation as would be in a smaller deposit confined between wall rock.

The mine was discovered and located by Sam Mather, Geo. Smith and some others, although these are the only ones of the original locators now interested. Many assays have been made from this property and the general average runs from 50 to 100 ounces silver, \$20 gold and from 10 to 20 per cent copper. This does not include assays made from selected ore, as a number of these have been made that run very high

in the aggregate. The altitude of this mine is over 11,000 feet above the level of the sea. It will be another capital point for a Huson tramway, similar to the one used by the Helena Mining & Reduction Co., to convey their concentrates from Comet to Wickes. It is quite a long distance above the timber line on the mountain, and it will take as much capital to make a good wagon road to the mine as it will require to build the tramway, and that would very materially lessen the cost of transporting the ore to the reduction works.

## The Daisy

Is a very similar location, a short distance south of the Homestake, and has nearly as large a quantity of ore. It is owned by Messrs. Kearns & Brownser. It carries more gold than the Homestake, but not so much silver, making the general aggregate about the same. Nature has certainly favored the discoverers of these two properties very much by placing immense quantities of ore in plain open sight, and the only way that any further development would be satisfactory would be to take away the ore in sight and treat it, and thus clear the way to see what is below the outside showing. A number of the oldest and best mines in the country are in lime formation, and this about explodes the old theory that mines in lime were not lasting.

## The New Year's Call

Is located south of these other mines, and but little has been done here. It is owned by John Tate & Zed. Daniels, and is on the top of Henderson mountain—rather a lofty place for a New Year's call, I should say, but as it carries plenty of free gold it is likely to develop into a fine property, and it is my earnest wish that it may, as Tate is one of my friends of the old placer-mining days of Montana, and is deserving of all the good luck that may befall him.

## Bull of the Woods

Is located half a mile to the north of the Homestake, on the backbone of the low divide lying between Henderson mountain and Fisher mountain. It is owned by Mather, Bowen & Smith, and carries enough silver, gold and copper to make it a fairly profitable ore to work when facilities are sufficiently advanced. As the camp now stands, it requires about \$100 to pay expenses, and it takes pretty rich ore to do that.

## The Young America

Is located on the west side of Henderson mountain and well up to the top. It is owned by Frank Essler, who has done considerable development work, running a tunnel in some 200 feet, and has a fair body of ore. In running this tunnel he crossed two small bodies of ore running at right angles with the main ledge. Each of these prospecting well, and he thinks he has a good property. Mr. Essler also owns the Big Blue lead over on Miller mountain. He is working quite a force here and is selling his ore to the Republic Co. It is a heavy black galena ore and carries some silver. There are also some sand carbonates and rather an easy deposit to work, the main trouble being to keep it lagged tight enough to prevent it from pouring through and running to the surface.

## The Elkhorn Mine

Is a location on Fisher mountain, northeast of Henderson, and is owned by Geo. Fisher, who, by the way, was our only subscriber in the place when I arrived here. His mine is developed by a tunnel run in on the lead for 75 feet, and a shaft in the head of the tunnel 50 feet in depth. This is a heavy galena ore and carries about 100 ounces silver and from 50 per cent to 60 per cent lead. What ore he has taken out in his development work he sold to the Republic Co. This also lies up close to the top of the mountain and is quite inconvenient to get at.

The Black Warrior is another of the finest properties in Cooke, and is really the best developed property on the Miller mountain. They have a shaft down 60 feet, and 50 feet of levels run from the bottom of shaft. Then they have a tunnel run in from below and an air connection tapped through, and are now shaping up their tunnel for stoping out. They will then have their mine in shape to take out ore as fast as they may need it.

Some of the finest assays ever obtained in the Territory were here in a small strata on the top of the ore body, running as high as \$29,000 per ton, gold and brittle silver. The general average of this immense body is 50 per cent silver. This property is owned by Gassert, Black & Randal. They have had the old Bozeman Company smelter leased—the one built in 1877, and spoken of before in this letter, and have been operating this all the season. Just at the present time it is shut down for the purpose of effecting arrangements with the company for putting in one of the improved water-jacket furnaces. If this is done the production of Cooke will be very materially increased.

These are the same parties who have been operating the Shoo Fly mine under a bond and lease for \$21,000. This property was owned by Horn, Miller, Pike, Moore, and Maj. Pease. This is a fine silver property and carries a large percentage of lead, as in fact all the properties on Miller mountain do. The general impression is that they have already made money enough out of the mine to pay for it. That is, of course, gossip, and cannot be depended upon. The Little Judge is a short distance below the Shoo Fly, and carries \$20 in gold and some silver, and a small percentage of lead. This is owned by Messrs. Sanborn & Roberts. It is a promising prospect and is rather conveniently located, which is a miracle in these mines.

## The Stillwater

Is located in Wolverine Pass at the headwaters of Stillwater creek. It is owned by Dewing, Bowen & Fleming. The only development on this property is a shaft about 50 feet in depth. A short time since they sold to the Republic Co. nine tons of ore from this shaft, receiving therefor \$125 per ton, and certainly that is a good grade of ore and well worthy of further development. If its proprietors are too rich to do this themselves, it will pay for hired help in this same section. There are numerous other locations, but as they are nothing more than prospect holes of uncertain dimensions and a stake and notice, I will have to defer mention until a more convenient season, and, at least, until their proprietors have played their picks and shovels to advantage.

## The White Warrior

Is located on Sheep mountain. This is on the east side of Clark's fork proper, and is owned by Collins, Howell & Co. It is developed by a tunnel in some 200 feet. The ledge has widened from a seam to start with, until it is now near four feet in width, and has the appearance of a well-defined fissure vein. This is in the granite formation and assays have been obtained here as high as \$400 per ton gold. It carries a small amount in silver. This is a very favorable-looking prospect, and will soon be more thoroughly investigated by its owners. All the prospects obtained on this mountain in the granite formation have been gold properties, and as those are attracting the most attention, it will make them more attractive to prospectors than heretofore. On the east side of Miller mountain there are quite a number of locations, and more or less work done, according to the will or the depth of the owner's pocket.

The Washington is owned by Messrs. Tate & Black. On this a tunnel is in for some distance, and its close proximity to the Black Warrior makes it a desirable property to hold fast and await developments. On this same location is a fine bed of fire-clay, which may at some time be a valuable property itself, totally dependent on the development of the general interests in the vicinity.

Then there is the Tate mine. In this a tunnel has been run over 100 feet to strike the ore body at a depth of over 100 feet, but they were driven out by water when the snow was melting last spring, and have never commenced work on it again. This is owned by Tate, Mather & Fuller. They are intending to drive the tunnel in some 50 feet more very soon, and have strong hopes of striking an ore body. The Morning Star is a short distance below, and some work has been done here, but not enough to be satisfactory either way.

The Iceberg is another location, "one-third of which sold a few days ago for \$700. But little development has been done here yet. It is simply a prospect, and a fair one, too, but that is all that you can say for such claims where no work has been done to show up the value of the property.

The product of the Republic smelter, when running steadily, is from four to five tons of bullion per day, and the fact that the smelter continues to run is patent enough to any one with ordinary understanding that, notwithstanding the enormous freight bills they must pay on supplies in and bullion out, it is a paying investment.

Now, as to the mode of reaching Cooke, there is but one way of getting there. That is to take the Northern Pacific to the end of the Cinnabar branch and then stage it for 70 miles. J. A. Clarke, of the Mammoth Hot Springs, runs a stage-line and carries the mail in twice a week and such passengers as wish to go back and forth. Clarke is a thorough-going stage man and he always gets there on time, one and a half days' time from the Springs.

The town itself is scattered over considerable ground and is more of a burgh than I expected to find. The Cosmopolitan hotel is kept by J. P. Allen, and the wants of the inner man are carefully attended to here. The accommodations, while not elaborate, are comfortable, and that is all any sensible person will require in a new mining camp. There are two restaurants, another hotel, livery stable, one book and stationery and notions store, and barber shop. There is a hardware store and three general supply stores, and another about to open, and that will be ample for this season. By another season there will be an opening for more. A livery stable, butcher shop and barber shop about complete the Cooke business directory.

As both the smelters are within a stone's throw of town, it is very convenient for the hands to board at the different hotels and restaurants. I saw no Chinamen in the town, and presume they are barred out, as they are usually among the first in an outside camp like this, and there surely must be a reason for their absence in this case.

The trustees of Cooke City district are just having the finishing touches put on a very comfortable schoolhouse, and are thus showing their appreciation of the educational privileges accorded us as free American citizens.

In nearly every house one enters here you will see from two to half a dozen pairs of snowshoes carefully laid away for a time of need. Indeed it is about their only means of locomotion at times in the winter when the snow falls deep. I think from the way they converse about it they rather enjoy the life, yet I have no particular desire to spend a winter in there, although if a man were steadily employed on a mine, for instance, he would not notice the weather much.

## The Hunt Placer Mines.

Mr. C. L. Hunt, son of J. S. Hunt, manager of the Hunt mines, Snake river, 18 miles from Bliss, on the Oregon Short Line, is visiting Boise City, and gave the *Statesman* a friendly call and a description of the celebrated Hunt placer mines, the finest as well as the largest flour gold placer mines in Idaho, if not in the country. The claims lie on the Alturas county side of Snake river, two and a half miles below the Salmon Falls. The entire claim, sloping westward and fronting the river for the distance of about one and one-fourth miles, consists of 148 acres patented land, which is the only patented placer claim in Alturas county. In addition to this there is about 200 acres of good mining ground held under location, which shows "colors" from the surface down; besides this there is also about 120 acres that is valuable for dumping ground and for placer machines. The gravel of the claim is fine, none of it being larger than a goose egg. No boulders have been found to interfere with the mining, except in one small corner, next the U. S. mineral monument. The Burlap system is used—five machines with grizzly plates, 4x24 feet, and with six burlap boxes each, 3x24 feet. Only three machines are used at present. An abundance of water for any number of machines can be obtained by enlarging the present ditch, about 200 inches of water being necessary to the machine. There is room on the river front to put in some five more machines. Where the ditch now comes on to the claim it is an elevation of some 30 feet above any other point on the claim, and being easily conducted by surface ditches to any point desired, no pipes are used for washing the ground the first time; pipes will be used, however, in cleaning off the bedrock. The gravel has been found to be of much greater depth than was at first supposed when the claim was opened, having been worked down in some places to the depth of 25 feet, with no sign of bedrock appearing. Some of the pits have been worked back 600 feet, and the gold found is as fine as flour. The ground that has been worked has paid at the rate of five cents to the cubic yard, from 300 to 350 cubic yards being washed by each machine every 24 hours. The average production of each machine per month during the past year has been \$350. The quality of the gold is very high, running about 945 1000 fine. The number of men employed is as follows: One on the ditch, one in the pits of each machine, one making ditches, one with the team, and another to rock up the concentrates. During the past three winters there has not been a single cleanup missed on account of cold weather. In the winter of 1885-6 the coldest was five degrees above zero and that only three or four mornings. Each machine is cleaned up twice a week, except in very warm weather, when it is necessary to clean up three times. Two men will clean up a machine in two hours. The burlaps and concentrates are then hauled to the rockup shop, which is the only building on Snake river for that purpose, and rocked up.—*Boise (Idaho) Statesman*.

A PUMP FOR RIVER MINING.—Peter E. and Joseph G. Falcon, the submarine divers, have secured a patent on a pump for excavation and other purposes which is attracting considerable attention at the Exposition. Experiments thus far have proved successful, and loose matter of all kinds, even boulders, have been removed from river-beds at a depth of 10, 20 and 40 feet. The suction is so great that a \$20 gold piece laid flat on the river-bed has been raised, and the inventors claim that an 8-inch pump will do the work of 100 men, and a 12-inch pump that of 250 men. The fans permit anything to pass through them, owing to their flexibility. The pump is really centrifugal with flexible fans, and that is why the Messrs. Falcon were enabled to obtain a patent on it, as it is just as good for excavating as for any other purpose. Any solid matter can be removed by the patentees, who operate a steam jet in connection with the pump, and if this is not effective they can accomplish what they desire through the assistance of the submarine armor. Through their ingenuity they have effected what tunneling and other contrivances have endeavored to bring about, and they have received several letters from various sections of the United States and South America congratulating them on the results. They have experimented for four months and found the pump to work satisfactorily, and have overcome the obstacles heretofore encountered in the removal of the stones and other material from rivers, and they are now about to test the pump in California, on the spot where one of them, in 1851, picked up a 12-pound piece of gold.—*Chicago Times*.

THE Martin White Mining Co. has declared a dividend of 25 cents per share, payable immediately on the outstanding shares—about 2200. This company recently milled about 1100 tons of low-grade ore which had accumulated, and netted some \$15,000 therefrom. The balance of the fund in the treasury will be used for future prospecting operations.

THE long-contested mining suits of the Phoenix Mining Co. vs. S. F. Mack and Seymour vs. S. F. Mack, involving the title to a valuable group of mines in the Cave Creek district, has been finally decided against Mack. This ends the case, and will inaugurate a new era in mining circles at Phoenix, Arizona.



## California Names.

Many of the names of cities, towns, rivers, etc., of California are derived from Spanish and Indian words. The first Spanish settlers were Catholic missionaries; hence, the many sacred names. The male saints have "San," the females "Santa," preceding their Christian names. The missions were all named from saints or sacred dogmas. There are San Miguel, San Gabriel and San Rafael (from the three archangels, Michael, Gabriel and Raphael); San Juan Bautista and San Juan Capistrano (St. John the Baptist and St. John of Capistrano); San Luis Rey and San Luis Obispo (St. Louis the King and St. Louis the Bishop); San Fernando Rey (St. Ferdinand the King); Santa Cruz (the Holy Cross). Other Spanish sacred names, not derived from saints, are Trinidad (Trinity); Sacramento (Sacrament); Jesus Maria (Jesus, the son of Mary), etc.

The errors which Americans most frequently commit in pronouncing Spanish words are in giving to *a* the English sounds of *a* in fat and fate; giving to *s* the sound of *z*; to *j* and *g*, before *e* and *i*, the same sound in English; to *gu* the sounds of the English *w*, and on putting the accent on the first syllable—English fashion. The following, from Hittell, may serve as a guide to the proper pronunciation of some of the names. It is not a perfect guide to pronunciation, but only an approximation:

Diego—dee ay go.	Napa—aah pah.
Suisun—soo ee soon.	José—ho say.
Alameda—ah lah may da.	Jesus Maria—hay soos mah ree ah.
Sierra—see er ra.	Putá—poo tah.
Nevada—may vah dah.	Tejón—tay hóne.
Mateo—mah tay o.	Farallones—fah rahl yó nes.
Monterey—mon ta ray ee.	Gabriel—gah bree ále.
Luis Obispo—loo ess o bées po.	Rafael—rah fah ále.
Los Angeles—lohs áhn hel es.	Miguel—mee gále.
Vallejo—val yáy ho.	Pájaro—páh bah ro.
Vallecito—val yay thee to.	Coyote—co yó tay.
Joaquín—ho ah keen.	Pacheco—pah chay co.
Juan Bautista—hwahn bah oo técs tah.	Cahuilla—cah oo eel ya.
Tamalpais—tah mal pice.	Hueneme—way náy may.
Nietos—nee áy tos.	Dos Pueblos—dohs pwáy blós.

In the pronunciation of the names of Spanish and Indian origin, the letters usually have the Spanish sounds. The following from Hittell's Resources of California is a good guide. *A* is like *a* in far; *e* like *a* in fare; *i* like *ee* in meet; *o* like *o* in go; *u* like *oo* in fool. *H* is silent; *j* and *g* before *e* and *i* have a sound similar to that of the English *h*; *s* never has the sound of *z*, but is always like *s* in hiss; *qu* before *e* and *i* is like *k*. *Ll* is like *ll* in William; the Spanish, or with the circumflex over it, is like *ni* in union. There are no diphthongs in Spanish. Every vowel is sounded separately. Words ending in a vowel in the singular have the accent on the syllable next the last; those ending in a consonant on the last.

The following list of California names with their meanings will be of interest to visitors to the State, and by what has been said above, the pronunciations can readily be made. This is compiled from various sources:

Alameda—An avenue of elms or cottonwoods.  
Alcatraz—Pelican.  
Almaden—Arabic. The mine.  
Alvarado—The white road—a proper road.  
Alviso—The view.  
Anador—The lover.  
Alta California—Upper California.  
Agua Fria—Cold water.  
Agua Caliente—Hot water or warm spring.  
Alamo—Elm.  
Baja California—Lower California.  
Calaveras—Skulls.  
Calistoga—Cup and gown.  
Chico—Small.  
Colusa—An Indian name.  
Contra Costa—Opposite coast.  
Corral—Yard or pen.  
Coyote—A kind of wolf.  
Campo Seco—Dry field.  
Corte Madera—Place where wood is cut.  
Del Norte—Of the north.  
El Dorado—The golden land.  
Esperanza—Hope.  
Farallones—Rock islands in the sea.  
Fresno—Ash.  
Hornitos—Little oven.  
Lobos—Wolves.  
Loma Prieta—Dark mountain.  
Los Angeles—The angels.  
Laguna Seco—Dry lagoon.  
Los Gatos—The cats.  
Marin—Chief of the Tomalo Indians, of the sea.  
Mariposa—The butterfly.  
Merced—Mercy.  
Modoc—Strange or hostile Indians.  
Mount Diablo—Devil mountain.  
Monterey—The king's mountain.  
Monte—The mountain or forest.  
Montecito—Little mountain.  
Nevada—Snowy.  
Pah Utes—Utahs that live near the water (Indians).  
Pájaro—The bird.  
Pescadero—The fish.  
Placer—Gold diggings.  
Plumas—The feather.  
Potrero—Pasture grounds.  
Presidio—Garrison, fortress.  
Prieta—Black.  
Rincon—Place where two corners meet.  
Rio Vista—River view.  
Sacramento—Sacred mind.  
Salinas—Place of salt.  
San Andreas—St. Andrew.  
San Buenaventura—St. Good Ventura.  
San Diego—St. James.  
San Felipe—St. Philip.  
San Francisco—St. Francis.

San Joaquin—St. Joachim.  
San José—St. Joseph.  
San Lorenzo—St. Lawrence.  
San Luis Obispo—St. Louis the Bishop.  
San Mateo—St. Matthew.  
San Pablo—St. Paul.  
San Pedro—St. Peter.  
San Rafael—St. Raphael.  
Santa Clara—St. Clara.  
Santa Cruz—Holy Cross.  
Saratoga—Healing waters in a rock.  
Saucelito—Little willow.  
Shasta—Stone house or cave.  
Sierra—Saw, or mountain chain.  
Solano—The potato.  
Sonoma—Valley of the moon.  
Sonora—Harmonious sound.  
Tahoe—Big or deep water. Some say it means grasshopper.  
Tamalpais—Country of the Tamal Indians.  
Tejón—Badger.  
Temescal—Indian sweat-house.  
The Dalles—Stone spout for water.  
Tamales—A tribe of Indians. A kind of food.  
Tulare—The tule or rush.  
Tule—Rush of a plant.  
Utah—Mountain dwellers.  
Vacaville—Cow town.  
Vara—A measure about 33¾ inches.  
Vallejo—Big valley.  
Walla Walla—Away down.  
Yolo—Region of rushes and tules.  
Yosemite—Large grizzly bear.  
Yreka—Corruption of We-e-kah-white.

## Value of Mines.

The test of merit of a mine is its ability to yield a profit, when properly worked. The test of merit of a prospect is its ability to become a paying mine, when developed. Naturally, it is much more difficult to determine the value of a prospect than to determine the value of a mine. Still, there are rules which experience has taught are safe to follow, in estimating the chances for a prospect becoming a paying mine. The rules are altogether different in judging a fissure vein prospect from those which are, or should be, followed in judging a contact or bed deposit. The value of the latter depends largely upon development of surrounding claims, value of ore, size and direction which ore shoots are taking. What we commonly call a fissure vein, gets no value from its proximity to rich veins. Each vein is a "tub that stands upon its own bottom."

An enormous amount of labor is expended in working assessments on and developing veins which give not the least promise of ever becoming paying mines. It is impossible to generalize rules for judging prospects which are without exceptions, but experience has taught a few which can always be followed with safety, and from which no experienced miner will deviate.

The first rule is, that if it is not found on the surface, it is useless to dig for it. There never was a greater error than the commonly accepted opinion among prospectors that veins increase in richness as depth is gained, and that all that is required to make a mine is to sink to considerable depth. The instances in which richer ore is found at depth than on the surface are very rare. After shinning up and down a great many hundred prospect holes, and from the British possessions to the Caribbean sea, we can say that we never have seen a paying mine which did not have pay ore on the surface. The cases, too, are very rare in which the quantity of ore increased with depth. If, after prospecting the surface of a vein, pay ore is not found, it is a poor investment to continue work upon it.

The fissure vein prospect which has a value is the one which discloses ore of sufficient richness and in sufficient quantity to make a paying mine if it continues until the vein is developed to the point of economical production. The exceptional prospect, with exceptional value, is the one which is rich enough to pay for its own development. Of course there are other things besides those to be considered in determining values. The cost of working a vein, the character of the ore, the location, with reference to wood, water, roads and markets, are all important factors in determining values.

There is one thing that can be set down as a certainty, which is, that prospectors almost invariably place a value on their claim far in excess of any value they can possibly possess. Nine-tenths of the prospects in the country, judged by the rules here laid down, would be dear at the price of recording a deed. The sooner prospectors learn these things the better will be their chances of finding something salable and valuable.—*Denver Republican*.

A BIG COPPER MINE.—An Ottawa dispatch says: Canada has just hit upon a "bonanza" in the way of a copper mine. The Canadian American Copper Company has hit upon one of the most remarkable copper-bearing areas, it is said, in the world, at Sudbury Junction, on the Canadian Pacific. It is remarkable because the ore is so near the surface as to form practically little copper mountains, rising to a height of over 100 feet above the prevailing level and extending in a broken range for nearly eight miles. The Canadian Pacific Railway has constructed a siding from the Algona line, and within the last four days between 30 and 40 cars, containing an aggregate of some 500 to 600 tons of ore, have been sent to New York. Montreal capitalists, who have visited the mine, declare it is

the largest area in the world and with the highest percentage of pure copper that has ever been discovered. The mines are owned by Ohio capitalists, who have 120 men taking out 300 tons of ore daily, and the company is erecting 500 houses for the miners who will be added to the present force when the dwellings are completed.

## The Life of a Miner.

It is seldom that so true a picture is found as is presented by the following from the *Eureka Sentinel*: "To those who know nothing more of mining than they gather from seeing ore hauled to mills and there witnessing the process it must necessarily pass through in order to obtain the precious contents, the miner's calling does not seem to be one that requires a high or even more than a commonplace order of intelligence; but this is a mistake. The perils that environ a miner at his daily tasks, and that are sometimes so subtle in their natures as to require nothing less than a scientific mind to combat them successfully, make it necessary and highly important that, so far as the work of mining is concerned, only men of skill, of clear heads and steady nerves and a fair knowledge of the work, should be engaged in it. There are some people who cannot realize a distinction between the miner and the laborer. The former, in order to fulfill the requirements of his calling, must possess considerable skill and knowledge of the requirements of the intricate work of drilling and blasting down the tons of rock and ore from their fastness of centuries, while muscle and endurance are sufficient for the latter. A knowledge, too, of timbering, lagging, etc., is imperatively necessary. This scribe can never meet one of these grim stained men passing down Poverty Gulch or over mountain trails on his way home from work, with heavy footsteps and jaded spirits, without feeling something of the thrill of happiness that he knows must greet him as he enters his little home where he left anxiety to take his place when he set out for his day's risk and toil. From the time the miner sets foot on the cage that whirls him down in 'hell of the deep, sunk mines' until he emerges again from his work, the specter Death is his constant companion, and his friends above ground do not know what moment they may hear the terrible news of his being crushed by a fall of rock or torn to fragments by one of those unexpected blasts, whose destructive powers no pen can adequately portray. There is a poem in the life of a miner which awaits the touch of some inspired writer who will give it adequate expression."

SODA LAKE DISTRICT.—Fred. W. Moore, of San Jose, a well-known mining man, early in 1885 conceived the idea of prospecting that portion of what is known as Soda Lake mining district, lying just below the south line of Death valley, in search of mineral wealth which, he was firmly impressed, could be found there. Mr. Moore organized and thoroughly equipped a gang of prospectors and accompanied them to that portion of the district. His hopes of the country were not doomed to disappointment, for the party had not worked a month when a rich vein of gold-bearing quartz was unearthed, samples of which assayed in value up into the hundreds per ton. By reason of several difficulties not to be overcome at that season of the year, Mr. Moore was obliged to leave his new discovery partially developed and seek civilization and financial aid to thoroughly develop the prospect. During his absence in the North he formed a company to work the property, and upon his return here yesterday, announced to an *Express* reporter that he would organize a company of miners and proceed to Soda Lake at once to place the mine in condition for extracting ore and milling it. Probably five or six men will be taken and employed in the work. Mr. Moore is a miner of experience and expressed himself as confident that the prospect would turn out to be one of the richest finds on the coast.—*Los Angeles Express*.

WILL IT PAY?—How shall a mine be judged? There are a number of people who are ready with answers, and there are a number of different answers, and each man giving one is altogether sure that his particular way is the best. There are men who judge every mine in granite as worthless, or at least too risky to touch. There are others who denounce contacts, others who would not have anything to do with a deposit in limestone, and still others who would not touch an ore deposit of any kind, believing that placer mining is the only real simon-pure, never-failing way of making money. Every well-posted man knows that there are good mines in each and every one of these classes against which there are strong prejudices. If a man, possessing some one of these prejudices, were to be called upon, as such men often are, to pass judgment on a mine in the despised class, how much would his opinion be likely to be worth? There is not much question but what the ultimate test to which all mines must be put is the simple one, "Will it pay?" If it will not pay, the next question is "What is the chance for making it pay, and what will be the probable cost of the same?" These questions seem simple and easy to determine correctly, but many a man knows to his sorrow that a correct answer is hard to get.—*Denver Tribune-Republican*.

## Pluck and Energy.

There are thousands of young men in this city and throughout the country who have passed through their school days and arrived at the point where they must throw off the dependence of youth and assume the helm of their own fortunes. It is one of the most eventful periods in human history. All depends on the way they start. Very few seem to think how much success hinges upon the spirit, pluck, energy and equipment of the individual at the outset. Five or six years will usually determine what sort of a destiny the maturer years of manhood will develop. Fortunate circumstances may place here and there one above the plane of toil and effort; but it is certain that 99 out of every 100 will have to work out their life problem. If a young man starts life in a mood of indifference, with low aims and ambitions, inclined to wait till he is married and settled in life before he puts forth any special effort, or to trust to luck, adventure or a prize sent to him from the wheel of fortune, he may for a season have a good time, but old age is almost certain to overtake him not far from the place where he started.

The first element of success is a proper equipment. "The winds and waves," says Gibbon, "are on the side of the ablest navigators," and it may be added that fortune favors the man who woos her knowledge. Take, for instance, the most unskilled labor of all, that of the tiller of the soil. It is his business to make the earth grow food; the elementary rules are very simple, the practice easy, yet between the worst agriculture and the best lie agricultural chemistry, the application of machinery, the law of the economy of force and some of the curious problems of physiology. But each point of science which the farmer acquires will not only make him a wiser but better tiller of the soil. The same fact is true of the whole catalogue of manual craftsmen—the blacksmith, carpenter, tailor, bricklayer, printer, or those who toil with hand and brain—doctors, lawyers, editors, reporters, engineers and preachers. Whoever would grow and thrive must become skilled in his particular art or vocation. This is no world for mopes and idlers. The young man who cares more for fine clothes than a knowledge of his business, more for cards, billiards, places of amusement than hard work and fidelity to his employer, may for awhile enjoy a sort of glow-worm glitter, but will always be a routine man, a drudge and an automaton in his work.

Then along with a good equipment, a young man must have pluck, courage, hope, faith and an intelligent appreciation of opportunities. Possessing these elements, he can hardly fail. His reward will be commensurate to his deserts. There may be exceptional cases, but they will generally be found not attributable to the man so much as to those contingencies that like tropical storms suddenly come and give no warning, and destroy the work of a life-time in an hour. But such squalls are rare. And then the plucky young man cannot be wrecked by any ordinary gale. He is equal to the emergencies. We learn from the *Santa Rosa Democrat* that two well-dressed young men recently passed through that place en route to Mendocino county, where they intended to take up and pre-empt a homestead. Through no fault of theirs, but owing to dull times, they had been discharged from lucrative positions in San Francisco, and after seeking employment for a few days concluded to strike out and make a situation. This kind of pluck is sure to win in the struggle of life. It is safe to predict that within a few years these young men will be independent and prosperous, while the great majority of those who hang about large towns and cities, content to be book-keepers and clerks, will be dependent upon the caprice of employers and as helpless as a fish out of water if thrown out of employment. And yet, we regret to say, but few young men of the present generation are amply endowed with this kind of pluck and energy. Many of them prefer to be dudes and ladies' poodles, counter-jumpers and lackeys in the city than strong, independent and valiant men in the country, and verily, they have their reward.

AMERICAN GLASS MANUFACTURE.—An American glass manufacturer, who recently visited the principal factories in Europe, says he is convinced that Pittsburg is ahead of all the European centers of the glass industry. The large sale of foreign window glass in this country he attributed not to higher quality, but to lower prices, due to the low wages paid in Europe. The plate glass made in this country, he says, is superior in quality to French plate, and when enough factories are built in this country French importations will cease. America, he says, is far ahead of France and Belgium in the manufacture of novelties, as regards ingenuity of design, labor-saving machinery and cheap production.

At the Alameda Co. salt works, out of 20 different firms, only three are employing white labor. About 350 Chinese are employed and only 25 white men. The Chinamen receive \$1 a day and board themselves, while white men are paid \$25 a month with board. The largest number of white men employed by a single proprietor is 15, while 100 Chinamen are at work for the largest employer of Chinese. All the salt produced is shipped to this point and is sold through the regular trade.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.  
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Oct. 23, 1886.

## TABLE OF CONTENTS.

**EDITORIALS.**—The Mining Industry in California; The Lick Telescope Object-Glass; Copper Mines of Globe District, Arizona, 261. Passing Events; Cababa District, Arizona; Volcanic Dust; Suspension of Deep Mining, 254. Mining Accidents; Turn-In and Turn-Out Sluices; Con. California and Virginia, 265.

**ILLUSTRATIONS.**—Fig. 1.—Plan of Globe Mine, Arizona; Fig. 2.—Section of Globe Mine, 261. Fig. 1.—Turn-In Sluice at Head of Tunnel, Delaney Claim; Fig. 2.—Turn-Out Sluice Box, 265.

**CORRESPONDENCE.**—Cooke City, Montana, 262.

**MECHANICAL PROGRESS.**—Oil Circulation in a Loose Pulley; Speed of Machines; Steam vs. Water as a Power; Metal Saws; A New Process of Round Forgings; Machinery Not Labor-Saving; Stonecutting Machinery; Cement for Iron; Cheap Engineers; Testing Boilers, 266.

**SCIENTIFIC PROGRESS.**—Nature the Great Teacher; Weather Forecasts; Curious Illustration of the Flow of Metals; Effect of an Earthquake on the Ocean; An Electric Plant; The Aurora's Hight; Utilizing Sea-weed; The Telephone; Renewing Its Vigor, 266.

**USEFUL INFORMATION.**—Does Charring Timber Promote Durability; Tapping the Pine for Turpentine; Type-writing Ink; The Wax Process for Engraving; Buying a Hand-Saw, 267.

**GOOD HEALTH.**—Dr. Abernethy's Prescription for a Dyspeptic; Physic Tippling; Poisonous Plants; A Profitable Dental Practice; The Morning Bath; A Novel Industry; Duration of Infectiousness; Oatmeal for the Complexion; Precocity; Coffee Leaves, 267.

**MISCELLANEOUS.**—The Hunt Placer Mines, 262. California Names; Value of Mines; The Life of a Miner; Pluck and Energy, 263. Notices of Recent Patents, 267.

**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 268-69.

**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 272.

## Business Announcements.

Information Wanted.—G. A. Gellen, Vallejo, Cal.  
Civil Engineer.—W. A. Goodyear.

See Advertising Columns

## Passing Events.

Silver continues to hold its advanced price, with prospects of going still higher. The slight advance in copper is also another encouraging feature to miners. This metal has been depressed for a long time, and those engaged in working it are in hopes to see a marked advance.

A proposition is made by English capitalists to establish tin plate works on this coast. This will be a new article of manufacture here. The large quantity of tin packages now used by our fruit and fish canneries would make ready sale for all the plate made.

Arizona appears to be on the eve of experiencing a revival in mining affairs. The settlement of the Indian question, so long pending, will encourage immigration, and now that protection to life and property is assured many languishing districts will revive. There are plenty of mines in the region that would have yielded largely long since if they had been properly worked.

Snow has already come in some of the more mountainous mining regions, putting a stop for the present to prospecting operations.

STEAM COALS are in free supply, but house coals are not overabundant. The Northern coast mines are shipping freely to this market. The shipments of coal from Puget Sound ports in September were 32,660 tons, valued at \$114,310.

## Cababa District, Arizona.

Cababa district is about 20 miles east of Quijotoa and 50 miles west of Tucson, or about 10 miles from the Mexican boundary line. It is one of the oldest districts in Arizona, having been worked by the Mexicans some years before the Comstock was discovered in Nevada. Many of the mines have even been patented, but have not been worked for a long time.

We had a conversation this week with D. M. Hyde, a miner who owns claims in the district, and who is about to return there. He states there is a good road to the district and that there are many good claims there. The reason of the long inactivity which has prevailed has been the fear of Indians. It has not always been safe for men to work there. Now, however, that the Indian question has been settled and the hostiles removed, claim-owners are going back there to develop their prospects, so good times are expected this winter.

Water is rather scarce, though there is enough for general use. It is supposed that by sinking plenty will be found for a mill. There is an abundance of wood. The climate is fine and there is never any snow. There are very few miners there now, though a number are going in this winter. The ledges are large and some of the ore is very rich. Specimens from several claims have been shown us. That from the Mountain Lion runs \$500 per ton in silver. The Grand View has turned out some ore assaying from \$700 to \$800. The Hard Cash goes \$20 in gold and \$150 in silver. The Hard Cash vein is eight feet wide, with good walls, and about three feet of it ore. None of these locations are at present more than prospects.

Our informant is very sanguine concerning the future prospects of that portion of Arizona, but says they need reduction works badly. The miners have been sending little parcels of ore to Denver and to Pueblo, Col. From New Mexican reduction works they claim not to get such good returns. The country is now perfectly safe to prospect and to work in. Capitalists need no longer fear to invest in mining property in that region. People have been naturally frightened at the presence of the Indians, but now they are gone, there is no excuse for not going to work and developing the mines.

## Volcanic Dust.

The State Mining Bureau and the California Academy of Sciences have both received samples of the dust, or ashes, ejected by the more active volcanoes of Pabloff, situated west of Pabloff bay, Alaska. This volcano has been more or less active for years—perhaps for centuries; but on the 12th of August last put forth all its strength about 6 A. M. and sent cinders and ashes a wondrous distance skyward. Some of these were collected, and sent here. Wm. Atwood, who examined the specimens sent to the Mining Bureau, states that there are indications of some magnetic substance.

Captain John Ross, of the schooner *Unga*, was fishing off Unga settlement on the morning of the eruption, and saw what appeared to be a fast-rising thunderstorm to the westward; this was the more remarkable inasmuch as thunder is very rare in that region. Yet it was so like an electric-laden mass that neither the captain nor his companions doubted for a moment its aerial character; and to further convince them they heard a continuous rumbling between 7 and 8 o'clock, with several loud roars resembling distant claps of thunder.

The mass was slowly moving eastward, and at nine o'clock it was over and around the vessel, darkening the sky considerably, and so thick that they could not see the land, though but a mile off the shore. They expected rain, but none came, and the air remained crisp and dry. For a time they were at a loss how to account for the phenomenon. After awhile, however, some of the men would blink and shake their heads, and assume a questioning mien; then another, and another, until all hands were winking and sneezing. Finally, some one discerned minute particles resembling emery on his clothing, and they discovered the character of the "dry rain."

The sky began to clear about 2 P. M., and in the evening the air was clear and the sky bright. From where they lay at anchor, the volcano was distant about 65 miles. The captain has heard that ashes fell to the eastward, off, and on Kodiak island, in plenty.

## Suspension of Deep Mining.

The Situation and Outlook on the Comstock Lode.

In the last issue of the MINING AND SCIENTIFIC PRESS it was stated that the Combination Company was then holding under advisement a proposition to stop the pumps and suspend further prospecting on the lower levels of their mines on the Comstock lode, this being the only company, with two or three exceptions, that for some time past has been prosecuting such explorations along the line of that lode. Having finally come to a conclusion on this point, the company proceeded, on the 16th inst., to shut down the hydraulic pumps stationed on the 2400-foot level of the Combination shaft, through the action of which pumps the several mines represented by this company were drained to a depth of 3200 feet, the powerful Cornish pump on the surface having also, meantime, been stopped. Within 36 hours after this was done the water had risen to the 2400-foot level, filling the entire lower workings of these mines, including several miles of drifts, crosscuts, etc. While the water will continue to rise yet another 400 feet, its upward progress will hereafter be less rapid, it having now reached above the points of greatest influx.

Since these proceedings were taken by the Combination Company the Gould & Curry and the Best & Belcher Companies have ordered the stoppage of work on the Osbiston shaft, being sunk by them jointly. Although there had occurred no perceptible increase of water in this shaft, it was considered unsafe to continue sinking at a depth of 2500 feet with a body of hot water 500 feet high standing above and in such close proximity to the workmen. Hence the shutting down of this shaft, from which all movable material of value has been taken out in anticipation of its filling up with water to the same level as in the mines of their neighbors adjoining on the south.

What is known as the Combination Company consists of a union of the Chollar, the Hale and Norcross and the Savage Companies formed several years since for the purpose of putting down a deep drain shaft at their joint expense and for their joint benefit, the expense of keeping the pumps running in this shaft after it had been sunk having also been defrayed by these three companies jointly. The reason assigned by the former two companies for shutting down these pumps is that the Savage Company had declined to pay their quota of the expense required for keeping them going. Whether such declension was based on a lack of confidence in the outlook or a lack of funds we are not advised. Through the course adopted by the different companies mentioned there ensues an almost entire suspension of deep prospecting on the Comstock lode, nearly all of the other leading companies along it having heretofore given up this line of exploration, some of them several years since.

Such being the case, we are naturally led to inquire whether this movement means a final abandonment of deep workings on the great Washoe lode, as many incline to think, or whether such workings, more satisfactory arrangements between the several companies having been effected and conditions generally become more auspicious, are likely to be resumed, as an almost equal number of persons affect to believe. The truth is, opinion on this subject is much divided, the trustees and others officially connected with the companies most concerned appearing to take a less hopeful view of the future than is taken by the general public. These officials tell us that the shafts and other exploratory works in some of these mines approximate now a vertical depth of 3500 feet, the depth reached in several others exceeding 3000 feet. They tell us that for the last 1700 feet hardly any pay ore has been encountered, nor are the prospects in the lowest workings opened up at all encouraging, the little ore found there being of low grade and much scattered. Owing to the great depths reached and the steadily increasing quantity of water encountered, the cost of further sinking will be heavy, as will also be the cost of raising the ore, should they meet with any large bodies of it. Then, to pump out and rehabilitate these lower levels, after having allowed them to fill up with water, will be no easy matter, as the timbers, swelling, will be more or less warped and, perhaps, thrown out of place altogether, while the

ground, rendered soft and soggy, will be liable to cave, not to mention much other injury from this condition of things likely to ensue. They find some of the companies little inclined, if not averse, to contributing further toward the expense of pumping, while shareholders are so tired of paying assessments that the trustees cannot hope to much longer raise funds from this source to go on with; the foregoing aggregating a sum total of difficulties and discouragements that they fear will prove insurmountable.

Admitting the truth of what is here said about the difficulties to be encountered, there are those who incline to the opinion that deep sinking on the Comstock will again go on, adding in support of this view the fact that the companies, while discontinuing pumping, have failed to remove their pumps from the lower levels. Leaving these machines in place is construed to mean that these companies contemplate having use for them in the future, it being further argued that the bringing in of an additional supply of water can have no other end in view than its application to these hydraulic pumps. Some few there are who affect to think that this "shutting-down movement" is designed to alarm holders and thereby cause them to throw their shares on the market or let them be sold for assessments. As this class of stocks have not sensibly depreciated of late, there does not seem to be much weight in this argument. Shares in the Combination Companies appear to be widely distributed and held rather firmly.

There is a chance, too, that some of our Comstock barons may have a pride to sink a few hundred feet further on the great lode, and thus gain for the workings here the distinction of being the deepest of any vein mines in the world.

Again, some encouragement to persist in going down may be gained by consulting the history of the various *Veta Madres* of Mexico and other old mining countries, and from which it appears that the pay ores in these masterly lodes have never been entirely bottomed. Under the workings of centuries the ore in these mines has become so impoverished or reduced in quantity as to lead to their repeated abandonment; but they have as often been again resuscitated, and are nearly all being profitably worked to-day.

Both experience and science assign to these great ore channels an imperishable life. They are apt to go down preserving their proportions and carrying their ores through the sedimentary, the metamorphic and the primitive rocks, down probably clean through the outer crust of the earth. The Comstock lode is marked by all the features of fertility and permanence characteristic of the most powerful veins of other countries. Standing for the first thousand feet or more between the syenitic underlie of Mount Davidson and the Andesite country to the east, it takes at last, according to Prof. Becker, to the syenite altogether, cleaving it to indefinite and unknown depths.

The Comstock vein carries a true silver ore, noted for its purity and staying qualities. As is the case in the ancient and long-worked mines of Mexico and Peru, the ore here contains but little copper, lead, zinc or other base metal, nor does the percentage of these increase with depth, a feature by geologists considered favorable to the continued fertility of the veins that carry them; and, finally, should matters on the Comstock come to the worst, should this cessation of pumping result in the filling up and the absolute abandonment of the lower workings of the lode, there remains still ore enough above the 2000-foot level to keep all the mills in the vicinity profitably employed for many years to come. Not only so, but it is believed, by those most competent to judge, that there is enough ore of that kind to keep a considerable number of additional mills so employed, parties proceeding on this assumption having already adopted measures for largely increasing the ore-crushing capacity of the district. It is for this purpose, it is said, rather than for furnishing motive power for driving the hydraulic pumps placed in the deep, that the Virginia and Gold Hill Company is bringing in an additional water supply. Arrangements have, in fact, already been made by this company to furnish water for driving the stamps in a series of mills to be put up along Six-mile canyon, and at such intervals apart that this water, owing to the steep grade of the canyon, can be used many times



over, and under a head varying from 75 to 100 feet in each case.

In withdrawing their men from the lower levels, the several companies have already set some of them to work in the upper portions of the mines, extracting the ore there left behind in the days of bonanza; and it is expected that many more will in good time be put to work there. Should this come to pass it may yet turn out that the era of bonanza, with its more moderate but more steady and certain returns, will prove to the community at large, if not to the shareholders in these mines, more beneficial than the era of bonanza, with its fluctuations, excitements and anxieties, always so endangering and often so damaging to a great variety of interests. What most concerns the business public, and more especially the inhabitants of Virginia City and Gold Hill and other communities, more or less dependent on the output of these mines, is that the latter yield pay ore enough to keep a large labor force constantly employed. This, by reason of the expenditures required, will benefit these communities almost as much as if the mines were making for the shareholders the large net earnings of former years.

Whichever way we view it, the situation on the Comstock is by no means desperate, nor is the outlook such as should fill the resident inhabitants with alarm. That the towns in the vicinity of the great mother lode will be able to exist, and even hold their own, seems probable. That large requirements for machinery will continue and a large consumption of lumber, fuel and other supplies go on, is pretty certain. There will still be extensive demand for the products of the farmer, the stock-raiser and the lumberman. There will be, as always before, much work for the teamster, the wood-chopper and the charcoal-burner—in fact, employment for multitudes of men, though, perhaps, at wages slightly less than were formerly paid. Should, however, this be so, any reductions made will be fully offset by the lessened cost of living.

#### Mining Accidents.

On Saturday last Wm. Seavey was killed in the Pilgrim mine, Sierra county, by being struck on the head with a stick while removing wood from the bottom of a chute.

John Judge was killed in the Daly shaft, near Park City, last week. John Judge and James O'Connell were coming up on the cage from the 700-foot level on which stood a car containing several drills. As the cage went past the 700-foot level it suddenly stopped, as if it had caught on something, and the car was completely smashed. John Judge was caught between the cage and shaft, and, as supposed, instantly killed. From an examination after the accident it is supposed a drill, catching in the shaft, threw the car out of gear with Judge in it. O'Connell was hurt slightly about the leg.

Last Thursday, while a number of laborers were engaged in taking down the framework of the old Con. Virginia mill, at Virginia City, one man was killed and another seriously injured. Williams and Stacy were engaged in sawing off a main bent, while the laborers were pulling on another portion with tackles. The bent gave way and the men fell to the ground, about 25 feet. Stacy fell into the pit of the stone foundation formerly occupied by an engine and was instantly killed. Williams struck at the foot of the waste dump and had one leg broken near the thigh and one side of his skull fractured.

THE increase in the value of real estate in Santa Barbara during the last six months has been something remarkable. The ruling rates for desirable property is twice, and in many cases three times, what it was half a year ago, and the tendency is still upward.

THE San Francisco iron market is quiet, although there is a hopeful feeling owing to advances in the iron trade at the great manufacturing points on the Eastern coast.

THE Government printing presses are turning out 80,000 one-dollar silver certificates a day. The supply does not equal the demand.

#### Turn-in and Turn-out Sluices.

In continuing the subject of mining sluices from the last number of the PRESS, we have taken engravings from Mr. Bowie's work on "Hydraulic Mining in California" to show turn-in and turn-out sluices and their construction. Diagram 1 shows a turn-in sluice, adopted, after many experiments, at the Delaney claim, Patrickville, in this State. It was set with what is perhaps the sharpest curve that can be given for successful work to a sluice 4 feet wide and 32 inches deep, on a  $3\frac{1}{2}$ -inch grade to 16 feet.

The amount of water used was from 1000 to 1400 24-hour inches. The grade was light and dump for the tailings could be obtained only by means of direct connection with the Patrickville main sluice.

With any decrease of the radius the sluices

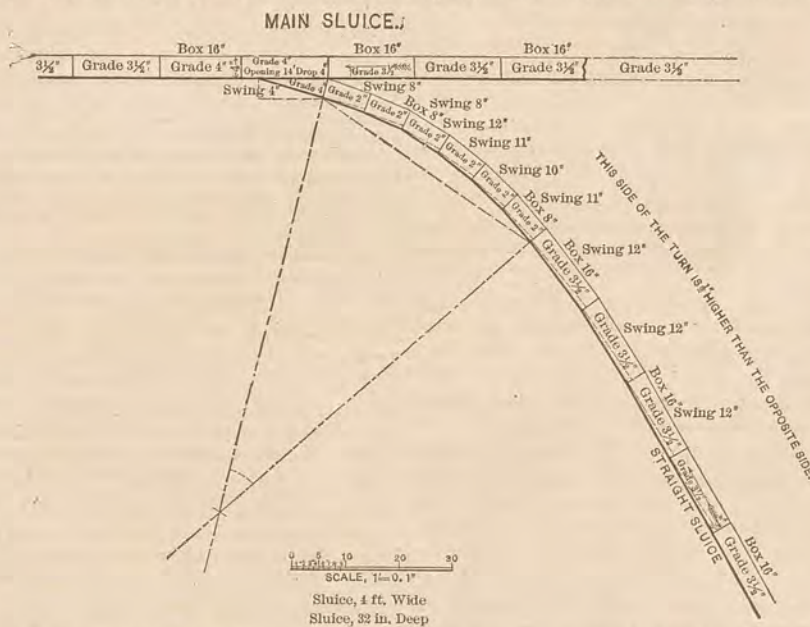


Fig. 1.—TURN-IN SLUICE AT HEAD OF TUNNEL, DELANEY CLAIM.

would not run uniformly, but would deposit tailings. The smallest radius of the curve having been ascertained by experiment, the next question that presented itself was: Would the main sluice carry the tailings discharged into it? As the main sluice was straight, and the general fall of the ground slight, an attempt was made to economize grade and run this sluice, with its original grade of 3 inches to 16 feet, below the junction, but the experiment was unsuccessful.

The main sluice was then taken up and a  $1\frac{1}{2}$ -inch drop was given from the turn-in sluice at the junction, and the first two boxes from this

The opening at the points of divergence was originally made 14 feet wide and a drop of  $1\frac{1}{2}$  inches given from the main sluice to the turn-out sluice, which latter was set on a "swing" of 4 inches to 16 feet.

The sluices thus constructed were found to run satisfactory, but on increasing the "swing" (as became necessary) to 5 inches the boxes on either side of the junction choked, only partially discharging the material, which difficulty could not be obviated by increasing the grade. On increasing the width of the discharge opening from the main sluice, which was gradually widened from 14 feet up to 24 feet, the sluices ran uninterruptedly and no further difficulty was experienced.

The first bottom box was cut in the form shown in Fig. 2—that is, from a point to full width; the succeeding half box of 8 feet was high on the outside, set with a slight increase in



Fig. 2.—TURN-OUT SLUICE BOX.

point were set on a grade of 4 inches to 16 feet, while the remaining boxes had a  $3\frac{1}{2}$ -inch grade to 10 feet. This improved matters, but material still accumulated in the main sluice at the junction and in the one box below. The turn-in sluice was then given a drop of 4 inches at the junction and the discharge opening was increased from 11 to 14 feet; the sluice then ran uniformly.

The outer course of the sluice was set a half-inch higher than the inner side. The boxes forming the curve were made in lengths of 8 feet each, and a grade of 2 inches given each box. The head of the sluice was straight, as well as the lower end below the junction.

The "turn-out" sluice is generally used when the dump-room is very limited. It is more difficult to operate on a light grade than a turn-in sluice.

At the La Grange Company's mines, in this State, the grades varied from  $2\frac{3}{4}$  inches to 4 inches per 16 feet, and the dump-room was very limited, necessitating many turn-out sluices and frequent sharp curves. As the dumps filled up the sluices were extended, and every available space was utilized which could be reached with a branch sluice.

across the main sluice. This concentrates discharge and prevents the forming of bars.

#### Con. California and Virginia.

The old Consolidated Virginia and California mines, now owned by one company, which paid immense dividends when in bonanza, are being worked vigorously still, but their yield is much diminished and they are paying no profit. It will surprise many, however, to know that they have produced \$1,297,881 during the last year, a sum that would be considered very large for an ordinary mine. It is true that no dividends have been paid, but this yield alone would give a reputation to many a mining camp. As a general thing, when we hear of bullion product we do not hear of expense account at the same time. During the past year the Consolidated California and Virginia Mining Company extracted and milled 98,834 tons of ore, producing \$1,297,881.81, of which \$659,647.81 was gold and \$638,234 was silver, the average yield being \$13.13 per ton.

The Jones lease was surrendered to the company on January 1, 1886, up to which date there was extracted from the mines and milled

under the terms thereof 10,369 tons of ore, yielding bullion of the assay value of \$184,742.67, of which \$74,276.13 was gold and \$110,466.50 in silver, being at the rate of \$17.81 per ton. According to the terms of the contract, this company received (at the rate of 50 cents per ton) the sum of \$5184.80 royalty on the above-mentioned amount extracted and milled.

Since the surrender of the Jones contract and the resumption of work by the company through the old Consolidated Virginia shaft, explorations have been carried on vigorously on the 1200, 1300, 1400 and 1500 levels, resulting in the discovery and extraction of large quantities of low-grade ore, being principally from portions of the old ore body left behind in former workings, lying to the south of the Consolidated Virginia shaft. There are still large quantities of low-grade ore in this portion of the mine, on the 1400, 1500 and 1600 levels, which may be extracted by proper management.

As showing what it costs to run such a big mine, some of the items of expense may be mentioned: Salaries and wages cost \$275,769; wood, \$50,141; timber and lumber, \$87,934; powder, caps and fuse, \$20,844; reduction of ores, \$603,789; Suto tunnel royalty, \$109,204; ice, \$7168; candles, \$7017; oils and lubricants, \$4268; drill fittings, \$4793; iron and hardware, \$4236; water rent, \$6150; assay office, \$11,492; taxes, \$5542. The whole disbursements aggregate \$1,243,682. The ore yield is stated above.

#### How Discount on Silver Works.

The Paradise Valley mine, Spring City, Mount Rose district, is one of the few profitable mines of Nevada, and has been paying dividends for some time. The last year has been marked for success, as has been demonstrated by the payment of dividends numbers six, seven and eight, aggregating \$60,000, with a surplus on hand of over \$20,000, sufficient to pay dividend number nine, of 20 cents per share.

The mill has run steadily for the past year. Total number of working hours, 8760; total number of hours run, 8475; number of hours lost for year, 285.

Total number of tons of ore milled, 6890; blanket tailings, 997; tons of ore and tailings milled, 7887; average battery assays of ore milled for year, \$54.37; average battery assay of blanket concentrations, \$53.51. The ore produced from the mines has aggregated 7631 tons.

The ore is concentrated and the concentrates shipped away to be worked. The concentrations produced last year were as follows: 13,308 sacks, 1,265,842 pounds; par value, \$361,624.29; cost of reduction at smelters and freight from Ogden to Argo on concentrations, \$27,526.97; discount on silver, \$77,580.82, total, \$105,107.79. Net proceeds of sales of concentrations, \$256,516.50; silver bullion produced, bar No. 141, net, \$1,105.84, bar No. 142, estimated, \$800, total, \$1,905.84. First-class ore produced and shipped without milling, 4360 sacks, 509,390 pounds, par value, \$66,733.69; cost of reduction at smelters and freight from Ogden to Argo, \$8284.24; discount on silver, \$14,640.56, total, \$22,924.80; net proceeds sale of first-class ore, \$43,808.79; total production for year, \$302,231.13.

The superintendent of the mine, J. V. McCurdy, in his annual report, has the following paragraph about the discount on silver and its influence on mining operations:

By the discount on silver we have suffered a loss of \$77,580.82 on the shipment of concentrations and \$14,680.56 on the shipment of ore, making a total loss by the discount on silver of \$92,221.38. This loss is deplorable, as it does not go toward benefiting any one who has been directly connected with it either in the labor of production, or who have risked their fortunes and spent years of their lives in search of the precious (but depreciated) metal, employing skilled labor, developing the resources of the country, assisting the manufacturer of the East as well as the West, and purchasing by means of the product of his toil all of the products of skilled labor, as well as the natural products of all parts of our continent, thereby furnishing a supply of money as well as employment to all classes of laborers, directly and indirectly. Instead of this it goes toward benefiting a few non-producers, who, for the sake of gain unto themselves (and a severe loss to the producer) keep silver depreciated and fluctuating in its market value, as a matter of a few shares of stock would be handled, and they rob the producer of his hard earned dollars. While lamenting this unquestionable fact, we trust that in the near future the masses will learn to understand the true state of affairs, and a remedy will be found for this crying evil.



## MECHANICAL PROGRESS.

## Oil Circulation in a Loose Pulley.

After every arrangement in the Babbitt metal line has proved a failure, and the bronzed bush with a space inside for an oil chamber is found to be of no use, a cast-iron sleeve perforated with a number of three-eighths of an inch holes and fitted loosely that the wheel may turn on the sleeve or together revolve on the shaft, is found to run cool without giving any trouble. A smooth, even surface has been the cause of heating in a great many cases, and it was only after the bearings were roughed out with a coarse file that they continued to run cool; but it will be noticed that the imperfect surface is always made in the bearing and not on the journal. It is to be supposed that the load on a shaft is to be evenly distributed over the bearing, to work in the best condition and avoid the inequality of pressure that might bring an injurious strain on some portions of the bearing, and by causing a roughness to be left on the bearing surface would be contrary to the first elements of the best working conditions. But these narrow, imperfect grooves are, no doubt, when oil is plenty, the means of providing an even pressure over the bearing surface of the journal, and keeping the surfaces in contact well lubricated. It has been found that by drilling a hole in the bearing where the most intense pressure is found, the oil is ground into the cavity faster than it is drawn out; in other words, the oil has better means of passing down on the receiving side of the bearing where the space is continually growing smaller till it enters the drilled hole, than it has in finding its way out, creating a pressure of a number of pounds to the square inch, the tendency of which, it will be easy to see, is to assist in supporting the shaft. If three oil cups are needed to keep a pulley with a perforated sleeve well lubricated, there may be, and no doubt is, a partial support to be derived by the overflowing of the perforations with oil; but a far greater advantage is derived from the benefit that every portion where the load on the shaft is brought to bear has a reservoir of oil close by to draw from and not to be deprived, as in a smooth and accurately-fitted box, where the particles of lubrication are wiped entirely away before they reach the place where all the friction is found.—*Boston Journal of Commerce.*

**SPEED OF MACHINES.**—A very simple way of getting at the speed of any machine you are about to start, and which has an intermediate or counter-shaft, is to draw a perpendicular line, and put the speed of line shaft and all sizes of the drivers on the left-hand side of the line. Then put all the sizes of the driven pulleys, with X for the required speed, on the other side of the line. Thus: Take the speed of a line shaft at 300, which has a pulley 20 inches in diameter, driving tight and loose pulleys on a counter-shaft which is 10 inches in diameter. This counter-shaft has a pulley 18 inches in diameter driving a cutter-head whose pulley is three inches in diameter. What is the speed of the cutter-head? By putting the figures representing the driving speed and all the drivers on one side, and all the driven on the other, and working by cancellation, we find that the required speed of the cutter-head is 3600, thus:

$$\frac{300 \times 20 \times 18}{10 \times 3 \times X} = 3600$$

This same rule is equally handy for the determination of the size of any drivers or driven pulleys, driving or driven speed. It is a simple and direct method, and it is accurate and quickly learned. It beats guessing all to pieces.—*Dominion Mechanical News.*

**STEAM VS. WATER AS A POWER.**—The motive power for the industries of the United States is yearly becoming more dependent on the economical utilization of steam and fuel. The water power of the older sections of the country is well developed toward its full capacity, and where this is not the case, its inaccessibility to manufacturing purposes renders inoperative the employment of steam. There are probably, to-day, in the United States as many as 70,000 stationary engines, furnishing 2,500,000 horse power; and we think we are not far out of the way in the statement that 70 per cent of the motive power of the States is obtained from steam. Sixteen years ago the supremacy of steam power was but two per cent more than half the total power required for the industrial enterprises of the country. The iron and steel manufacturing industry depends almost exclusively on steam power, and the lumber trade is chiefly devoted to this kind of motive agency. The greatest increase in the percentage of steam power has been, for the last 10 or 12 years in the textile manufacturing establishments, from necessity and not from choice.

**METAL SAWS.**—A German firm are referred to by the London *Ironmonger* as sending out some specimens of their diamond steel saws for metal-cutting, which, they claim, unite thorough pliability of blade with the highest degree of hardness. The makers point out that metal saws hitherto in use which possessed the necessary hardness could not be produced, in consequence of their brittleness, of less thickness than one-twelfth inch. Thinner saws being only blue-tempered, the teeth wear down

in a very short time, and are also very liable to break. Hartmann & Co.'s diamond steel saw being hardened on a new principle enables the blades to be produced as thin as one-twenty-fourth inch, with teeth which can hardly be broken with fair usage upon any kind of work. The saws are supplied in lengths of 11, 11½ and 12 inches, and in packets of not less than one dozen.

**A NEW PROCESS OF ROUND FORGINGS.**—Mr. George H. Simonds, of Fitchburg, Mass., has invented a machine for the purpose of forging iron or steel in any form which can be turned. This involves an entirely new method of working iron. Instead of being hammered or rolled to the desired form, the mass of red-hot metal is placed in a groove in two plates which are moved in reverse directions; the grooves are in primitive form at the places where the iron first enters between the plates, and along its course these grooves become more closely in conformity to the shape which is given to the finished piece, which is twisted into shape. The process is applied with success to the manufacture of conical shot, forged out of steel, the British Government having given an order for 500,000 shot, which are being made by the English representative. This process is applied to the manufacture of any small iron or steel pieces of turned form.

**MACHINERY NOT LABOR-SAVING.**—Machinery is not labor-saving, remarks a cotemporary. The man who works with a thrashing machine works as hard as his grandfather did with a flail, but he produces greater results. To those who think only of the price of wages, machinery is a fraud, but to the consumer of manufactured articles it is a boon. Our mothers used to card their own wool, spin and weave it and wear it, and it is no disparagement to our wives and sweethearts that they do not. They can't afford to. If it were not too expensive the present race of girls and women would do this, and more too. Machinery has not obviated the necessity of work; it has only given it a new direction. Good machinery is a good thing, but a man who expects it to do his work will be misled; it helps him to do more work.

**STONECUTTING MACHINERY.**—Among the inventions that have recently been patented we notice that stonecutting by machinery has received some attention. It has been a difficult task for inventors to contrive some way to operate on a block of granite so as to leave a true even surface without breaking down the edges, and more especially the destroying of the edges of the cutting tool. Nothing as yet has stood up to the work equal to the cold chisel and hammer unless it is the soft iron band sharpened up with the grit of quartz sand. A Boston stonecutter has been trying his hand at ornamental stonework and finds no difficulty in cutting out some of the finest designs by rocking a figured die in contact with the object with a layer of attritious substance between them.

**CEMENT FOR IRON.**—A correspondent of the *English Mechanic* says that he used the following recipe with the greatest success for the cementing of iron railing tops, iron gratings to stoves, etc., and with such effect as to resist the blows of a sledge hammer: Take equal parts of sulphur and white lead, with about a sixth of borax; incorporate the three so as to form one homogeneous mass. When going to apply it, wet it with strong sulphuric acid, and place a thin layer of it between the two pieces of iron, which should then be pressed together. In five days it will be perfectly dry, all traces of the cement having vanished, and the iron will have the appearance of having been welded together.

**CHEAP ENGINEERS.**—The tendency to employ cheap engineers is, no doubt, a fruitful cause of disaster, and under careless management the best boiler may be ruined in a week or less. The desire for excessive pressures, especially on boilers that have been some years in use, and that are not of sufficient capacity for the work required, is another fruitful source of disaster. Steam users in many cases forget that with the enlargement of their works for increased production they should add correspondingly to their boiler power. They often try to provide for this increase of product by ordering their engineers to increase the pressure on the boilers. This is all wrong, and it invites disaster.—*Boston Commercial Bulletin.*

**TESTING BOILERS.**—It is customary with some mechanics to test new boilers, or old ones which have undergone repairs, by simply subjecting them to a high steam pressure. Why any intelligent person should do this passes our comprehension. If a boiler is known to be strong enough to sustain a certain pressure, there is no earthly reason to subject it to that pressure. If, it is not absolutely certain that it will safely sustain any given pressure, then it is the height of folly, and it incurs a risk that no man can afford to take, to apply that pressure in such a manner that, in the event of the boiler not proving strong enough to sustain it, an explosion will inevitably occur.—*American Miller.*

**SODA WATER.** not the drug-store article, but washing soda dissolved in water, it is said, will effectually cool any hot box.

## SCIENTIFIC PROGRESS.

## Nature the Great Teacher.

Rev. J. G. Wood, in his new book, "Nature's Teachings," has discussed a subject not before handled at length. The object is to show how man's implements and mechanical devices have been anticipated in Nature. He asserts that there is no invention of man which was not anticipated by Nature; that all his mechanical devices have been used in Nature for countless ages. He claims that the great discoverers of the future will be those who carefully study the natural world.

The Burr-stones of mills are a copy of molar teeth. The hoofs of a horse are made of parallel plates like a carriage spring. The finest file made by man is a rough affair when compared with the Dutch rush used by cabinet-makers. The jaws of the turtle and tortoise are natural scissors. Rodents have chisel teeth, and hippopotami have adz teeth, which are constantly repaired as they are worn. The carpenter's plane is anticipated by the jaws of a bee. The woodpecker has a powerful little hammer. The diving-bell only imitates the work of the water-spider. This insect, although as easily drowned as any other, spends a great part of its life under water. Having constructed a small cell under the water, it claps a bubble of air between its last pair of legs and dives down to the entrance of its cell, into which the bubble is put. A proportionate amount of water is thus displaced, and when all of it is expelled the little animal takes up its abode in this sub-aqueous retreat.

In laying its eggs on the water, the gnat combines them in a mass shaped somewhat like a life-boat. It is impossible to sink it without tearing it to pieces. The iron mast of a modern ship is strengthened by deep ribs running along its interior. A porcupine quill is strengthened by similar ribs. When engineers found that hollow beams were stronger than solid ones, they only discovered a principle which had been used in nature for centuries before the creation of man. A wheat straw, if solid, could not support a heavy head. The bones of the higher animals, if solid, would have to be a great deal heavier to bear the weight which they have to support. The framework of a ship resembles the skeleton of a herring, and he who would improve aerial navigation might study the skeleton of a bird with advantage. Palissy made a careful study of the shells by the seaside, in order to learn the best method of fortifying a town.

The ship-worm feeds on wood, and gradually tunnels its way through any submerged timber. It also lines its burrow with a hard, shelly coating. Brunel, taking a hint from this, was the first to succeed in sub-aquatic tunneling. The Eddystone lighthouse is built on the plan of a tree-trunk, and fastened to the rock in a manner somewhat similar to the way a tree is fastened to the soil. It is supposed that the first idea of a suspension bridge was suggested by the creepers of a tropical forest.

Mr. Wood gives an interesting account of the origin of the plan for the Crystal Palace. Mr. Paxton, a gardener, having noticed the structure of the great leaves of the Victoria Regia, a plant which had been introduced into England a few years previous, struck the plan of copying in iron the ribs of the leaf and filling the remaining space, which corresponds to the cellular portions of the leaf, with glass. Thus, by copying nature, an obscure gardener became Sir Joseph Paxton, the great architect.—*Wilmington Collegian.*

**WEATHER FORECASTS.**—Dr. Lonie, of St. Andrews, has lately drawn attention to some of the leading facts connected with the science of "weather forecasts" and with the theory of circular storms. He states that a strict examination of the records of the weather in the Greenwich observatory has conclusively proved that predictions based on the moon's changes are delusive. The same results have been shown from records kept for long periods of time in this city and in Philadelphia. But in the matter of sun-spots the case is different. There is a remarkable concurrence of scientific opinion that the 11½ years' cycle of their recurrences leads to increased solar radiation, of which we have our share in the form of increased evaporation and rainfall, and consequent development of cyclonic and magnetic storms. According to Dr. L., we are now approaching a period of maximum sun-spots, during which we may expect an unusual amount of rainy weather. Such a law, if once established, would prove to be an important means of weather-forecasting over long periods, and, looking backward over the more remarkable weather events of the century, Dr. Lonie finds two witnesses equally for its truth and its value. It has been remarked that a mild winter in Europe often corresponds to a severe one in Asia and America, and that a mild winter in America corresponds to a cold one in Europe. A severe drought nearly destroyed the crops of Europe in 1846, while America had an abundant harvest.

**CURIOS ILLUSTRATION OF THE FLOW OF METALS.**—The flow of metals is illustrated very curiously, says the London *Engineer*, in one phase of Japanese art metal work, of which, however, it is quite difficult to obtain native examples. In its preparation thin layers of copper, precious metals and various alloys are soldered in superposition like the leaves of a

book. Through these layers holes are drilled to various depths in the thickness of the metal, or trenches are cut in it. The mass is then hammered flat until the holes or trenches disappear, and the result is contorted bands of some complexity, possessing much beauty, especially when the color of the metal is developed by suitable chemical treatment and polishing. A similar effect may be produced by beating up the metal from one side and filling the other flat.

**EFFECT OF AN EARTHQUAKE ON THE OCEAN.**—The chief effect of an earthquake on the ocean is the raising of a great sea wave, sometimes very large, e. g., 60 feet high at Lisbon (1761); 80 feet at Callao (1724); 210 feet at Lupaika (1737). These waves are often more destructive on land than the actual shocks; the influx is usually preceded by an outflow, which, in fact, acts as a warning. One of the most remarkable effects is the distance to which these waves are propagated as "great waves," e. g., right across the Pacific. Thus most large earthquakes on the east and west coast of the Pacific produce waves which are recorded on the opposite coast about 24 hours after. As to prediction of earthquakes, nothing certain is yet known. In many cases there are noticeable changes in springs and wells preceding earthquakes. One useful warning is, however, obviously possible, viz., the report of an actual earthquake on one side of the Pacific Coast could be at once telegraphed to the other side, thus giving 24 hours' warning of the probable advent of a great sea wave.

**AN ELECTRIC PLANT.**—Phytolacca electrica is the name given to a plant which possesses strongly marked electro-magnetic properties. In breaking a twig the hand receives a shock that resembles the sensation produced by an inducting coil. Experiments made on this plant, says the New York *Medical Times*, showed that a small compass was affected by it at a distance of about 20 feet. On a near approach the needle vibrated, and finally began to revolve quite rapidly. The phenomenon was repeated in a reverse order on receding from the plant. It is said that no birds or insects are ever seen on or about this plant. The soil where it grew contained no magnetic metal like iron, cobalt or nickel, and it is evident the plant itself possesses this electrical property.

**THE AURORA'S HEIGHT.**—Many attempts have been made to fix the height of the aurora borealis, but the estimates have given a discouragingly wide range of figures. The aurora has been observed when it seemed to rest on the earth's surface, and at other times has appeared simultaneously at stations so widely separated that it has been supposed to be 200 or 300 miles high. In experiments with his powerful voltaic battery, practical demonstrations of the effects of electrical discharges in rarefied air were made by Dr. De la Rue. These forced him to the conclusion that 38 miles is probably the height at which the most brilliant auroras take place, that a pale and faint glow may possibly be produced as high even as 82 miles, but that at a height of 124 miles no aurora discharge is possible.

**UTILIZING SEA-WEED.**—An English chemist has found a way for turning to account the practically illimitable quantity of sea-weed that the ocean supplies, or at least as much of it as may be desired. He boils the weed with carbonate of soda, and treats the filtered solution with sulphuric acid, obtaining from it in this manner a substance that has more viscosity than starch, or even gum arabic, and that can be profitably employed in stiffening various textile fabrics. It is also said to be excellently adapted for the making of syrups and for certain culinary uses. From the cellular and fibrous matter left after the extraction of that material—to which he has given the name of "algina"—a very good quality of writing paper can be cheaply made.

**THE TELEPHONE.**—Every one who has used the telephone much knows how troublesome "cross talk" is at times. Indeed, in lines not more than 10 miles in extent, if there be parallel wires, a good, clear service is not to be thought of. In this regard, a curious discovery was recently made by one of the speakers at the recent convention. He says that when it is found impossible to work two parallel wires at the same time, if those using one of them will speak German or any other foreign tongue, while those in the other are speaking English, they will have no trouble in making themselves understood.

**RENEWING ITS VIGOR.**—Vesuvius furnishes an example of a volcano whose activity has been increasing instead of diminishing during the last 2000 years. At the beginning of the Christian era the mountain's fires seemed to have been long burned out forever, and the eruption which buried Pompeii and Herculaneum in the year 79 was the first known. The next outbreak was not until 1036, and thereafter several came at intervals of a century or more, but since 1631 the eruptions have been very numerous.

**GERMAN EXPERTS** say that Schleimann's excavations in Greece have revealed a wealth of material for designers in woolen goods. The ancient patterns reproduced in modern fabrics would have a charming effect.



## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

**NIPPERS FOR PILE-DRIVERS.**—Henry Von der Wulbecke, Arcata, Humboldt county. No. 350,223. Dated Oct. 5, 1886. The invention relates to that class of nippers which are used on pile-drivers for engaging the weight or hammer, whereby it may be elevated and again released, so that it may drop upon the pile. The invention consists in the novel construction and arrangement of the opposing spring, actuated jaws or hooks, and the means for relieving them of their engagement, together with peculiar cushions for the nipper-head.

**SEPARATOR AND CLEANER.**—Alfred Swingle, S. F. No. 350,171. Dated Oct. 5, 1886. This is a machine which is to be employed in separating or cleaning peas, beans, almonds, etc., after being shelled. It consists of a box or drum revolving upon a horizontal axis and adapted to receive the shelled peas or other articles in its interior, screening material for separating the larger from the smaller articles or cleaning them from dust or lighter waste matter, and a peculiar cam with its adjuncts whereby a longitudinal shaking motion may be given to said drum or box.

**DERRICK.**—George Rounds, Vallejo. No. 350,213. Dated Oct. 5, 1886. This derrick consists of three standards or legs, two of which are united permanently at their tops and are hinged to the bed or frame at their feet, and the third of which is hinged at its foot and has its top fitted between and guided by the other two, and in a block-and-tackle mechanism by which the legs are raised and lowered, with limiting stops for the lower leg. The object is to provide a derrick which is simple and cheap in construction, and so arranged that it can be readily raised and lowered with but the exercise of a small amount of power.

**GREASETRAP.**—Chas. H. Ackerson, S. F. No. 350,181. Dated Oct. 5, 1886. The usual construction of grease-traps provides for the rising of the grease to the surface where it may be collected, while the water may pass off through the lower part of the apparatus; but in practice this is found defective, because much of the grease becomes mixed with heavy dirt and sediment which will carry it to the bottom, so that it will escape through the passages with the water and in time clog them. Mr. Ackerson's invention is designed to provide receptacles for the grease, above and below which the water is allowed to escape through intermediate passages in the diaphragm.

**FURNITURE-SUPPORT.**—Chas. M. Plum, S. F. No. 350,390. Dated Oct. 5, 1886. This invention relates to a device which is especially useful for the support of certain articles of furniture when not set up for actual use, such as the head and footboards of bedsteads. It consists of a narrow board or plate, having latches or hooks on each edge, so that it may be introduced between the head and footboard, the latches entering the openings which are ordinarily employed for holding the side rails in place when the bedstead is set up, and in connection with this is employed a support with casters, upon which the head and footboard may rest, close together but just out of contact. This device is useful while furniture is being manufactured, when on exhibition, for sale in stores and during transportation.

**OVERPRODUCTION.**—In former years, when all the world bought its iron of England, there was no necessity for restricting production. Under that favorable state of the trade there grew up in the minds of English economists the idea that it was wrong and unprofitable to form combinations for the purpose of regulating production or prices. During recent years, however, other countries have greatly increased their production of iron, and the result is that the iron-producing countries of the world have capacity to produce more iron than the world consumes. This has made it necessary to keep a part of the producing capacity idle. But while this necessity has been acknowledged, and made painfully manifest by increasing stocks and decreasing prices, the necessity has not at all times been made the basis of action, each company feeling that it had as good a right to its share of the trade as any of the other companies, and would not lessen production unless the others would. This has forced combined action, and has led to a very perceptible change in the views of the economists of England upon the subject. It is true the most of them still keep up a show of adherence to the former belief, but it is done in such a way that they may be classed with the man who was "in favor of the Maine liquor law but agin its enforcement."—*Ex.*

MUCH work in the mining-machinery line, which used to be done in San Francisco for Arizona and Montana, has been cut off, because of the construction of railroad lines through these districts, by means of which Eastern manufacturers are placed at an advantage over local manufacturers. In consequence of all this the outlook for the trade here is not good, competition is keen, work slack and prices unsatisfactory.

## USEFUL INFORMATION.

## Does Charring Timber Promote Durability?

The general belief has long been that it does, and in accordance with this conviction the practice has been widely followed. But a contrary view of the subject is taken by *Wood and Iron*. That journal says, in a recent issue: As charcoal would endure for ages in places where timber would decay speedily, the practice of charring the surface of fence posts and other timber has been repeatedly recommended in books and ephemeral publications as eminently worthy of universal adoption.

The theory upon which such a recommendation is based would seem to warrant a confident expectation of satisfactory results in practice, but repeated experiments with charred timber have furnished conclusive assurance that this process will not promote its durability. Indeed, numerous experiments have shown that charring promotes premature decay. Two posts split from the same log may be set side by side in the ground, the surface of one being charred and the other not, and it will be seen that the charred post will perish before the other.

The same is true of railroad ties and all such timber as may be exposed to the alternating influences of wet and heat. Could the entire timber be changed from its perishable condition to one solid piece of charcoal, the durability would be promoted to a surprising length of time, but the strength of the material would be destroyed. When fence posts or other sticks of timber are exposed to the rapid action of wet and heat, the surface will decay first. One might suppose, therefore, that when timber is enveloped by a layer of charcoal the durability of the entire piece would be greatly promoted, and such would be the case were it not for the fact that the charcoal is not impervious to water; and as water reaches the timber below the charred surface, decay will commence soon after the grain of the wood has been exposed to the influences of the weather. When the change has once begun beneath the charred surface the durable covering of coal will be of no service whatever in preserving any portion of the wood. Taking this practical view of the subject, it will be perceived that if only half an inch of the outside of a post be charred the post will not endure so long as if the same thickness of wood had been left uncharred to waste away by slow decay.

**TAPPING THE PINE FOR TURPENTINE.**—The *Northwestern Lumberman* remarks that the extent to which tapping a yellow pine tree injures the timber is a question that has not been decided. There are men who assert that lumber produced from the timber cut in a turpentine district is not so good as that from trees which were never boxed, yet how little these men know about it is shown by the fact that if the two kinds of lumber be laid side by side they are unable, oftener than otherwise, to tell which is which. Government contracts for yellow pine specify that it must be unboxed, but it is an open secret that Government timber-inspectors cannot detect the difference, and as a result the contractor is not particular to follow the instructions of the document by which he is supposed to be guided. The absence of pitch in the wood is generally supposed to be evidence that the tree was tapped. The evidence is misleading, however, for tapped timber is sometimes full of pitch. The subject is one which theoretically has caused some commotion, but which practically, so far as we have observed, is of less importance than has been ascribed to it by many.

**TYPE-WRITING INK.**—The ink that is used in inking the indelible ribbon in type-writers, which writes black but copies a very dark blue, is made as follows: Take vaseline of high boiling point, melt it on a water bath or slow fire, and incorporate by constant stirring as much Prussian blue as it will take up without becoming granular. Remove the mixture from the fire, and while it is cooling mix equal parts of petroleum, benzine and rectified oil of turpentine, in which dissolve the fatty ink, introduced in small quantities by constant agitation. The volatile solvents should be in such quantity that the fluid ink is of the consistency of fresh oil paint. One secret of success lies in the proper application of the ink to the ribbon. Wind the ribbon on a piece of cardboard, spread on a table several layers of newspapers, then unwind the ribbon in such lengths as may be most convenient, and lay it flat on the paper. Apply the ink, after agitation, by means of a soft brush, and rub it well into the interstices of the ribbon with a stiff tooth-brush. Hardly any ink should remain visible on the surface.

**THE WAX PROCESS FOR ENGRAVING.**—By means of the new and ingenious little instrument known as the hyalolypotype, or hot pen, drawings can be made on glass or glossy substances with a waxy composition, which is solid and somewhat hard at ordinary temperatures. The pen is so contrived that it can be heated by either gas or an electric current, and the waxy material flows easily from the heated pen, setting so quickly on the glass that cross-hatching can be done more rapidly than with ordinary pen and ink, without risk of blocking up the angles; corrections, too, can be made

with the greatest ease by means of a penknife, which leaves the surface afterward intact. After the drawing has been made, the plate is etched by fluorid acid, and when it is complete it can be either electrotyped, stereotyped, used direct or applied to any purpose for which engraved surfaces are applied.

**WHEN FILING HAND-SAWS** there are two objects to be kept in view—namely, cutting off the fiber of the wood, and removing it as fast as it is severed. If the teeth be filed too fleaming, they will cut faster than they will remove the sawdust. On the contrary, if the faces near the points be not dressed fleaming enough, the saw will tear out the kerf in a rough manner, rather than cut its way through the timber. When you are filing a saw and the file gets gummed up, don't try to work with it so, or throw it one side and get a new one. If you have no card to clean the file, take a piece of pine wood three-fourths inch square by three or four inches long. Rest one end of the file upon the bench: with the little stick strike the file nearly edgewise with the square corner of the stick, following the slant of the teeth. This will clean a file nicely and without causing half the wear that a card would. A little practice would enable you to clean a file in half the time it would take you to hunt up a card-cleaner.

**BUYING A HAND-SAW.**—Stiff blades are made of better material than thick ones, and are less liable to "buckle" or "twist," and are not so apt to break. They require less set, will stand an edge longer, and are not so tiresome to work. They should be hung in plain beech handles with rivets flush or countersunk. The blade should be of dark color and have a clear, bell-like ring when struck with the ball of the finger. Blades of a light, iron-gray color are not so good. Never take a saw that jars or trembles in the handle. The first point is to grasp it by the handle and see that it hangs right and that the handle fits the hand properly. Then try the blade, by springing it, and see that it bends regular and even from point to butt. See that it has a good crowning breast. Hold it at a distance and get a proper light to shine on the blade, and you will see if there is any imperfection in grinding and hammering.

It is estimated that the United States produces enough lumber each year to load 1,428,581 railroad cars, each averaging 7000 feet. This would make a train 8500 miles long, or about one-third around the globe.

## GOOD HEALTH.

**DR. ABERNETHY'S PRESCRIPTION FOR A DYSPEPTIC.**—General John A. Dix was at one time the unhappy victim of dyspepsia. After seeking in vain for relief, he was at length led to consult the famous Dr. Abernethy. After listening impatiently to his story, Abernethy interrupted him with these words: "Sir, you are pretty far gone, and the wonder is that you are not gone entirely. If you had consulted common sense instead of the medical faculty, you would probably have been well years ago. I can say nothing to you excepting this: You must take regular exercise, as much as you can bear without fatigue, as little medicine as possible, of the simplest kind, and this only when absolutely necessary, and a moderate quantity of plain food, of the quality which you find by experience best to agree with you. No man, not even a physician, can prescribe diet for another. 'A stomach is a stomach,' and it is impossible for any one to reason with safety from his own to that of any other person. There are a few general rules which any man of common sense may learn in a week, such as this: That rich food, high seasoning, etc., are injurious. I can say no more to you, sir; you must go and cure yourself." It is needless to say that General Dix was rewarded by restored health and a good old age.

**PHYSIC TIPPING.**—The vice of physic tipping, remarks a cotemporary, is spreading with alarming rapidity, and the medicine-bibber who indulges constantly in all sorts of doses, on his own diagnosis and prescription, is found everywhere nowadays. Even the soda-water fountains have been diverted from their legitimate function to that of supplying these unfortunates with powerful tinctures, potassium and sodium bromide, chloral-hydrate, bromal-caffeine, aromatic spirits of ammonia and deleterious "nerve foods"—such drugs, in short, as are best calculated, when habitually used, to destroy the physical health and upset the mind. The increase in the demand for those medicaments which act specifically upon the nervous system has been especially marked. The consumption of chloral and the bromides, but little known 15 years ago, now amounts annually to hundreds of tons. The habitual employment of insanity-producing drugs, disguised as "nerve foods" or otherwise, is becoming decidedly fashionable, so that one cannot help wondering, if it requires so many sedatives and stimulants to keep this generation at the proper level, what will become of humanity in the 20th century.

**POISONOUS PLANTS.**—It is very important for people to know which plants are poisonous and dangerous. One of the most popular groups of plants is the buttercup, but many of these are

sufficiently acrid to produce blisters when applied to the skin. The poisonous sumac is probably the most dangerous of all our native plants which poison through contact. Avoid all sumac which has not red berries, and you will be safe from poison. The common horse-chestnut is used in Europe as food for horses and cattle, and yet the small horse-chestnut of the South, "Buckeye," is claimed to be poisonous. The laburnum or gold chain, a common garden plant, has roots that taste like licorice and which thus tempt children to chew it. It is, however, a dangerous poison to eat. Water hemlock, fox-glove or digitalis, aconite, Jamestown weed or stramonium, common poke weed, skunk cabbage, poison ivy, and various other common weeds or shrubs, including some mushrooms, are rankly poisonous and should be avoided.

**A PROFITABLE DENTAL PRACTICE.**—The enormous wealth of the famous Parisian dentist Evans—not less than \$10,000,000 he is said to be worth—has been acquired not so much in the course of his regular practice as from the huge fees given him by distinguished personages in various parts of Europe who request his services from time to time. Thus he is always flying about from capital to capital, pulling a tooth from one crowned head and filling a "cavity" in another, of course receiving in such cases an emolument proportionate to the dignity of his patients. The jaws of half the nobility on the continent are kept in order by Dentist Evans, and the decorations he wears sufficiently attest their appreciation of his professional skill. It is said that he is the most decorated man in Europe. Ribbons and crosses cover him from head to foot, and many of them are of such great importance that they give him a quasi position upon which even dukes and princes can hardly look down.

**THE MORNING BATH.**—The cold or tepid sponge-bath, taken in the morning before breakfast, with friction to make the skin red, is one of the most health-giving actions we know. It promotes healthy circulation to the skin and all organs of the body, and keeps them in good condition and healthy in appearance. Some persons cannot indulge in such a "morning tub," by reason of peculiarity of constitution or from liver affections, and are unable to take the bath quite cold. It should, then, have just the chill taken off, but the skin should, in all instances, immediately after the bath, be thoroughly dried and rubbed with a coarse linen towel. No soap is used to this bath, and it is a good plan to have a warm bath about the temperature of 92° F. once a week. The brain is invigorated by the bath from the healthful stimulation of the nerves. If the person is not very strong, and the reaction is not perfect, a glass of very hot water taken after the bath will prevent a chill.

**A NOVEL INDUSTRY.**—Few persons on visiting a museum consider that such objects as skeletons require a certain fitting for exhibition. Yet the preparation of skeletons for the market constitutes a distinct industry, to which a large manufactory in the suburbs of Paris is devoted. Corpses are supplied from dissecting rooms and hospitals. On its delivery the raw material is boiled for days in a caldron, and the grease which rises to the surface is skimmed off and sold. The bones are carefully cleaned and bleached in the sun, and finally assorted and converted into articulated skeletons. The preparation of frogs, lizards, and various reptiles occupies a separate department.

**DURATION OF INFECTIOUSNESS.**—The duration of the infectious stages of various diseases is thus given by Dr. T. F. Pearce, an English physician: Measles from the second day of the disease, for three weeks; small-pox from the first day, for four weeks; scarlet fever from the fourth day, for seven weeks; mumps from the second day, for three weeks; diphtheria from the first day, for three weeks. The incubation periods, or intervals occurring between exposures to infection and the first symptoms, are as follows: Whooping cough, 14 days; mumps, 18 days; measles, 10 days; small-pox, 12 days; scarlet fever, three days; diphtheria, 14 days.

**OATMEAL FOR THE COMPLEXION.**—It would not be easy to find handsomer women anywhere than the oatmeal-eaters of Edinburgh, and the only ladies who equal them in rosy health and classic beauty of figure, so far as has been observed, are found in the interior districts of Ireland. Oatmeal would seem to have something to do with it, and every one may remember the reply of the Scotchman to the taunt of Dr. Johnson that the horses in England ate the same kind of meal as the men in Scotland. "Ah!" said Scotchie, "but such horses and such men!"

**PRECOCITY.**—Precocity is the too early unfolding of the higher faculties of the mind. For instance, the love of sport and play in a child would not indicate precocity; but a dislike of sport, and a love of arts, sciences and subjects proper for adults, would. Precocity is generally at the expense of physical development.

**COFFEE LEAVES.**—In coffee-growing countries an infusion of the leaves of the tree is held by many to be superior to the infusion of the berry. The probable value of the dried coffee leaves as an article of commerce has been suggested.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**SUTTER CREEK.**—Cor. Amador Ledger, Oct. 16: Work on the Mahoney tunnel is progressing satisfactorily. There remains a distance of about 150 feet to be tunneled, when, in all probability, everything will be in readiness for the starting up of the mill. The Mahoney mill will be used, as I was misinformed last week as to there being no pipe connection between the mill and Amador canal. It is the intention to start the entire 40 stamps, and there is pay ground in sight to run for at least a year. About 25 men will be employed. The new iron bridge to convey the pipe of the canal which runs to Plymouth across Sutter creek is rapidly approaching completion. There are two piers 18 feet high, and the bridge, as a whole, will be a very substantial structure and calculated to withstand any storm. The old Eureka mill has been sold to George Allen.

**DRYTOWN.**—Amador Sentinel, Oct. 13: The Olive mine has been reopened by M. C. Randolph, who has erected a whim that works like a charm. The water has been taken out and the shaft retimbered, and everything seems to be in a flourishing condition. The shaft is about 80 feet deep, with drifts running 30 feet east and west. A ledge four feet wide has been struck in the east end, and the prospects are favorable for a prosperous mine in the near future. Three men are employed in the mine at present. The Loyal mine still continues to develop in a satisfactory manner. Capitalists who are thinking of purchasing have been making a thorough exploration of it, but I have not heard anything definite concerning the success of the negotiations. The Gover mill, which has been idle for the past week on account of the water failing in the ditch, has started up again. Everything looks flourishing about this mine and as though the Gover was going to become one of the leading mines of the county.

## Calaveras.

**ACTIVE WORK.**—Calaveras Citizen, Oct. 12: Work on the Donnollan mine, at the Bay State Ranch, is being actively prosecuted. A new shaft has been sunk, a short distance east of the old works, and at a depth of 30 feet a fine body of good milling ore has been discovered. The proprietors, Messrs. Donnollan & Haggerman, are about to put a pump in the mine to free it of water, and intend to add five more stamps to their mill. Until such arrangements can be perfected they will keep their arrastra grinding ore.

## El Dorado.

**FINE QUARTZ.**—Placerville Observer, Oct. 16: The Hale and Norcross mine, recently purchased from Dennis Gallagher by the Melton brothers and Joseph Lyon, is showing some remarkably fine quartz, and expert miners predict that it will soon develop into one of the first properties of Mountain township. Work was commenced on the Idaho mine, Cosumnes township, last week, and Mr. Voss is hopeful of a bright future for the property.

## Fresno.

**AROUND HILDRETH'S.**—Cor. Fresno Republican, Oct. 15: Around Hildreth's times are lively. The gold fever is getting up to the proper heat. Many men are finding employment and a great deal of gold is being taken from the rocky fastnesses. Every day, nearly, witnesses a new claim and a prospect that is flattering. Miners are flocking to the quartz mines, and to give them the necessities of life and also some of the luxuries, new stores, hotels and restaurants are being continually opened. Lewis Wilson has made a big strike a mile and a half northwest of the Hildreth mines. It is a quartz ledge from three and a half to four feet thick, and is very rich. He was offered \$30,000 last Saturday for it by a San Francisco party. James & Frances have struck a mine half a mile northeast of Hildreth's mine. They have sunk a shaft 30 feet and have struck it rich. Blue & Bartlett are working a mine for one-third interest, belonging to Mrs. Wilson and Mr. Grisby. It is very rich and they have been offered a good price for it. The White Rock mine, belonging to McNalley, Grayson & Co., promises to be the finest mine in the mountains. They have struck an excellent body of ore. The Abbey mine is now 500 feet deep, and the vein is much richer. It measures three feet and four inches, and McNalley, who knows, says it will go \$200 to \$300 to the ton. They are working 60 to 70 men in the mine. The pay-roll amounts to \$3900 to \$4000 per month. Geo. Grayson, Duly and Nicholson and Webber are opening an extension of the Abbey mine, called "Grayson Mining Company's mine." The prospects are good. They are down about 70 feet already.

## Inyo.

**THE SODA WORKS.**—Inyo Register, Oct. 14: Some 35 men and 4 or 5 teams are constantly employed in excavating vats for the evaporation of the waters of Owens lake for the production of soda. These vats now cover an area of over ten acres. About 75 tons of crude soda has been crystallized this season, although it is not considered that even a commencement has yet been made. These cakes or crystals taken from the bottom of the vats are said to go 90 per cent soda. This material has yet to be "furnaced" before it is in a merchantable condition. By another season a furnace for this purpose will be built on the ground. The evaporation process cannot be advantageously carried on during the winter months, therefore that process may be considered ended for the present season. The work of preparing vats is to be pushed right along, possibly until the entire eastern shore of the lake is lined with them. While the enterprise is yet in its infancy, it has got in all its departments clear beyond the experimental stage, and may be set down as an established enterprise, and one certain to prove of very material importance to the business interests of the county.

**ANOTHER NEW MILL.**—Supervisor John Eddy and John Wilson, of Darwin, are building a new five-stamp mill at old Coso, some nine miles west of Darwin, and will have it under steam in four or five weeks. The mines of old Coso have been worked (by the Mexicans mostly) for over 20 years, and it was upon them that one of the first

mills ever built in the county was erected. It was destroyed by the Indians very soon after, however. The ores have since been worked by arrastras, and have always been considered exceedingly rich—running from \$50 to \$300 per ton in fine gold. The principal mine is down about 300 feet, and will furnish ore sufficient to keep the mill running constantly.

**RUNNING.**—The Hawley 10-stamp mill at Keeler was fired up about a week ago, and will be kept at work until 250 tons of second-class silver ore from the Ygnacio mine are put through. This ore goes about 40 oz per ton. The high-grade goes from four to six times as much, but has all been shipped to San Francisco. A good part of both classes came from new ground in the mine, the remainder from the old dumps. Mr. S. D. Woodhull is the assayer and mill manager.

**THE MARBLE WORKS.**—Mr. Luce, superintendent for the Inyo Marble Company down at the lake, has quite a force of men at work putting up his marble working machinery, and hopes to make a shipment of polished marble blocks before the beginning of another year. He has a fine building already up, with engine and all the special machinery on the ground. After a personal visit to the quarry, we give it as our candid opinion that this is probably the most promising and permanent enterprise ever started in this county. Experts say that the marble itself is the finest in the world, and we can testify that there is a mountain of it, also that the power for handling it is the only limit to the size of the blocks that may be taken from the quarry even now, at the surface of the ground.

## Mariposa.

**SURVEY.**—Mariposa Gazette, Oct. 9: Captain Diltz and James H. Malone have, during the past week, been making a survey for a pipe line, to bring the water from Snow creek into the mines of Sherlocks, Colorado and Saxtons, which they find will decrease the distance probably from one-third to one-half. They also find at the head of the ditch 24 inches of water at this season of the year which could be conveyed by means of a pipe without loss. The fall is so great that water can be carried or forced to any given height, mine or hill, occurring along the line of the survey. The great facilities for constructing reservoirs to catch and save all the surplus water is remarkable, and materially adds to the value of the enterprise. With this magnificent work once completed, the section of country which would be benefited would become a great mining center.

**IRON ORE.**—Merced Argus, Oct. 16: Johnny McCready, the Mariposa stage-driver, showed us a specimen of iron ore last night, taken from a mine at Mt. Raymond, near the Big Tree Station. The specimen shows richly of iron and contains considerable silver.

## Mono.

**THE BULWER CON.**—We have shipped to mill during the week 300 tons ore and crushed 220 tons, leaving 80 tons at mill. We will work 60 tons per day at mill. The pulp assays were as follows: Oct. 14, \$25.58; 15, \$29.40; 16, \$36.62; and 17, \$31.90. The mill is working well and the mine is looking well. We are taking out ore from the 50, 100, 150, 200, 300, 360 or tunnel level, and the 400 levels.

**THE STANDARD CON.**—Ore shipped to mill 339 tons. Standard side of Bulwer Standard mill running steadily on ore. Standard mill running to full capacity of pans on tailings. Bullion shipment was made on Tuesday, 12th.

**THE BODIE.**—South upraise from 700 is extended 27 feet.

**THE MONO.**—We are taking out rich ore below the 700.

## Nevada.

**SILVER ORE.**—Nevada Transcript, Oct. 16: The Fowler brothers, who have a claim near Banner mountain, and recently erected a mill for the crushing of the gold ore, find that, as they sink, gold is becoming scarce in the ledge and silver is coming in. The ore assays very high in the latter mineral, and 50 tons of it will shortly be taken to O. Maltman's reduction works to be put through as a test working. If the result is satisfactory, an effort will be made to put up on the mine the proper kind of machinery for milling silver ore.

**NORTH STAR MINE'S MILL.**—Foothill Tidings, Oct. 18: Work is going on with all dispatch in the way of building the new mill at the North Star mine. The Risdon Iron Works Co., of San Francisco, the contractor, is doing the most substantial kind of work. The iron pipe, for conveying water, for power, to the North Star from the Empire mine, will weigh about 130 tons. James Harrigan has the contract for hauling this pipe from the railroad depot to such points as the pipe is wanted. The weight of the metal of the machinery has also been increased over that at first agreed upon. Substantiality is the object aimed at for the revived North Star mill and mine.

## Placer.

**CROESUS.**—Placer Argus, Oct. 7: Another mine near Auburn that is doing well is the Croesus, on Baltimore ravine, owned by C. H. Mitchell, of Grass Valley, but which is at present bonded to the Hales brothers. These gentlemen have had charge of the property since January last, and have spent several thousand dollars upon it. Some 20 men are employed there. They have run a tunnel that is over 400 feet, and they have made other improvements. Last Friday they shipped 75 or 80 ounces of bullion, and yesterday they cleaned up about 100 ounces more, the latter from a five days' run of a five-stamp battery. W. J. W. Hubbell, agent for the company that owns the Belmont, is about to put on a force of men to work on that property. Col. J. W. McCullough has lately resumed operations on the Mina Rica mine.

**DOIG MINE.**—An item in last week's Argus was that Shurtleff & Robinson, of the Doig mine, Ophir, had shipped to San Francisco the day before 259 ozs. 12 dwt. 18 grs. of gold bullion valued at about \$18,000. The weight was 1259 ounces, etc., but by mistake the first figure was omitted. The amount in money was substantially correct, as correct, in fact, as we can give it now. Since then an additional shipment of 1400 ounces has been made by the same parties, making a total of nearly 2700 ounces within a week, or over \$40,000.

## Sierra.

**THE EMPIRE.**—Sierra Tribune, Oct. 15: At this mine great activity and life prevail. During the past week over 10,000 pounds of freight was received for

the new chlorination works. Fifty-two men are employed by the company. During the last storm 35,000 bricks, which were to have been used in building the chlorination works, became so soft from the rain and snow as to be totally unfit for use.

**THE CLEVELAND MINE.**—The new ledge at the Cleveland presents a good appearance. It runs in an easterly and westerly direction and is five feet in width. A crosscut will soon be made to tap the ledge. The Tribune people were shown a piece of the rock taken from it which showed up well in sulphurets and free gold.

**PHOENIX.**—Thirty men are now employed at the Phoenix mine, and it is expected that 20 more will be put on in a short time. It is stated that the rock in sight on the western part of the ledge will mill \$200 a ton. The Dakota claim in Lady canyon district is principally owned by Geo. Abbe, Sr. About 200 feet of tunnel has been run to date.

## Trinity.

**DEADWOOD.**—Cor. Shasta Courier, Oct. 16: The old Willey mine, now known as the Vermont, is still turning out good rock. I have just seen J. C. Leas, one of J. Falan's lessees, and he informs me that he expects the next cleanup will be better than the last, which was \$64 to the ton. Watson, who leased the Frick & Davis mine, at the head of Dornnigh gulch, is crushing his rock at the Dreadnought mill; report places it at over \$100 to the ton. It was more of a pocket than a vein, and he has got out all that was in sight. McDonald & Olive are building quite a village around their reduction works at the south fork of Deadwood creek. The works will be completed in about one month from date. They have 12 men employed. The Van Matre brothers have had another cleanup from their lease of the Brown Bear Company.

## Tulare.

**WHITE RIVER MINES.**—Visalia Delta, Oct. 14: D. B. James, who is in town from White river, informs us that he is at work on the old Keyes mine, which he bought a few months ago. The old shaft has been cleaned out and retimbered, and a drift started in from the bottom which follows on the ore vein. The width of the latter is 7 to 10 inches, and occasionally is 12 inches wide. The average width is eight inches. Steam hoisting works have been erected, and a pump is also worked by steam, as there is a great deal of water in the mine. The ore contains a considerable amount of sulphurets, but only the free gold is saved by the old style process used, an arrastra being employed for crushing the ore. Five tons of ore mixed with country rock (granite) was crushed recently and yielded \$430, or \$86 per ton. Sulphurets from the mine were assayed in San Francisco and went \$1600 to the ton. Mr. James is quite hopeful of the future of his mine, and of the White river district. He says that there are a number of mines in that vicinity, and that considerable work will be done during the winter, both in vein and placer mining.

## Tuolumne.

**WATER STORAGE.**—Tuolumne Independent, Oct. 16: It is unfortunate that the water storage in the mountains gives out at this season. A month longer of mining operations would help this part of the country wonderfully. If the upper reservoirs on the line of the T. C. Water Co.'s works could be made tight, it is said that an abundant supply would be had for a month to come. With the present structure, however, this would not be practicable, and the cost of a stone dam could not be thought of with the present revenue of the company. In the event of a railroad to this section, with the increase of population which would ensue, a stone dam would pay as a permanent investment, thereby insuring a full supply of water for mining and agricultural purposes all the year around.

## NEVADA.

## Washoe District.

**ALTA.**—Virginia Enterprise, Oct. 16: The winze and crosscut No. 2 on the 725 level is down 26 feet, all the way in good ore. Work is still being pushed in the upraise in crosscut No. 2, and is in quartz giving low assays and steadily improving.

**LADY WASHINGTON.**—On the 725 level the drift is out to the north about 75 feet, and the material improving, showing very nice quartz, with occasional streaks and spots of ore.

**BENTON CONSOLIDATED.**—The Keystone drift in Benton on the 725 level is running south on said level and is swung out of the ledge in very hard rock. There is no change in the mine from last week's report.

**CHOLLAR.**—No work at present is going on in Chollar, except preparing machinery and getting ready for the resumption of work in the old upper levels.

**CON. CALIFORNIA AND VIRGINIA.**—On the 1400 level, west crosscut No. 1 and west crosscut No. 3 have both been advanced some 45 feet. On the 1500 level the south drift corresponding with the south drift on the 1455 level in Ophir was advanced 30 feet. Ore from this mine has been shipped daily to the Morgan mill, the number of tons of which will be given to-morrow morning.

**HALE AND NORCROSS.**—All work for the present has been stopped in both Hale and Norcross and Savage, pending the stripping of the combination shaft.

**CROWN POINT AND BELCHER.**—The usual amount of work is still being carried on in the Crown Point and Belcher, and the usual daily shipment of ore to the mills on the Carson river being made. This shipment will be increased as the water in the river rises, allowing the mills to run all their stamps.

**GOULD AND CURRY.**—West crosscut No. 2 is still being advanced on the 600 level. The upraise above the 450 level in north drift No. 1 has been driven about 20 feet, making the total length 62 feet. This upraise is still showing streaks of good ore.

**SIERRA NEVADA.**—West crosscut No. 3 on the 520 level, started from the north lateral drift, is out 100 feet.

**UTAH.**—On the 472 level the west drift has been extended 40 feet, making the total length 84 feet.

## Eureka District.

**ORE SHIPMENTS.**—Sentinel, Oct. 16: During the past week ore shipments were made from the mines of the district to the two reduction works, as

follows: To the Richmond works—Weller and Dible mine, 2 tons; Williamsburg, 5; Members, 34; Marguerita, 3½; Marion, 1; White Pine, 6; War Eagle, 2½; Wide West, 4½; Reeves and Berry, 13; Silver Lick, 15. To the Eureka Con. Works—Eureka Tunnel, 4½; Geddes and Bertrand, 3; Lord Byron, 8; North Star, 2½; Rescue, 38½; Reveille, 2; Clark, 1; Branchi, 1; Norris, ½; Dunderberg, 23.

## Mt. Cory District.

**GOING AHEAD.**—Walker Lake Bulletin, Oct. 6: Geo. R. Wells, President of the Mount Cory Mining Company, has been here for a few days, looking over the progress of the renewed work. Under the experienced management of Superintendent Ballard, everything in the way of successful work has exceeded anticipation, and the company has every right to expect extensive profitable development. The new works are now under cover and sinking has begun. What experienced miners, formerly employed in this mine, know, justifies resumption of operations, and forms a good basis for reasonable expectation of large returns.

## Ophir District.

**BULLION.**—Belmont Courier, Oct. 16: The Chicago Mining and Reduction Company is sending forth a steady output of bullion from Ophir, and everything runs along smoothly under the direction of Superintendent T. A. Oliver. Ophir is one of the liveliest camps in Nevada at present.

## Pioche District.

**PROSPECTS OF THE DISTRICT.**—Virginia Chronicle, Oct. 16: Between the years 1871 and 1878 the Pioche mines paid out over \$4,000,000 in dividends. One mine alone yielded over \$15,000,000 in bullion. There was a very large population, and every man rated his labor at extravagant figures. Then came the inevitable relapse and the place was deserted. Now work is to be resumed by a company who have obtained 15,000 linear feet of picked property. The average value of ore previously extracted was \$100 per ton, and it is estimated that there is four times as much ore above water as was ever lifted. The country is so dry that the water level is 1200 feet below the surface. Much of the improvements are in excellent condition. A new mine has recently been discovered, the ore from which is said to assay high in silver and gold. A new and strong company is organizing for a thorough working of the great ore deposits of Lincoln county.

## Reveille District.

**BULLION.**—Eureka Sentinel, Oct. 16: The Gila Con. mine, of Reveille district, Nye county, shipped through Wells, Fargo & Co.'s express, yesterday, nine bars of bullion, valued at \$9290.

## Sacramento District.

**GOLD-BEARING LEADS.**—Silver State, Oct. 15: In Sacramento district, about 11 miles south of Rye Patch station, Robert Hope and Jack Bennett located two gold-bearing leads, the Tiger and Oro Fino, some years ago. The Tiger is opened to a depth of over 200 feet on the dip of the vein in two places some 200 feet apart. The vein is incased in syenite walls, and averages, as far as developed, about 20 inches in thickness. The Oro Fino is developed by drifts run on the vein several hundred feet, and its average thickness is about the same as the Tiger. The quartz carries gold almost exclusively, and several hundred tons of it have been worked by the owners in a small mill. They are satisfied that the ore would pay much better if concentrated, but they are now getting advanced in years, and prefer selling the property, or giving some practical men, who understand the business, an interest in it, for putting up concentration works. From the description given of the mines, they afford an opportunity for practical men to make a raise.

## Taylor District.

**REFUSED.**—Tuscarora Times-Review, Oct. 15: The Argus Company, of Taylor, has proposed to its discharged miners that they return to work for \$3 a day. The miners refuse to entertain the proposition until Joe Carothers, the superintendent of the mines, returns from the East, which will be in a few days.

## Tuscarora District.

**NEVADA QUEEN.**—Tuscarora Times-Review, Oct. 16: Articles were filed in the County Clerk's office of San Francisco, a few days ago, for the incorporation of the Nevada Queen, of this district, with the following officers: Directors—George W. Grayson, John F. Cassell, Steve Roberts, J. E. Dixon, and Geo. W. Hickox. Subsequently Geo. W. Hickox was chosen president; W. E. Deane, secretary; and F. F. Coffin, superintendent. The property of this company has become famous all over the coast through the recent Squabble Gulch litigation, now happily terminated between the May Queen and Nevada owners. The ground is known to be exceedingly rich, there being at least a half-dozen shafts upon the two locations, in every one of which pay ore was found. The superintendent, Mr. F. F. Coffin, an experienced miner, at one time a resident of this vicinity and who is familiar with the ores of this section, arrived last evening and will at once proceed to select a suitable location for a working shaft which will be commenced without delay. The erection of hoisting works will immediately follow, and Squabble Gulch will present a lively appearance before snow flies to any great extent. The mining outlook of this section has never looked brighter, even in the palmiest days of the Grand Prize, Belle Isle and Navajo, and the Times-Review hazards the prediction that the bullion shipments from the North Belle Isle and its immediate neighbor, the Nevada Queen, will astonish the world by their extent before the close of the coming year.

## Tybo District.

**WILL COMMENCE.**—Belmont Courier, Oct. 16: It is expected that work will soon be commenced on one of the Tybo mines by Eureka parties. There is a good chance for the profitable investment of capital in Tybo's mines. It is a wonder they have lain idle so long. Good mines seem to go begging while worthless ones attract the attention of capital.

## ARIZONA.

**GLOBE.**—Silver Belt, Oct. 12: The '86 mine, Mack Morris lode, and first eastern extension of the La Platta mine, in Richmond basin, is attracting attention in consequence of its recent extraordinary yield of silver. One and a half tons of ore milled 8580 ounces, of which one ton, belonging to Henry Risbridge, produced in silver 6700 ounces. It was



milled by Paul J. Johnson, and so cleanly done that an assay showed but one per cent in the tailings. Three and a half tons of Blue Cap ore treated by Johnson at the same time produced 440 ounces in silver. The Blue Cap joins the south line of the East Richmond and is a promising mine, as, indeed, are most of the discoveries in Richmond basin, the chief of which is the Mack Morris, which produced, during the three years the Mack Morris Company worked it, \$647,574.85. The sum total taken from it exceeds \$700,000, and had it been properly worked it would be a dividend-paying mine to-day. But the company was unfortunate in having a business man for superintendent who knew nothing whatever of mining. It consequently was butchered, the lead lost and pronounced worked out, which has since proved not to be the case. Miners who originally worked in it took leases, and have made money out of it and are anxious to renew their leases. It is above the water level and the ore is of an enduring character, argentiferous and antimonial sulphurets. The same thing can be said of the Stonewall Jackson, at McMillen. It is a big mine and equally as prolific in silver as the Mack Morris, but it also was unfortunate in not having skilled superintendents, who left the mine in so deplorable a condition that its owners were induced to cease working it. But with such a promising property it was not possible that it should be permitted to remain idle, and now it resounds with detonating powder and the sturdy thwacks of the hammer upon the head of the drill. The Howard, another valuable property, belonging to a Cleveland company, and practically abandoned, is also coming to the front, under the same management, but a different superintendent, who, at last accounts, had revealed a valuable bed of ore. Globe is not only a silver-producing district, but is also the best copper camp in Arizona, and no one has done as much as Dr. Alexander Trippel, superintendent of the Old Globe mine, who has established the fact that that mine has no equal in richness and quantity of ore. Nor is the Old Globe our only copper mine; there are others, if equally developed, would show a mine of wealth.

**SOUTHERN BELLE.**—*Arizona Star*, Oct. 9: Mr. E. Alvord came in from the Southern Belle mine. He says there are 20 men working for the company. The mill has 10 stamps, and chews up 30 tons of ore daily at 24 hours. The ore showing in the Southern Belle mine is good. There is a vast quantity of ore. Mr. Alvord says it is the best little gold mine he has ever seen in Arizona or California. The vein represents a blanket lead, and runs from 4 to 15 feet in thickness, and the gold is very evenly distributed through the entire vein.

**PIMA DISTRICT.**—*Tucson Citizen*, Oct. 6: Ham Light, of Pima mining district, Yuma county, informs us that there are in this promising district many high-grade strata and ledges, but none sufficiently developed to establish their stability. Messrs. Clay & Hyde, of San Francisco, are the principal operators there at present, and own some good mines, only one of which they are working to any extent. The Centennial mine will give an average of \$30 per ton, though there is much richer ore in small quantities. The camp lies 60 miles to the north from Centennial station on the Southern Pacific, and 25 miles from Cullen's Well on the Prescott and Wickenburg overland. The roads are reasonably good for a new country, and well supplied with wood and water.

**SILVER KING.**—*Pinal Record*, Oct. 11: The Silver King Co. received a sand crusher this week, which will be used for pulverizing some of the rich tailings that were saved several years ago. The company at that time did not have the proper machinery for extracting all the silver from some characters of their rich ore, and so the tailings were saved to be worked over again. These tailings contain anywhere from 40 to 75 ounces per ton. When this ore was being worked in the first place the company never failed to pay a regular monthly dividend of 25 cents per share, therefore the ore originally must have been very rich.

**SILVER THREAD.**—*Tombstone Democrat*, Oct. 15: A reporter of the *Democrat* was yesterday shown some ore taken from the Silver Thread mine, owned by Charley Leach and others. The sample was taken from the 100-foot level, where a body at least 15 feet in width has been struck. It is not high grade, averaging only about \$50 in silver, but the large body will make up for what it lacks in richness.

## COLORADO.

**LAKE COUNTY MINES.**—*Leadville Herald-Democrat*, Oct. 15: The Clark shaft on the Chrysolite has entered the dolomite sand belt. The Tip Top mine has declared another dividend of \$16,000. The northern portion of the Smuggler lode will probably be leased in a few days to parties who will thoroughly develop it. The Harrison reduction works is still confining itself to three furnaces. The stock of ore on hand is slowly increasing. The Best Friend mine, at the head of Big Evans gulch, is stopping and sacking ore. A shipment of rich mineral will be made in a few days. Three or four lessees are working the Argentine property, on Iron hill, and moderate shipments of fair ore are being made from time to time. Captain Blaisdell and others, working properties on the Mosquito range, north of the Continental Chief mine, are encountering good indications of a large ore body. A number of the smelters are laying in a supply of fire clay for the winter months. The source of supply is in Big Evans gulch, where a six-foot vein has been opened, yielding clay of superior quality.

**SMELTING CHARGES.**—The Iron Mask mine, of Red Cliff, has temporarily suspended ore shipments to Leadville smelters. Mr. Lay, the manager of the property, was in the city a few days ago soliciting bids, but failed to receive any that met his approbation. It is reported that he has since declared that he would shut down the mine before he would pay the prices at present demanded by Colorado smelters. Mr. Lay's experience at mining is rather limited or he would not make such assertions. Owing to the competition between Leadville and Pueblo smelters he had his ore treated for some time past at far less than cost. This unnatural contest for supremacy in the smelting field has closed down one of the competing works, and smelting at less than cost has ceased. So long as the prices charged are not exorbitant, and they are much lower in Colorado than in any other place in the world, no one can find fault, and the miner that objects to paying present

rates certainly cannot be informed on the cost of reducing ores. A mine that cannot be operated at present with all the existing favorable conditions to assure success and profit can never expect to be a very profitable one.

**GEORGETOWN NOTES.**—*Georgetown Courier*, Oct. 14: Evans, the sailor, has struck it again. He has a three-inch vein of ore on Irwin's Peak which will mill about \$1000 a ton in silver. The drift on the Crown Prince shows from 4 to 5 feet of ore which runs well in gold. A very fair vein of ore has been opened in the Gold O. K. lode, which mills 16 2-10 ounces gold and 30 ounces silver per ton. Work will soon be resumed on the Michigan tunnel to cut the Warsaw lode. A discovery is reported on McClellan mountain which turns out 1988-ounce ore. Carl Anderson is taking 250-ounce ore out of the Graymont lode. He has from 6 to 24 inches of it. Taylor & Co. have a very good vein of ore on the Dunderberg, which mills in two classes—300 and 184 ounces. Southward & Thomas report a fair vein of ore on the Eagle Bird, which mills 515, 212 and 96 ounces, according to class. The County Treasurer lode, West Argentine, is improving in quantity and quality. Last mill-run, 700 ounces per ton. John Sopp, lessee on the Dunderberg dump, shipped about three tons of ore last week which returned \$16 in gold and 120 ounces silver per ton. The output of the Jo Reynolds mines for September was \$6620.67 net. The Freeland made an output of \$24,883.40 during September, \$20,808.55 of which was gold, \$3954.53 silver and \$120.32 copper. The product of the Plutus for September was gold, \$3930.71; silver, \$2902.47; copper, \$111.17; total, \$6944.35.

## DAKOTA.

**DRIFTING.**—*Black Hills Tribune*, Oct. 16: The pump in the Seabury-Calkins has been lowered to the 200 level. Drifting will recommence on the 160 level at once. The new hoists on the Eureka and Empire mines at Carbonate will be ready for operation in a few days. Both mines are of promise, and we hope with the aid of their new machinery they will rapidly develop bonanzas. Four bricks were brought from the Iron Hill last evening. They weighed 3837.60 ounces. This is the first shipment this month. There is now in Deadwood about \$5000 worth of base bullion which still continues to come in. Shipments to Omaha will shortly commence.

## IDAHO.

**FURNACES.**—*Ketchum Keystone*, Oct. 12: The furnace of the Philadelphia Company was yesterday closed down temporarily. The roasters will be kept going. W. T. Popham has purchased the Ava mine, on Boulder mountain, from T. Lavell and Jack Cochran. The claim will be thoroughly prospected, and with the little work already done, an ore streak nearly a foot wide has been found. J. B. Reiff, Supt. of the Falls City M. & S. Co., has 10 men at work on mines on Boulder mountain doing assessment work. The company owns the Moosehead, Leviathan, Copper Queen, and other mines in the locality.

**ATLANTA.**—*Idaho Statesman*, Oct. 15: The old mining town of Atlanta is almost abandoned. The 13 business firms which existed there six months ago are now reduced down to one solitary saloon-keeper. Less than 50 persons will winter there, and these simply to care for the expensive mining works which stand as idle monuments of a once thrifty town. Yet there are scores of "old-timers" who believe the mines of Atlanta exceed in value those of any other town in these mountains.

**CAMAS, No. 2.**—*Virginia Enterprise*, Oct. 13: The Camas, No. 2, mining property, on the Gold Belt, in Idaho, is yielding steadily, but they are under disadvantages, owing to the small supply of water. Arrangements are going on, however, for a larger supply, at which time the yield will be considerably increased. The mine yielded \$5000 during July, \$3600 in August, and during last month \$3000. It has been satisfactorily shown that with the proper amount of water a yield of \$50 per battery can be made. The mill is now running but five stamps a day, which would bring the yield up to over \$200 per day, at a cost of about \$70, but a larger number of stamps will be started without increasing the expense.

**THE GOLDEN CHEST.**—*Cœur d'Alene Record*, Oct. 6: Yesterday a *Record* reporter was informed of a very rich strike that had just been made at the Golden Chest. Ever since Supt. Pettit's return from the Hailey convention he has been busy making assays at the company's office. The returns were very flattering even before the last strike, which is said to be a two-foot vein of very rich free milling ore. Several assays already made have run from \$500 to \$1000 per ton. The superintendent is a thorough miner and a practical, conservative man, and when he advises the company to get additional machinery needed, and put the mill in proper working order, it may reasonably be taken for granted that there is good ground for the belief that the Golden Chest mine is very valuable property.

## MONTANA.

**MILLER AND HENDERSON MOUNTAINS.**—*Cor. Butte Miner*, Oct. 18: The first location we came to is owned by Frank Essler, and is called the Big Blue. This is a galena deposit and carries a small amount of silver, and is a fine ore to mix with the Republic ore. The next visited was the Little Judge, owned by Sanborn & Co., a nice prospect. This does not carry quite enough lead to be as useful as the former mine, but carries more silver. The Shoo Fly is owned by Horn, Miller, Pike, Moon and Major Pease, and is now working under bond and lease to Messrs. Gassett, Black & Co. They are working quite a crew of men and are taking out some very fine ore. They are also operating the Old Bozeman Co.'s smelter under a lease and then treat the ore from the Shoo Fly and also the Black Warrior, which they own, and is one of the finest properties in the camp. It is up close to the top of the range and is being rapidly developed through a tunnel and some three shafts. At their upper shaft on the top of the divide they had some of the largest prospects that have ever been assayed in the Territory, going nearly \$30,000 to the ton gold and silver. They are now doing the most of their work through the tunnel, as that strikes their ore body

100 feet lower than at any other point, and an air connection has been made through to the shaft workings, and they are now getting it in good shape to take ore out as fast as they may want it. This company had a lease of the old smelter that was built here by the Bozeman Company, and have been actively operating it all season, but just at present have shut it down and are arranging with the company to put in an improved water-jacket furnace in the place of the old one. The Homestake, on Henderson mountain, is one of the largest properties in the district, and is really a mine without being developed, as there is a much larger body of ore in sight on top of the ground than the owners of many paying mines have after years of work. This mine is now under bond to the Republic Company for \$100,000, six months' time, and as most of that will be winter, they will no doubt make their final decision much earlier. It is owned by Messrs. Mather, Smith and others. The Daisy, close by this location, is very similar in quantity and grade, and is owned by Kearns & Brownser.

## NEW MEXICO.

**ADDITIONAL STAMPS.**—*Silver City Enterprise*, Oct. 11: The framework for the additional 20 stamps of the Carlisle Co.'s mill is being put up, and the machinery will very shortly begin to arrive on the ground. Everything is expected to be in working order by Jan. 1st, though the bad weather may delay the completion beyond that date. The addition is to be an exact duplicate of their present crushing and concentrating plant, the balance of the works being of sufficient capacity to accommodate the 40 stamps. Money has not been spared at the expense of labor and convenience by this company, and they will unquestionably have the finest and most complete mining plant in the Southwest when the new mill is finished. The greatest credit is given to Mr. Huntley, the superintendent and manager, for the success he has achieved in this camp, as he has been restricted by the company to the profits of the mine, after paying the usual dividends, for funds to carry on the necessary improvements, and yet has a considerable unappropriated surplus in the treasury. The mine has not lately changed in appearance, except that the ore bodies have developed in extent beyond the expectations of any one connected with the property. The working shaft is down something over 400 feet, with no change in the character of the rock, while work on the 160-foot and 300-foot levels has proved the ore body to be more than 45 feet in width and the first wall not yet found. The 160-foot level has been run west about 1000 feet on the ledge, and a force of men is still working in the face of the drift. No waste rock is handled, and the 12 or 15 miners employed on the day shift take out sufficient ore to keep the mill going, making it unnecessary to do any night work. From 50 to 60 tons of ore are concentrated every 24 hours, and the concentrates shipped to market either in San Francisco or Kansas City. The mill may be closed down for a time inside of the next two months, pending the completion of the new machinery, though a small force of men will be kept in the mine to get things in shape for the vigorous work of the coming year.

**WHITE OAKS.**—*Cor. Socorro Bulletin*, Oct. 18: The two stamp mills of White Oaks are running in good order, the new mill on South Homestake, and the Glass mill on North Homestake ores. The last mill-run at the latter mill gave \$2080 for 80 tons of ore. New mines are being opened, and it is expected that the Delaware gold mill will soon be in operation. The litigation about the Little Mac mine will soon be settled, a patent having been applied for. The Rita, Old Abe, Little Homestake and other mines are being developed, and show visible gold with a nice body of ore. What we miss is a railroad. Our stage communications are very poor; our coal and iron mines are of little value yet.

**SOCORRO.**—W. M. Glasson has resumed work on his Jordan Canyon gold claims. J. B. Rosebloom, of Kelly, was in the city recently. He is working his Jumbo claim, and dumping pay galena and cerussite ore. Dale Brothers are in 80 feet on their tunnel in Brush canyon. At that point they are taking out pay argentiferous galena from a vein two feet in width. The Graphic smelter is to have its capacity increased immediately by the reconstruction of the old No. 3 stack. The castings are on the way, and this will materially augment the bullion production of this city. The Graphic smelter is being improved by the addition of a desulphurizing furnace. It is being constructed of bricks made from slag, according to specifications and original plans of Mr. Reese, the superintendent of that plant.

## OREGON.

**QUARTZ AND PLACERS.**—*Jacksonville Times*, Oct. 15: Miners are generally getting ready for winter. John Lewman has struck excellent prospects in his quartz mine on Applegate. John O'Brien is making extensive preparations for placer mining in the Steamboat district. Sherrer & Judson, of Grant's Pass, are manufacturing hydraulic pipe for the California Co. and John Aden. Some promising nickel ore has been discovered in the vicinity of Eight-dollar mountain, Josephine county. Fisher & Stuart, who wing-dammed Rogue river, have ceased operations, their enterprise not proving remunerative. Baume, Klippel & Co. are at work on their quartz ledge, which promises well. Their mill will be in operation soon. Messrs. Maloney & Harkness, who own excellent placer mines on Grave creek, are negotiating a sale of them to parties from the East. Anton Rose informs us that work on the tunnels being run into the Green ledge on Galice creek is still going on and rapid progress is being made. The proprietors of the Hope ledge on Wagner creek made a cleanup a few days since and realized \$1632 from 100 tons of ore, which is a first-class showing. Jesse Huggins and Mr. Jensen are now engaged in cleaning out the shaft and otherwise improving the Jacksonville Milling & Mining Co.'s property on Timber Gulch. Brown's mill will be in position near the Swinden ledge in a few days, when operations will be commenced. Silas J. Day will sell the stock in the Jacksonville Milling & Mining Company, upon which the assessments are delinquent, on Nov. 13, 1886. Only two shareholders are delinquent, however. About 77 men, including 30 Chinese, are engaged in digging a ditch for

the California Company near Kerbyville, nearly one-third of which—about five miles—will soon be completed. This will enable them to do some work during the coming winter; but the ditch will eventually be 18 miles long. R. J. Cameron informs us that considerable preparation is being made for winter in the mines of Uniontown precinct. Gin, Lin & Co. are putting in new flumes at their hydraulic mines. Haskins & Co. are rigging up the Chappel diggings, and others are busily at work getting ready for the wet season. F. Clarno reports that a new and rich strike has been made at the Queen Mountain mine, Starveout, in the Cow creek district, Douglas county. A new tunnel, No. 3, has been run in the Green Mountain mine and the north extension which, at a depth of 20 feet, struck rock as rich as any yet discovered in that vicinity. A party who took up the second south extension began work with pick and shovel, and getting tired, borrowed a stick of giant powder and blew out some very rich rock showing leaf gold. The ledge is nine feet wide, and there is great excitement over it, and claims are being taken up for miles.

**PLACERS ON BURNT RIVER.**—*Bedrock Democrat*, Oct. 11: Messrs. G. W. and Z. A. Tucker and E. Henderson, of Huntington, discovered some very rich placer diggings recently on Burnt river, about two miles west of Huntington. They are using concentrating boxes, which is considered the best process for catching the fine gold. These gentlemen yesterday located 80 acres of this auriferous soil and intend to work it for all it is worth. The only drawback is water, and if they succeed in putting the proposed ditch through, they will, no doubt, have a sufficiency of water. To accomplish this it is necessary for them to organize a joint stock company. They will doubtless have no trouble in doing this, as every practical miner who has seen the ground thinks that the gentlemen have the richest placer diggings in that part of the country. It is beautiful looking dust and goes \$18.75 to the ounce. Mr. Tucker gave us a pleasant call yesterday. He seems to be fully confident in having one of the best pieces of placer ground in the country.

## UTAH.

**REVIEW.**—*Salt Lake Tribune*, Oct. 15: The week has been a fair one in mining activity. Ore has been coming in freely, and the bullion shipments have been a good average. At the same time, the shipments of ore abroad have fallen off considerably from the maximum of awhile back, and indications are that the product is being more nearly worked or stored at home than before. The receipts of the metals in this city for the week ending Oct. 13th, inclusive, were \$188,131.66, of which \$127,476.55 was in bullion and \$60,655.11 was in ore. For the previous week the receipts were \$86,428.83 in bullion, and \$85,583.71 in ore, a total of \$172,012.54. The output of the Ontario for the week was 14,108.62 ounces of fine bullion, and \$17,145.62 from ore sales; an approximate total of \$31,254.24. The Daily product for the week was 7634.59 fine ounces; no ore sales. Fine bars received during the week aggregate a value of \$37,605.82; base bullion, \$12,400. The Stormont sent up, on the 7th, silver bars to the value of \$4035. The product of the Hanauer for the week was \$27,230 in bullion. The Germania is undergoing repairs and is shut down for the purpose. Ore receipts were—by Wells, Fargo & Co., \$18,000; by McCormick & Co., \$26,790, including \$2000 Overland ore and \$5190 Queen of the Hills; by T. R. Jones & Co., \$10,425.89; by the Union National Bank, 16 lots, \$5439.22.

**BULLION SHIPMENTS.**—*Park Record*, Oct. 9: The early part of the week Freighters Drew and his teams were engaged hauling a carload of iron water-piping up to the Crescent mine. The water is to be piped from the head of Thane's canyon to the mine for the boilers, etc., and no freezeup will occur this year. Considerable inconvenience is met by the Crescent folks and by the Mackintosh sampler hands on account of the inability of the railroad company to furnish regularly sufficient cars for shipping ore and concentrates. The Morgan shaft has attained a depth of over 60 feet already, and sinking is going on with rapidity. The Crescent and Daly companies paid their employees about the middle of the week. Ontario payday is expected to occur within a day or two. For the week just ended the Mackintosh sampler received \$84,180 pounds of Ontario ore, 79,380 pounds of Daly, and 64,490 pounds of Sampson ore; total, \$28,050 pounds. The Daly bullion product from the Marsac mill was seven bars, on the 6th, containing 6031 fine ounces of silver, and yesterday the shipment was eight bars.

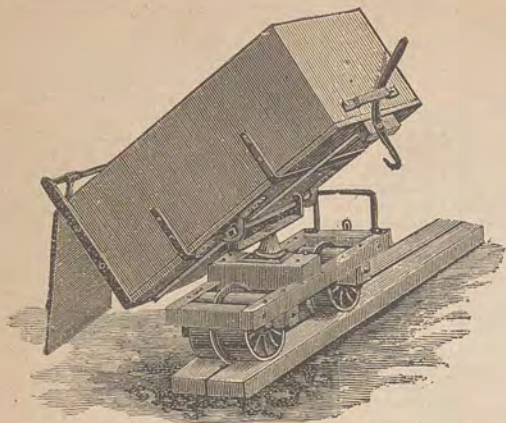
**PARK CITY.**—*Record*, Oct. 16: At all the principal mines around Park City the usual preparations for winter have been going on. At the Ontario and Marsac mills several thousand cords of wood are piled up, and this supply of fuel will last many months, while at the mines any quantity of lagging, stope timber and timbers for general use are on hand, calculated to fill the demand till next spring. Other preparatory work for winter is observed all around, and little else will be required to carry on active operations at the mines almost without any interruption during the entire winter.

**DOINGS AT THE MORGAN.**—The two-compartment shaft of the Morgan is down over 70 feet. The boarding and lodging house is about completed, and it will accommodate 50 men. A powder magazine and other necessary buildings are in course of erection, and the water service has been brought to a high degree of efficiency. About 20 men are employed on the Morgan group, and work will go ahead all winter.

**ANCHOR IMPROVEMENTS.**—Thursday afternoon the set of two large boilers arrived from the East, and to-day they were hauled up to the mine to be put in position. Twelve men are employed, and the mill for sawing timbers is about finished. By November 1st, it is thought everything will be in readiness to start up active operations. The force will then be increased.

**ORE AND BULLION SHIPMENTS.**—For the week just ended the Mackintosh sampler received 424,860 pounds of Ontario ore, 43,200 pounds of Daly, and 21,490 pounds of Sampson ore; total, 489,550 pounds. The output of Daly bullion from the Marsac mill for the week was 8 bars, containing 7686 fine ounces of silver. The Ontario bullion product for the week was 22 bars, containing 12,697.75 fine ounces of silver.





JAMES' PATENT ORE CAR.

Saves a Higher Percentage than any other machine. Its action is a reciprocating motion of four separate and distinct Dies attached to a heavy casting in such a way that the **WHOLE WEIGHT and FORCE OF BLOW ACTS ALTERNATELY ON EACH DIE**. In this respect it resembles the Stamp Mill, and in point of amalgamation is superior to any machine in use. There is no wear, except on Shoes and Dies, and there is no expense for setting. Weight, 3000 pounds. Capacity, 6 Tons in 24 hours through No. 40 Screen. Requires 4 H. P.

## H. P. GREGORY & CO.

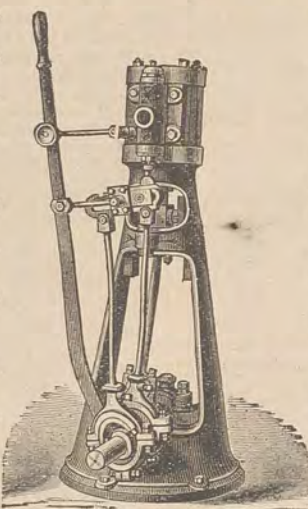
Nos. 2 and 4 California St., - - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

# MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING MACHINERY.  
FRANK & CO.'S WOODWORKING MACHINERY.  
NEW HAVEN MANUF'G CO.'S MACHINISTS' TOOLS.  
BEMENT & SON'S MACHINISTS' TOOLS.  
BICKFORD'S POWER DRILLS.  
BLAKE'S IMPROVED STEAM PUMPS.  
WEBBER CENTRIFUGAL PUMPS.  
PERIN BAND SAW BLADES.  
STURTEVANT BLOWERS AND EXHAUSTS.  
SHIMER MATCHER HEADS.  
BRAINARD MILLING MACHINES.  
TURBINE WATER WHEELS.  
BRADLEY CUSHIONED HAMMERS.  
MASSEY'S STEAM HAMMERS.  
SCHLENKER'S BOLT CUTTERS.  
HOLLOWAY FIRE EXTINGUISHERS.



WILLIAMSON BROS' HOISTING ENGINES.  
ATLAS ENGINE WORKS ENGINES AND BOILERS.  
PAYNE'S VERTICAL AND HORIZONTAL ENGINES.  
OTTO SILENT GAS ENGINES.  
EMPIRE LAUNDRY MACHINERY.  
PICKERING ENGINE GOVERNORS.  
JUDSON ENGINE GOVERNORS.  
TANITE CO.'S EMERY WHEELS AND MACHINERY.  
NATHAN AND DREYFUS OILERS.  
KORTING INJECTORS AND EJECTORS.  
DISSTON'S CIRCULAR SAWS.  
NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.  
LANE AND BODLEY SAW MILLS.  
H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

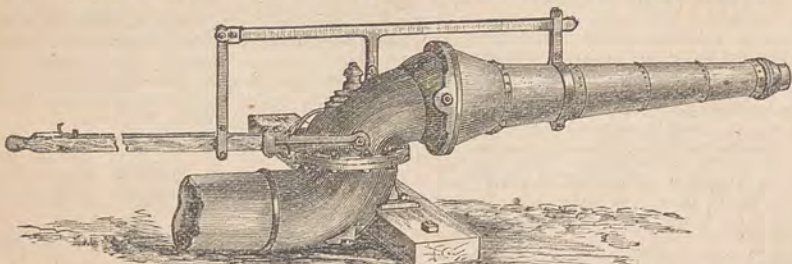
YACHT ENGINES.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the **IMPROVED FORM OF HYDRAULIC GIANTS**, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,  
39 to 51 Fremont St., San Francisco, Cal.

## AUGUST LUTZ, METAL SPINNER,

10 Stevenson St., 3d floor, S. F.

The only custom work spinner in the city. Personal attention given to all work. Orders respectfully solicited.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices - 47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast - Joseph H. Dorety, 529 Commercial St., S. F.

# TATUM & BOWEN,

34 & 36 FREMONT ST., Donahue Block, SAN FRANCISCO.

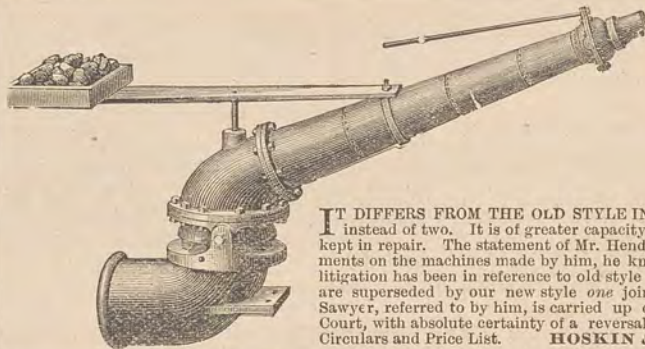
91 & 93 FRONT ST., PORTLAND, OREGON.

Ore Car, . . . \$ 40.00  
Rock Breaker, . . . 100.00  
Quartz Mill, . . . 350.00

## THE JAMES QUARTZ MILL

Saves a Higher Percentage than any other machine.

Its action is a reciprocating motion of four separate and distinct Dies attached to a heavy casting in such a way that the **WHOLE WEIGHT and FORCE OF BLOW ACTS ALTERNATELY ON EACH DIE**. In this respect it resembles the Stamp Mill, and in point of amalgamation is superior to any machine in use. There is no wear, except on Shoes and Dies, and there is no expense for setting. Weight, 3000 pounds. Capacity, 6 Tons in 24 hours through No. 40 Screen. Requires 4 H. P.



This cut represents our

## IMPROVED HYDRAULIC MACHINE.

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style *two* jointed machines, which are superseded by our new style *one* jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.

HOSKIN & CO., Marysville, Cal.



## THE IMPROVED FORM

—OF—  
SINGLE-JOINTED

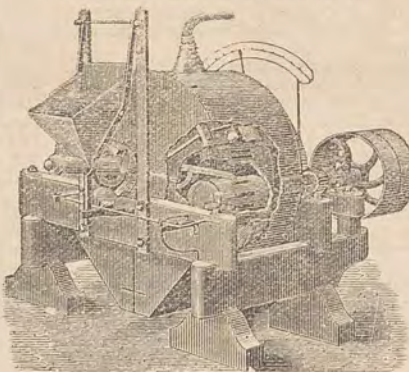
## HYDRAULIC GIANTS.

We are now in the field as manufacturers of SINGLE-JOINTED HYDRAULIC GIANTS, and are prepared to furnish the several sizes with quick dispatch, and they will be found to be the equal of, if not superior to, a similar form ordinarily known as the Marysville Nozzle, and will quote prices upon application.

## JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 FREMONT ST., SAN FRANCISCO, CAL.

## Tustin's Pulverizer WORKS ORE WET OR DRY FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLY, SPIERS & HAYES,

NATIONAL ASSURANCE CO.,  
OF IRELAND.

ATLAS ASSURANCE COMPY.,  
OF LONDON.

BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.

H. M. NEWHALL & CO.,

GENERAL AGENTS,

309 & 311 Sansome St., San Francisco, Cal.

THE RUSSELL PROCESS COMPY.

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

## Dr. Pierce's Electric Belt.

This small truthfully exhibits the **Crandest Medical** of the 19th century. By means of this BELT the human body is supplied with a continuous current of Electricity. It relieves and cures, without medicine, all diseases and weaknesses of male or female, that can possibly be relieved or cured by Electricity and Magnetism. Dr. Pierce's Belt is the only one which will produce electricity with or without acids; giving when charged a current of high tension, which can be instantly felt by the wearer. Contains all the latest improvements, including an improved **Electric Suspensory for Men**. In fact it is warranted to be the only complete and durable **GALVANIC BODY-BATTERY** ever invented. Satisfaction guaranteed. Prices very reasonable. **Call or write for our FREE descriptive pamphlet, No. 2.** **MAGNETIC ELASTIC TRUSS CO.** 304 N. SIXTH ST., COR. OLIVE ST. LOUIS, MO. and 704 SACRAMENTO STREET SAN FRANCISCO, CAL. AGENTS:—PETER VAN SCHAAK & SONS, 138 & 140 Lake Street Chicago, Ill.; M. W. ALEXANDER, Druggist, Fifth & Olive sts., St. Louis Mo.; J. H. WIDBER, Druggist, 3d & Market sts., San Francisco. **RUPTURE** Quickly cured! If ruptured send for our Pamphlet No. 1.

## Practical Treatise on Hydraulic Mining.

By AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep places, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting, tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by Dewey & Co., Publishers, 252 Market St., San Francisco.

## A Good Opportunity for a Machinist.

A variety of good Tools, Patterns, etc., with business for sale cheap by a party retiring from business. A splendid opportunity for an enterprising mechanic.

Address A. B. O., care of this paper.

## Engraving

Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

**MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.****PUMPING****ENGINES**

—AND—

**MACHINERY,****CORNISH****PUMPS.**

GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

# FRASER & CHALMERS, MINING MACHINERY,

**ENGINES AND BOILERS.**

## Huntington Centrifugal QUARTZ MILL.

SEND FOR CATALOGUE.

## CORNISH ROLLS, JIGS and TROMMELS.

**HOISTING****ENGINES,****HALLIDIE'S****WIRE ROPE****TRAMWAYS.**

DENVER OFFICE:  
No. 243 Eighteenth Street, Denver, Colorado.  
MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.  
UTAH OFFICE—SALT LAKE CITY, UTAH.

**Metallurgy and Ores.**

## SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

## GOLD AND SILVER REFINERY And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,  
LEAD PIPE,  
SHEET LEAD,  
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,  
Under Chamberlin Patent.

C. H. AARON,  
ASSAYER AND METALLURGIST,  
NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

WM. D. JOHNSTON,  
ASSAYER AND ANALYTICAL CHEMIST.  
514 Kearny Street,  
SAN FRANCISCO, CALIFORNIA  
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

JOHN TAYLOR & CO.,  
IMPORTERS AND DEALERS IN  
ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

**Nevada Metallurgical Works.**

NO. 23 STEVENSON STREET,  
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869

Ores worked by any Process.  
Ores Sampled.  
Assaying in all its Branches.  
Analyses of Ores, Minerals, Waters, etc.  
Working Tests (practical) Made.  
Plans and Specifications furnished for the most suitable Process for Working Ores.  
Special attention paid to Examinations of Mines; Plans and Reports furnished.  
C. A. LUCKHARDT & CO.,  
(Formerly Huhn & Luckhardt,)  
Mining Engineers and Metallurgists.

J. KUSTEL. H. KUSTEL.

★ **METALLURGICAL WORKS,**  
318 Pine St. (Basement,  
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.  
Assaying and Analysis of Ores, Minerals and Waters, Mines Examined and Reported on.  
Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,  
Mining Engineers and Metallurgists.



The California  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

**FLOUR AND OTHER MILLS.**

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.

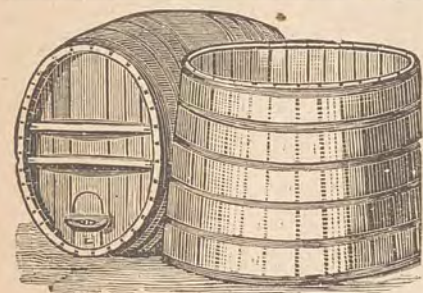
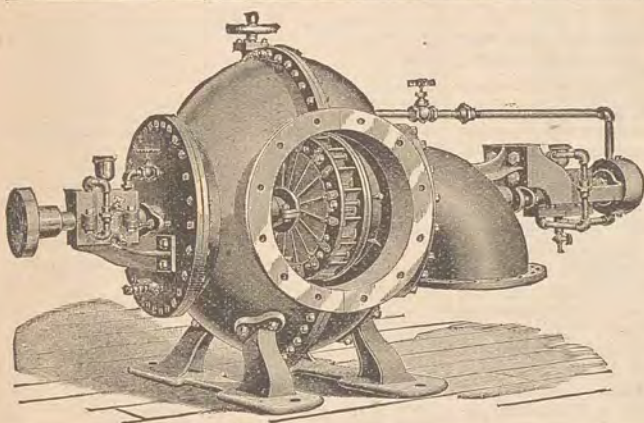
## JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.  
Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.  
Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,  
Springfield, Ohio, or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents,  
Chicago, Ill., and Denver, Col.

PARKE & LACY, General Agents, San Francisco, Cal.



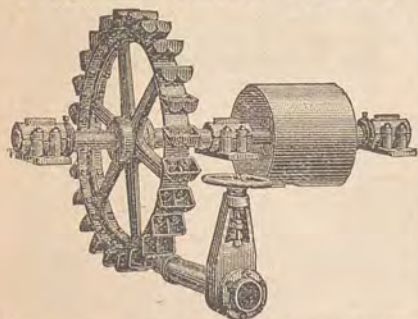
## WATER TANKS! WINE TANKS! CALIFORNIA WINE COOPERAGE CO.

FULDA BROS., Proprietors,

30 to 40 Spear St., - San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

**PELTON'S WATER WHEEL.**

THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent., distancing all competitors. Send for circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

## COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published relating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

**THE CONSUMERS' COMPANY.**

## VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

## Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**  
218 California Street, San Francisco, Cal.



## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

**GIANT POWDER or DYNAMITE,**  
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

**JUDSON POWDER IMPROVED.**

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

**BANDMANN, NIELSEN & CO.,**

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

## THOMAS PRICE'S ASSAY OFFICE,

CHEMICAL LABORATORY,

**BULLION ROOMS and ORE FLOORS,**

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.



## Centrifugal Pumps and Draining Machinery.

(Written for the Press by J. RICHARDS.)

NUMBER 5.

Another feature that has retarded or misdirected practice in centrifugal pumping is the want of uniformity in the working conditions and variation of circumstances under different heads. In all other kinds of pumping, the operative conditions, except resistance, are nearly uniform at different heads; but with centrifugal pumps there is no rule of the kind.

The factors of effect, to so call them, are centrifugal force, and what, for want of a better term, we may call "impact," or the mechanical "push" of the vanes. These two separate forces come into play in varying relation as the head, or as the relative speed of the water and wheel, which is the same thing; hence there is no uniformity.

A pump working against a head of 50 feet operates almost exclusively by centrifugal force, while one working against a head of five feet may operate mainly by impact, or, to express it in other terms, like a turbine water-wheel reversed.

These conditions qualify the form of the vanes which in one case may move ten times as fast as the discharge water, and in the other case almost at the same speed; one case calling for tangential tips, the other for straight radial vanes.

The velocity of the wheels conforming to the law of falling bodies while the flow of water is constant, calls for a continually varying construction suited to different heads, and has led to much of the modification and contention that has attended on this manufacture.

A recital of these difficulties may seem a contradiction of the propositions contained in the first part of this chapter, but they are not. They are all subjects to be dealt with by computation, and would be, if once taken up by our able engineers and scientists.

In proof they have not been, I will revert to my last proposition respecting the variation between centrifugal and direct force, and between the velocity of the wheels and the water, with the change of form these circumstances demand.

In such pump literature as has come under my notice, there is no dealing with these matters—the very first to be considered, and without which there can be no useful rules for construction.

By the force of repeated and prolonged experiment, extending over 60 years in all, or 40 years of active practice, we have arrived at a tolerably-settled form of construction for centrifugal pumps—that is, have reached a kind of standard, with a few of the best-informed makers.

Of empirical practice we have enough yet. The struggle for single inlets still goes on, and is often adopted without knowledge of the consequences it produces when a disk-wheel is employed.

We have tables that give the proper diameter of wheels for a certain duty, ignoring pressure and speed, and, worst of all, a continued search for some new way of constructing machines that have generally given a duty inverse as the amount of complication and detail.

I have not thus far said anything of French practice, and must confess to some prejudice in the matter because of certain reports made about the year 1866, respecting the competitive working of some Gwynne pumps with those made by M. Coignard, of Paris. The Gwynne pumps were set down as working at a duty of 35 per cent, while the Coignard pumps realized near double the same effect. Looking at the construction in the two cases, and making such deductions as a fair inference would afford, I concluded the report was of no value and its statements impossible. I moreover believed the Gwynne pump superior to any made in France, if we except those which are copies, one of which I recently examined at New Orleans.

French engineers have developed a good deal in compounding pumps, and, I believe, first invented the double wheels or multiple wheels, one discharging into another, to be used in the case of high heads. I am not sure, however, whether Mr. Gwynne's compound pumps were first proposed or not. It is not a matter of much importance either way, because, all things considered, is is doubtful whether compounding is a construction to be recommended beyond certain exceptional cases.

The problem involves questions not answerable by computation. It is one of mechanism and endurance, which future experience must determine; so that if added by our French friends to modern pump practice it must stand as a feature of questionable value.

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

## Academy of Sciences.

At the meeting of the California Academy of Sciences on Monday evening last, President Davidson read a brief account of the recent volcanic eruption of Pabloff, Alaska, and exhibited several specimens of the volcanic dust.

Dr. Behr presented two neuropterous insects, related to the Termites or white ants, giving an interesting description of their structure and habits, especially in regard to the appearance of one of the species some two weeks before a rain-storm.

This latter statement elicited some discussion. Prof. E. S. Holden was anxious to know whether the presence of these insects really predicted a rainstorm, or whether there were other circumstances which led to their appearance. The subject was discussed by Prof. Holden, Mr. J. T. Evans and Dr. Gibbons. Dr. Behr stated that, according to his best observation, the facts he had stated were correct.

Papers were read by title, "Descriptive Notes of North American Coleoptera," by T. L. Casey; "The Landfalls of Cabrillo and Farrello, 1542-1543," by George Davidson; "Early Spanish Voyages of Discovery on the Coast of California," by George Davidson; "Velocity and Direction of the Gulf Stream between Fowey Rock, Florida, and Gun Cay, Bahamas," by F. M. Thorn, Supt. U. S. Coast and Geodetic Survey. Prof. Davidson also read a paper on "Determination of Standard Geodetic Data for the Computation of Geographical Positions on the Pacific Coast." President Holden testified to the great accuracy of this work and the advantages it gave to those who required exact geographical position.

Papers were announced for the next meeting by Dr. Behr and Walter C. Bryan.

W. A. Goodyear, formerly of the State Geological Survey of California, and afterward Government Geologist of Salvador, read an extended and interesting account of the series of great earthquakes which occurred in Salvador in 1879-80. There were nearly 400 earthquakes in a few days, many of them very severe. Great landslides occurred, fissures opened, and the flow of water in streams and lakes accelerated. Mr. Goodyear described many of the details, he having been specially instructed to make observations of force, direction and character of the shocks. He related the fact that there was not wanting a local Wiggins to predict all kinds of dire disaster, which very much frightened the whole population of the country, and even the President himself. For several days this man kept the people terrorized, until it was found out in the end that he knew no more than any one else. Mr. Goodyear himself was importuned by the President to give an opinion of the man's predictions, and repeatedly stated that he could have no foundation for exact prophecies, although in a country thus badly disturbed almost anything might happen.

Dr. Harkness, at the close of the meeting, exhibited under the microscope two new species of fungi described by himself—a new *Ustilago* and a *Testalozzia*.

## Mining Share Market.

For the past day or two mining stocks have been rather active, contrary to what was supposed would be the case when deep prospecting was stopped on the Comstock. This is rather an agreeable surprise. The *Virginia Chronicle* asserts that explorations near the Con. California and Virginia north line, in the Ophir ground, indicate that there is a large body of low-grade ore in the latter mine between the 1300 and 1800 levels. Ore is being extracted from below the 1850 level in the Con. California and Virginia, and future explorations will doubtless demonstrate that the deposit which has shown a depth of more than 700 feet in the California and Con. Virginia old stopes will be found of equal dimensions in Ophir.

The rapid advance in Ophir and Con. California and Virginia is due to the fact that they are now hoisting from the 1300 level south drift of Ophir, running into Con. California and Virginia ground, large quantities of low-grade ore, giving assays of increased value. The ore from that ground is being shipped daily to the Eureka mill, on the Carson river, which is now running all its stamps.

The advance in the middle stocks is, beyond a doubt, due to the fact that the mines will now be worked for all they are worth on the upper levels, and that the shutting off of the water and reduction in the consuming of ice, wood and other materials will also lessen the amount of assessments fully one-half.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S M Co.	Nevada.	34.	25. Oct 16. Nov 20. Dec 10.	W. H. Watson.	302 Montgomery St
Andes S M Co.	Nevada.	30.	25. Sept 15. Oct 21. Nov 10.	B. Burris.	309 Montgomery St
Bullion M Co.	Nevada.	31.	30. Aug 31. Oct 5. Oct 26.	R. R. Grayson.	327 Pint St
Bedrock M Co.	Arizona.	2.	10. Sept 13. Oct 18. Nov 8.	J. L. Hunt.	808 Montgomery St
Baker Divide M Co.	California.	12.	25. Sept 24. Oct 25. Nov 17.	D. M. Kent.	330 Pine St
Best & Belcher M Co.	Nevada.	35.	50. Sept 29. Nov 4. Nov 24.	W. Willis.	309 Montgomery St
Diana M Co.	California.	6.	25. Oct 12. Nov 22. Dec 13.	P. J. Flannigan.	318 Pine St
Excelsior M Co.	Nevada.	23.	20. Oct 18. Nov 22. Dec 15.	C. E. Elliott.	306 Montgomery St
Golden Jacket M Co.	Nevada.	2.	10. Sept 1. Oct 14. Nov 4.	R. G. McClellan.	331 Montgomery St
Gould & Curry M Co.	Nevada.	54.	50. Sept 28. Nov 3. Nov 24.	A. K. Durbrow.	309 Montgomery St
Golden Fleece M Co.	California.	6.	15. Oct 18. Oct 23. Nov 13.	W. J. Gleason.	312 Phelan Block
Gold Point M Co.	California.	11.	01. Aug 31. Oct 2. Oct 23.	A. B. Brady.	Grass Valley
Liberty Hill Con M Co.	California.	1.	15. Sept 1. Oct 7. Oct 28.	F. E. Luty.	330 Pine St
Mount Cory M Co.	Nevada.	1.	1. Oct 23. Oct 23. Oct 23.	C. Frier.	309 Montgomery St
Mayflower Gravel M Co.	California.	33.	25. Sept 6. Oct 15. Nov 12.	J. Morizio.	328 Montgomery St
Nevada M & M Co.	Nevada.	1.	1.50. Aug 25. Oct 2. Oct 23.	G. L. Brander.	309 Montgomery St
North Banner Con M Co.	California.	15.	40. Oct 2. Nov 6. Nov 27.	T. J. Mitchell.	Grass Valley
Potosi M Co.	Nevada.	10.	30. Aug 31. Oct 5. Oct 26.	C. E. Elliot.	309 Montgomery St
Pneumatic M Co.	California.	1.	12. Oct 5. Nov 11. Dec 7.	H. Pletoir.	320 Sansome St
Rocky Bar M Co.	California.	9.	50. Oct 15. Nov 20. Dec 7.	G. W. Hill.	Grass Valley
Silver Lining M Co.	Nevada.	2.	10. Sept 14. Oct 18. Nov 5.	A. H. Clough.	431 California St
Sierra Nevada S M Co.	Nevada.	86.	25. Sept 11. Oct 13. Nov 1.	E. L. Parker.	309 Montgomery St

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Contention Con M Co.	Arizona.	D. C. Bates.	309 Montgomery St	Annual.	Oct 25
Kincaid Flat M Co.	California.	Called by Trustees.	432 California St	Special.	Nov 1
North Belle Isle M Co.	Nevada.	J. W. Pew.	310 Pine St	Special.	Nov 3
Pittsburg M Co.	Nevada.	C. J. Bandmann.	30 California St	Annual.	Oct 28

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Martin White M Co.	Nevada.	J. J. Scoville.	309 Montgomery St	30.	Oct 11
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	323 Montgomery St	20.	Sept 30
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St	25.	Aug 16
Young America M Co.	California.			40.	May 20

## Microscopical Society's Reception.

The reception given by the San Francisco Microscopical Society at Pioneer hall, on the evening of Oct. 16th, was probably the best of a long series of entertainments given by the society. There were more instruments than the society ever before mustered, and some of them of the very latest patterns. The choice of objects was very heavy; not too profound to please the popular observer and yet deep enough to warrant the gaze of the skilled microscopist. There were nearly 50 microscopes on exhibition. The audience included some of our best people, and both the scientific and social features of the reception were generally enjoyed.

Dr. C. P. Bates gave an exhibition of living pond organisms, showing some of the forms of minute animal life that may be found in our ponds and reservoirs. The general and capillary circulation of the blood in frog's mesentery was well shown by Dr. J. M. Selfridge. George C. Hickox gave an exhibition of the wonderful behavior of metals crystallizing from solution by the battery process, passing a stream of electricity through a solution, resulting in forms somewhat different from those occurring in nature. E. J. Wickson gave an interesting exposition of the different scale insects, showing them in various stages of development, from the egg to the full-grown insect. The exhibit was of special importance, because of the great injuries being done by these pests to the fruit interests of the State.

A. R. Breckenfeld, secretary of the society, showed some of the wonders of animal life, his young oysters rolling in fluid (polarized light) being considered one of the most beautiful objects on exhibition. C. W. Banks had a comprehensive exhibit of attractive objects, the most remarkable being the electric spark as shown under the microscope. Dr. J. H. Stallard followed his natural inclinations in the demonstration of pathological preparations, to which he has given much study. William Payzant exhibited eggs of the house fly and living brine shrimp (*artemia salina*); W. F. Myers exhibited male and female mosquitoes; L. M. King living rotifers (sacculinaria socialis); A. S. Brackett showed cocaine and its salts, the new preparation showing marvelous forms of combination; Professor H. G. Hanks exhibited insect in amber. The exhibition of Henry C. Hyde was specially interesting, because of the use of the electric light as an illuminator for the microscope.

Arthur M. Hickox showed his fine apparatus to splendid advantage, using as an object crystals of brucine under polarized light. Dr. Thos. Morfaw showed microscopic engraving on glass and Mollers typen platte. Dr. S. M. Mouser, president of the society, showed objects which attracted much attention—one especially, trichina spiralis, the dreaded parasite which is sometimes obtained from eating raw pork. Dr. F. Rehil exhibited bacillus tuberculosis, supposed to be the germ causing consumption. J. Z. Davis, Professor Thomas Price and F. L. Howard presented exhibits of interest.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Alice, Oct. 13, \$52,784; Moulton, 14, \$99,866; Queen of the Hills, 13, \$1000; Hanauer, 13, \$93,800; Silver Bow, 15, \$23,584; Lexington, 15, \$25,056; Marget Ann, 15, \$32,541; Hanauer, 14, 3270; Stormont, 16, \$28,855; Hanauer, 16, \$33,660; Queen of the Hills, 16, \$11,000; Hanauer, 15, \$33,300. The following shows the bullion product of the different Montana mining companies named, from January 1 to August 31, 1886: Alice, \$771,243; Boston & Montana, \$417,137; Elkhorn, \$120,889; Granite Mountain, \$839,000; Hecla, \$251,303; Helena M. & R. Co., \$240,234; Hope, \$102,456; Lexington, \$607,729; Montana Co., \$1,062,200; Moulton, \$514,966.

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Sept. 30.	WEEK ENDING Oct. 7.	WEEK ENDING Oct. 14.	WEEK ENDING Oct. 21.
Alpha.	.55 .60	.55 .60	.50 .60	.05 .60
Alta.	.85 1.75	.70 .90	.60 .75	.45 .60
Andes.	.10 .10	.10 .10	.05 .15	.35 .45
Argenta.	.1.25 .1.25	.1.10 .1.10	1.10 1.10	1.15 1.15
Belding.	.85 .85	.65 .65	.80 .80	.70 .75
Best & Belcher.	.05 .05	.35 .35	.45 .45	.40 .50
Bonanza King.	.25 .40	.15 .40	.40 .45	.30 .40
Belle Isle.	2.60 2.80	2.45 2.65	2.45 2.90	2.45 2.80
Bodie Con.	.15 .40	.15 .15	.15 .15	.08 .10
Benton.	1.70 2.20	1.85 1.90	2.00 2.10	1.35 1.95
Bulwer.	2.70 2.80	2.20 2.50	1.95 2.65	3.00 4.25
California.	.25 .30	.20 .20	.10 .10	.25 .25
Challenge.	.85 .95	.75 .85	.60 .75	.75 .80
Chollor.	2.50 2.55	2.25 2.25	2.10 1.95	2.90 2.90
Confidence.	.10 .15	.15 .15	.10 .10	.10 .15
Con. Imperial.	2.70 2.80	2.20 2.50	1.95 2.65	3.00 4.25
Con. Virginia.	1.10 .1.10	.95 .95	1.00 1.00	1.05 1.05
Con. Pacific.	.35 .35	.35 .35	.35 .35	.35 .35
Crown Point.	.35 .35	.35 .35	.35 .35	.35 .35
Day.	.35 .35	.35 .35	.35 .35	.35 .35
Eureka Con.	3.75 3.80	3.95 3.95	4.25 4.20	5.25 5.25
Eureka Tunnel.	.10 .15	.10 .10	.05 .05	.10 .10
Excelsior.	.45 .45	.45 .45	.45 .45	.45 .45
Grand Prize.	.55 .55	.60 .60	.45 .55	.50 .55
Gould & Curry.	.95 1.15	1.75 .55	.75 .65	1.05 1.05
Goodshaw.	1.90 .1.90	.25 .25	2.05 .25	2.25 .25
Hale & Norcross.	.25 .25	.25 .25	.25 .25	.10 .10
Holmes.	.70 .70	.40 .40	.10 .10	.35 .35
Independence.	.70 .70	.40 .40	.10 .10	.35 .35
Justice.	.70 .70	.40 .40	.10 .10	.35 .35
Martin White.	2.50 2.55	2.00 2.65	2.30 2.40	2.55 2.55
Mono.	.40 .50	.35 .35	.40 .50	.50 .79
Mexican.	2.50 2.50	2.50 2.50	2.60 2.60	2.75 2.75
Mt. Diablo.	.70 .70	.75 .75	.85 .85	.75 .85
Northern Belle.	2.25 2.75	2.40 2.75	3.70 3.35	3.65 3.65
Navajo.	1.15 1.30	.80 1.05	.80 1.25	.80 1.25
North Belle Isle.	1.00 1.25	.80 .95	.65 .85	.95 1.75
Ophir.	.30 .40	.30 .30	.25 .25	.30 .30
Overman.	.25 .30	.20 .50	.40 .70	.45 1.40
Potosi.	1.70 1.90	1.85 2.40	1.95 2.15	2.35 2.60
Pinal Con.	.35 .40	.30 .30	.25 .60	.85 .85
Savage.	.15 .15	.15 .15	.10 .10	.10 .10
Seg. Belcher.	.35 .40	.30 .30	.25 .60	.85 .85
Sierra Nevada.	.80 .80	.75 .75	.70 .70	.80 1.20
Silver Hill.	.90 1.00	.75 .95	.75 .80	.80 1.10
Silver King.	.15 .15	.15 .15	.15 .15	.15 .15
Silver Lining.	.15 .15	.15 .15	.15 .15	.15 .15
Syndicate.	.15 .15	.15 .15	.15 .15	.15 .15
Toga.	.35 .35	.30 .30	.25 .30	.30 .60
Union Con.	.80 .80	.75 .75	.70 .70	.80 1.20
Utah.	.90 1.00	.75 .95	.75 .80	.80 1.10
Yellow Jacket.	.90 1.00	.75 .95	.75 .80	.80 1.10

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., Oct. 21.	500 Mexican.	85 @ 90c
1050 Alta.	100 N. Belle Is.	3.40
100 Andes.	900 Navajo.	75 @ 80c
100 Alpha.	450 Ophir.	2.05 @ 1.10
550 B. & Belcher.	1.10 @ 1.10	400 Occidental.
100 Bullion.	450 Potosi.	75 @ 80c
580 Belle Isle.	300 Syndicate.	15c
300 Bodie Con.	950 Savage.	10c
300 Bulwer.	1.65 700 Savage.	2.50 @ 2.55
1850 Chollor.	1.10 @ 1.80	100 Silver Hill.
1000 Con Va. & Cal.	5.25 @ 5.38	1000 Sierra Nevada.
50 Crown Point.	1.10 1100 Union Con.	65c
300 Gould & Curry.	75c 100 Utah.	1.05
800 Hale & Nor.	1.05 280 Yellow Jacket.	1.10

## San Francisco Metal Market.

[WHOLESALE]		THURSDAY, Oct. 21, 1886.	
ANTIMONY—French Star.	9 1/2 @	8	
BORAX—San Bernardino.	10 @	8	
Armstrong.	10 @	6 1/2	
IRON—Glengarnock ton.	22 @	50	
Eglington, ton.	21 @	50	
American Soft, No. 1, ton.	24 @	00	
Oregon Pig, ton.	21 @	00	
Clippier Gap, Nos. 1 & 4.	23 @	50	
Clay Lane White.	21 @	50	
Shotts, No. 1.	23 @	50	
STEEL—English, lb.	16 @	25	
Black Diamond, ordinary sizes.	10 @	—	
Pow.	4 @	5	
Machinery.	5 @	6	
Sanderson Bros.	10 @	—	
COPPER—			
Braziers' sizes.	20 @	25	
Bolt.	19 @	—	
Sheathing.	30 @	—	
Ingot.	12 @	13	
LEAD—Pig.	4 75 @	—	
Bar.	5 25 @	5 50	
Pipe.	8 @	—	
Sheet.	8 @	—	
Shot, discount 10% on 500 bag.	Drop, 1 65 @	—	
Buck, 1/2 bag.	1 85 @	—	
Chilled, do.	2 05 @	—	
ZINC—German.	9 @	10	
Sheet, 1x3 ft, 7 to 10 lb, less the cask.	7 1/2 @	—	
QUICKSILVER—By the flask.	39 @	40 50	
Flasks, new.	1 05 @	—	
Flasks, old.	85 @	—	
TINPLATE—Ooke.	5 00 @	6 50	
Charcoal.	6 75 @	7 25	

THE largest single shipment of silver made from Butte, M. T., was sent down by the Alice mine last week—\$52,784.



**List of U. S. Patents for Pacific Coast Inventors.**

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

- FOR WEEK ENDING OCTOBER 12, 1886.
- 350,667.—COMBINED HARVESTER—J. P. Des- calzo, Peters, Cal.  
 350,494.—ROCK CRUSHER—Joel B. Low, S. F.  
 350,831.—CLOD CHOPPER, ETC.—David Lubin, Sacto.  
 350,832.—CLOD CRUSHER—David Lubin, Sacto.  
 350,597.—LIFTING JACK—M. C. Meeker, Occi- dental, Cal.  
 350,763.—STEAM PUMP—H. J. Oliver, S. F.  
 350,600.—FLOUR CHEST—J. Ozenberger, Middle- town, Cal.  
 350,602.—WRENCH—W. J. Pulliam, Chico, Cal.  
 350,507.—NEWSPAPER FILE—W. Schulz, S. F.  
 350,897.—TAP AND FAUCET—Shaw & Davis, S. F.  
 350,902.—AWNING FRAME—Toulouse & Delor- iaux, S. F.  
 350,791.—KNITTING MACHINE—Frank Wil- comb, S. F.  
 350,792.—KNITTING MACHINE—Frank Wil- comb, S. F.  
 350,793.—KNITTING MACHINE—Frank Wil- comb, S. F.  
 350,794.—KNITTING MACHINE—Frank Wil- comb, S. F.  
 350,795.—KNITTING MACHINE—Frank Wil- comb, S. F.  
 13,720.—TRADE MARK—J. J. Mack & Co., S. F.
- NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

**New York Metal Market.**

Telegraphic advices dated Oct. 21st give the fol- lowing New York prices:

- BORAX—5½¢ @ 6¼¢.  
 BAR SILVER—97.50 per oz.  
 COPPER-LAKE—\$11.25 @ 11.37½.  
 IRON—No. 1, \$17 @ 18.00.  
 LEAD—\$4.85 @ 4.95.  
 QUICKSILVER—54¢ @ 55¢.

The following is the latest by mail from the "New York Metal Exchange Market Report":

- COPPER—Steady, spot closing @ 11.20c. Trans- ferable Notices (Lake) issued at 11.30. Trans- ferable Notices (Chili Bars) issued at 11.15.  
 LEAD—Dull at \$4.25 @ 4.35c spot. Transferable Notices issued at 4.30.  
 TIN—Active at \$22.25 @ 22.30. Transferable No- tices issued at \$22.40.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering ex- tremes of buyers' and sellers' views. All prompt de- livery.—Australian Tin, \$22.60 @ 22.90; Billiton Tin, \$23.00 @ 23.25; Banca Tin, \$23.00 @ 23.50; Baltimore Copper, \$9.75 @ 10.25; Orford Copper, \$10.25 @ 11.00; P. S. C. Copper, \$10.25 @ 11.00; Foreign Lead, \$4.50 @ 4.80; Foreign Spelter, \$4.70 @ 4.75.

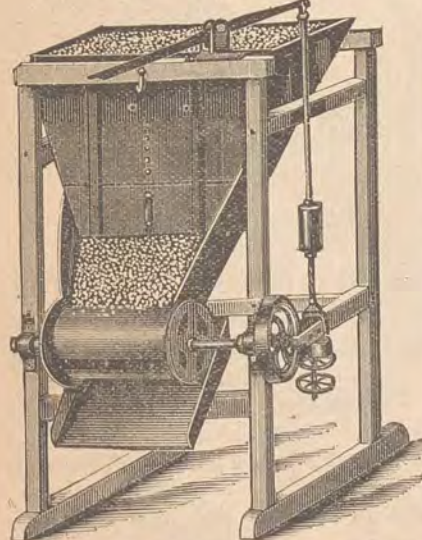
MAKER'S PRICES.—At tidewater. 100 ton lots of listed irons (when brand is specified) range nom- inally about as follows: Lehigh, Grade No. 1, \$18.50 @ 19.50; No. 2, \$17.50 @ 18.00; Grey Forge, \$16.00 @ 16.25. Hudson River, Grade No. 1, \$18 @ 19.00; No. 2, \$17.50 @ 18.00; Grey Forge \$15.50 @ 16.00. Southern, Grade No. 1, \$18.00 @ 19.00; No. 2, \$17.00 @ 18.00; Grey Forge \$15 @ 16.

**Don't Fail to Write.**

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some ir- responsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

**THE ROLLER ORE FEEDER**

[Patented May 28, 1882.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

**Golden State and Miners' Iron Works.**

Sole Manufacturers,  
 227 First Street, San Francisco, Cal.

**Acid-Proof Paint.**

Among the meritorious exhibits at the Me- chanics' Fair, to which was awarded a Silver Medal, is the display by the Paraffine Paint Company, whose main office is at 310 California street. The property which this paint pos- sesses of resisting acids and chlorine gas, as well as defying the effect of long submersion in water, makes it of particular value in gold mills using the chlorine gas process, the tanks containing the solution being rendered water- tight and impervious to the acid by its use. It has been adopted, among other places, at the Amador Reduction Works at Sutter Creek, and the Phoenix works at Drytown, Cal., where a variety of substances had been used without success. This paint is also used extensively in woolen mills for coating tanks and iron pipes in contact with acids.

**California Inventors**

AND FOREIGN PATENT SOLICITORS, for obtaining Patents and Caveats. Established in 1860. Their long experience as journalists and large practice as Patent attorneys enables them to offer Pacific Coast Inventors far better service than they can obtain elsewhere. Send for free circulars of Infor- mation. Office of the MINING AND SCIENTIFIC PRESS and PACIFIC RURAL PRESS, No. 252 Market St., San Francisco. Elevator, 12 Front St.

Should consult DEWEY & CO.

AMERICAN

**DIVIDEND NOTICE.**

OFFICE OF THE

**Paradise Valley Mining Company**  
 San Francisco, California.

At a meeting of the Board of Directors of the above- named company, held September 29, 1886, Dividend No. 9, of Twenty Cents (20c.) per share, was declared, pay- able on Thursday, the 30th day of September, 1886, at the office of the company.

W. LETTS OLIVER, Secretary.

OFFICE—No. 328 Montgomery Street, San Francisco, California.

**D. W. STONE, WHO MINED AT MUR-**  
 phy's Camp in 1882 and at Sonora in 1885, will please address G. A. GELIEN, Vallejo, Cal. Important.

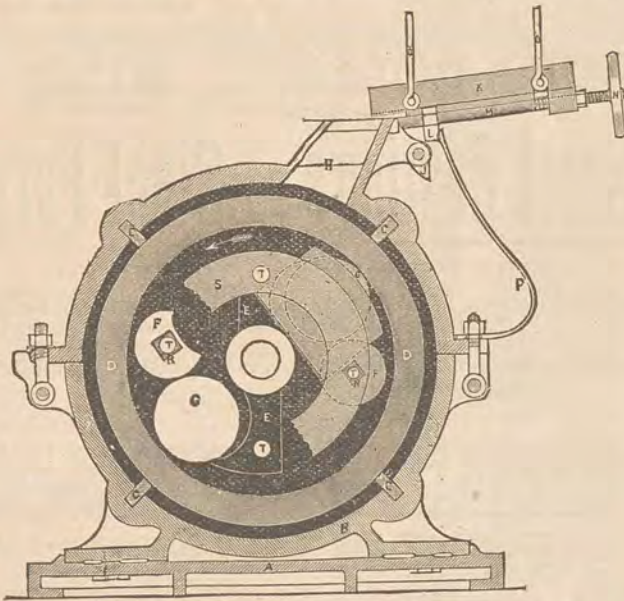
**RUPTURE**

RADICALLY CURED BY  
 Dr. Pierce's Great Discovery. Thousands of patients  
 cured AT THEIR HOMES. No experiment! It does the work  
 DRS. PIERCE & SON, 104 Sacra to st., San Francisco, Cal.

**Engraving.** Superior Wood and Metal Engrav- ing, Electrotyping and Stereotyping done at the office of this paper.



**THE FRISBEE-LUCOP MILL,**



**A CENTRIFUGAL ROLLER MILL**  
 —FOR WET OR DRY—

**Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fine- ness in a rapid and economical manner.**

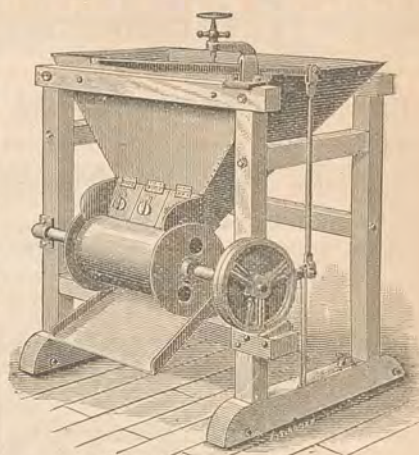
Any method of amalgamation may be applied. At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet. All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco. Certificates as to performance of the Mills, and any information required, furnished on application.

**THE FRISBEE-LUCOP MILL CO.,**  
 Office, 104 & 106 Washington St., NEW YORK.  
 OR PACIFIC IRON WORKS, SAN FRANCISCO.

**SQUARE FLAX PACKING.**

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of ref- erences. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.

**THE ORIGINAL Roller Ore Feeder.**



This form of Ore Feeder is well adapted for its peculiar work.

In reference to a similar form of "Roller" Feeder, which is being manufactured and offered for sale in this city, and of which a cut appears in this journal, we have to say that the Superintendent of the Bunker Hill Gold Mining Company states that the "Challenge" is far su- perior to the "Roller," he having had both of them operating side by side. We shall be pleased to show this letter, upon application, to any one interested.

We are also manufacturers of the "Challenge" and "Stanford Improved."

Prices furnished by the  
**JOSHUA HENDY MACHINE WORKS,**  
 39 to 51 Fremont St., San Francisco.

**ORE FEEDERS.**

We direct attention to an advertisement, which ap- pears in our journal, of the "Original Roller" Ore Feeder, manufactured by the "Joshua Hendy Machine Works," of Nos. 39 to 51 Fremont St., this city.

As the manufacturers of a similar form of Feeder, known as the "Templeton Roller," claim that it is su- perior to any other style, and cite those in operation at the "Bunker Hill" mill in Amador county, we expressly contradict the statement, and in substantiation submit a copy of a letter shown to us by a representative of the "Joshua Hendy Machine Works," which speaks for itself

BUNKER HILL GOLD MINING Co.,  
 AMADOR CITY, CAL., July 12, 1886.

To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: We have used the "Challenge" and "Roller" or "Templeton" Ore Feeders in our mill for the past three years, and I am free to say that I con- sider the "Challenge" far superior to the "Roller" Feeder, in that most important of all things in a quartz mill, namely, the regular feeding of ores to the bat- teries. If the "Roller" Feeder is regulated to feed finely pulverized ore, the coarser ore will choke the outlet of the Feeder, and no ore can reach the batteries. If, on the other hand, it is regulated to feed coarse ore, then the fine ore when it comes will sluice right through and fill the batteries. The "Roller" Feeder requires constant attention. Yours truly,  
 (Signed) N. W. CROCKER, Supt.



**LIFE SCHOLARSHIP, - \$75.00**  
 Full Business Course.

**SIX MONTHS' COMBINED COURSE, \$75.**

Including the Business Course, Academic Course, Mod- ern Languages, Telegraphy, Shorthand, Type-Writing, etc. Ladies admitted into all Departments. Day and Even- ing Sessions during the entire year.  
 CALL OR SEND FOR CIRCULARS.

**American Exchange Hotel,**  
 SANSOME STREET.

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50  
 PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

**W. A. GOODYEAR,**

Civil and Mining Engineer

**MINING EXPERT and GEOLOGIST.**

Address care of DEWEY & Co., 252 Market Street, San Francisco, Cal.



**RUPTURE!**

A New Invention! The "Perfection" Belt Truss, with Universal Joint Move- ment and Self-adjusting Spiral Spring. Worn with perfect comfort night and day. Gives universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDBER, (Druggist) 701 Market Street, cor. Third, San Francisco.

**HEALD'S BUSINESS COLLEGE,**  
 24 Post St. S. F.  
 Send for Circular.



**NOTICE TO  
MINING MEN,  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.**

**Engineers' Tables of Progress**

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

**NEW YORK  
AQUEDUCT TUNNEL**

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimate address:  
**INGERSOLL ROCK DRILL CO.,**

REPRESENTED BY  
**BERRY & PLACE MACHINE CO.**

**PARKE & LACY, Proprietors,**  
12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.



**H.H.H. HORSE LINIMENT.**  
THE H. H. H. Horse Liniment puts new life into the Antiquated Horse! For the last 14 years the H. H. H. Horse Liniment has been the leading remedy among Farmers and Stockmen for the cure of Sprains, Bruises, Stiff Joints, Spavins, Windgalls, Sore Shoulders, etc., and for Family Use is without an equal for Rheumatism, Neuralgia, Aches, Pains, Bruises, Cuts and Sprains of all characters. The H. H. H. Liniment has many imitations, and we caution the Public to see that the Trade Mark "H. H. H." is on every Bottle before purchasing. For sale everywhere for 50 cents and \$1.00 per Bottle.

For Sale Everywhere.

**N. W. SPAULDING  
SAW COMPANY**



**SAW MILLS AND MACHINERY**  
Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

**RICHARD C. REMMEY, Agent,**  
**Philadelphia Chemical Stoneware Manufactory,**  
1100 East Cumberland St., PHILADELPHIA, PA.



**QUARTZ BREAKERS!**  
—AND—  
**Pulverizers Combined.**  
To Run by Hand or Power.  
Mining Machinery of Every Description: Drawings, Plans and Specifications.

**E. I. NICHOLS, 316 Mission Street, S. F.**  
**INVENTORS, TAKE NOTICE**  
**L. PETERSON, MODEL MAKER,**  
258 Market St., N. E. cor. Front (up stairs), San Francisco.  
Experimental machinery and all kinds of metal, tin, and Brasswork.

**HOOD'S FOUNDRY COKE.**

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake. The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**  
316 California St., San Francisco.

**FULTON IRON WORKS,**

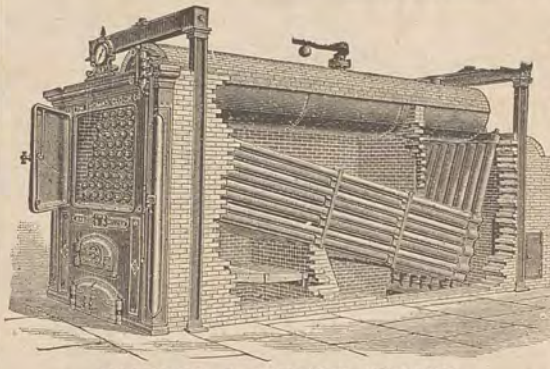
**HINCKLEY, SPIERS & HAYES, Proprietors.**

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



**BABCOCK & WILCOX BOILERS.**

**ENGINES AND BOILERS**  
OF ALL KINDS.

Either for use on Steamboats or for use on Land.  
**Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries**  
OF EVERY DESCRIPTION.

Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure  
or Compound, Stern or Side-wheel En-  
gines.

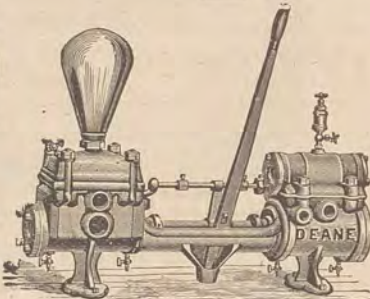
MINING MACHINERY—Hoisting En-  
gines and Works, Cages, Ore Buckets,  
Ore Cars, Pumping Engines and Pumps,  
Water Buckets, Pump Columns, Air Com-  
pressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for  
Dry or Wet Crushing, Amalgamating  
Pans, Settlers, Furnaces, Retorts, Con-  
centrators, Ore Feeders, Rock Breakers,  
Furnaces for Reducing Ores, Water Jack-  
ets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MA-  
CHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines  
and Boilers, Dredging Machinery, Pow-  
der Mill Machinery, Water Wheels.



**DEANE STEAM PUMP.**

**PACIFIC ROLLING MILL CO.,**

.....MANUFACTURERS OF.....

**Cast Steel Castings and Steel Forgings**

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

**GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.**

—ALSO—

**HOMOGENEOUS STEEL, SOFT and DUCTILE,  
SUPERIOR TO IRON FOR**

**LOCOMOTIVE AND MARINE FORGINGS.**

ALSO Steel Rods, from 1/2 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
**STEEL RAILS** from 12 to 45 pounds per yard. ALSO, **Railroad and Merchant Iron**, Rolled  
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**



**FRASER & CHALMERS.**

CHICAGO, ILL.

U. S. A.

General Office:  
Fulton and Union Sts.,  
CHICAGO, ILL.

NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.

**PERFORATED METALS FOR  
REVOLVING and SHAKING-SCREENS,**

**JIGS & STAMP BATTERIES.**

Denver  
Office:  
No. 248  
18th Street,  
Denver,  
Colo.

Mexico  
Office:  
No. 11  
Calle  
de Duero  
Chihuahua,  
Mex.

UTAH OFFICE—SALT LAKE CITY, UTAH.

**Iron and Machine Works.**

**CALIFORNIA MACHINE WORKS,  
WM. H. BIRCH & CO.,**

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

—BUILDER OF—

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines

Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. **ORDERS SOLICITED.**

**UNION IRON WORKS,  
SACRAMENTO, CAL.**

**ROOT, NEILSON & CO.,**

MANUFACTURERS OF

Steam Engines, Boilers,

AND ALL KINDS OF

**MACHINERY FOR MINING PURPOSES.**

Flouring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front St., bet. N & O Sts., Sacramento, Cal.

**Golden State & Miners Iron Works.**

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

**Mold-Board AMALGAMATORS,**

**Golden State Pressure Blowers.**

First St., between Howard & Folsom Sts.

THOMAS THOMPSON THORNTON THOMPSON

**THOMPSON BROTHERS,**

**EUREKA FOUNDRY,**

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

**MACHINE TOOLS,  
PRESSES AND DIES,**

**PUNCHING and SHEARING  
MACHINERY.**

**F. A. ROBBINS,**

....MANUFACTURER OF....

Canners' and Soap-Makers' Presses and  
Dies, 20-inch Engine Lathes,  
12-inch Shapers.

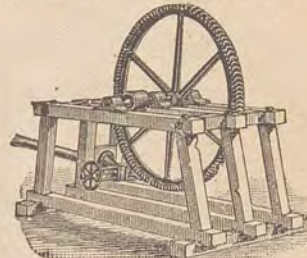
Punching and Shearing Machinery for  
Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

**Gear Cutting a Specialty.**

221 and 223 First St., San Francisco.

**KNIGHT'S WATER WHEEL**



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

**All Estimates Guaranteed.**

SEND FOR CIRCULAR.

**EDWARD A. RIX & CO.,**

Sole Agent,

18 and 20 Fremont Street, San Francisco.

**San Francisco Cordage Factory.**

Established 1856.

Constantly on hand a full assortment of Manila Rope,  
Sisal Rope, Tarred Manila Rope, Hay Rope, Whale  
Line, etc., etc.

Extra sizes and lengths made to order on short notice

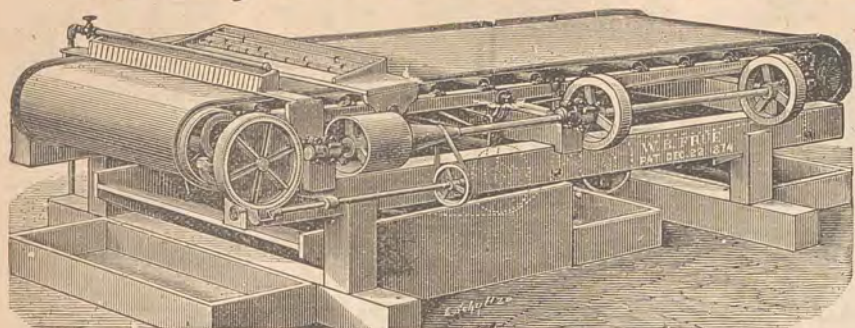
**TUBBS & CO.**

611 and 613 Front St., San Francisco

**DEWEY & CO.'S** SCIENTIFIC PRESS PATENT  
AGENCY is the oldest estab-  
lished and most successful on the Pacific Coast. No. 252  
Market St. Elevator 12 Front St., S. F.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR**  
OR VANNING MACHINE.

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS**  
(\$575.00) F. O. B.

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

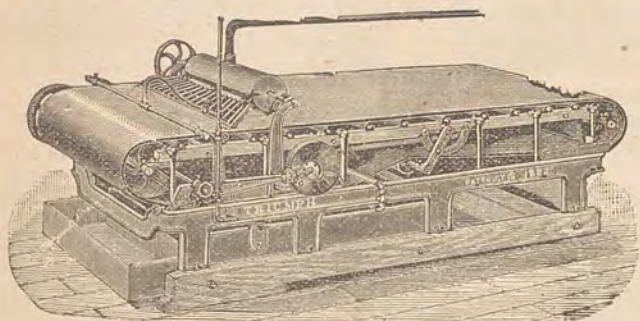
Room 7, No. 109 California Street,

SAN FRANCISCO, CAL.

# \$1,000 CHALLENGE ACCEPTED,

## PRICE, FIVE HUNDRED AND FIFTY DOLLARS

(\$550.00).



**THE**  
"TRIUMPH" ORE CONCENTRATOR.

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE, placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.  
J. C. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

### STEAM, AIR, AND HYDRAULIC MACHINERY.

### Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

### UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



### PATENT LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning  
and Salivation

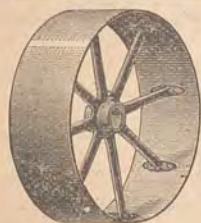
The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, Threshing and Stock-driving, and all other occupations where there is dust, poisonous vapor, or bad odor. In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,  
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.



## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

### CLOT & MEESE,

Sole Licensed Manufacturers of the

### Medart Patent Wrought Rim Pulley

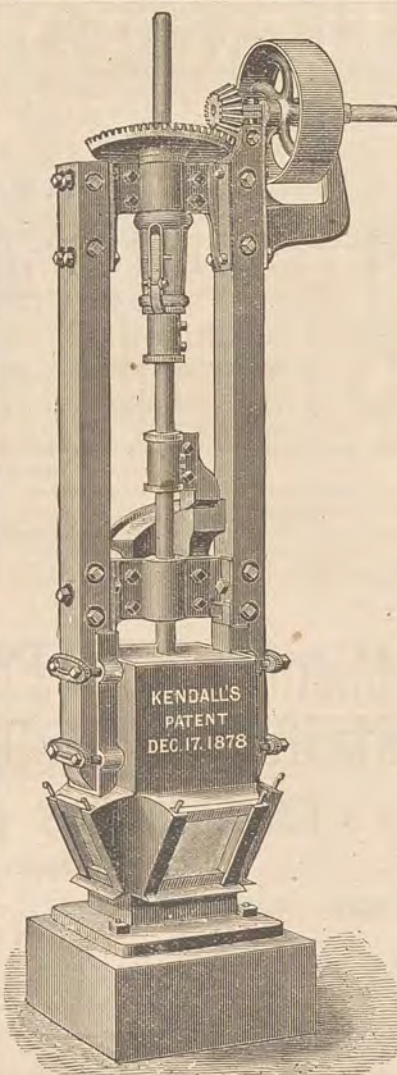
For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

### SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 & 131 Fremont Street,

San Francisco, Cal.



L. C. MARSHUTZ.

G. T. CANTRELL.

## NATIONAL IRON WORKS,

N. W. Cor. Main and Howard Sts.,  
San Francisco,

...MANUFACTURERS OF...

### Stationary and Compound Engines,

### FLOUR, SUGAR, SAW and QUARTZ MILL MACHINERY.

### AMALGAMATING MACHINES.

### CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

### Improved Portable Hoisting Engines

...SOLE MANUFACTURERS OF...

### KENDALL'S PATENT QUARTZ MILLS.

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past seven years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that is claimed for it and give entire satisfaction.

MARSHUTZ & CANTRELL.

Send for Circulars and Price List.



### Chicago Prices Beaten!

ESTABLISHED 1860.

### S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

### J. W. QUICK, Prop'r.

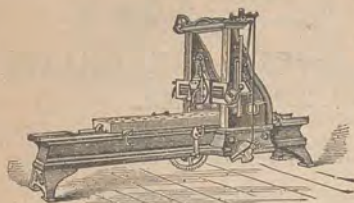
Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Churns, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).  
Orders Promptly Executed



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



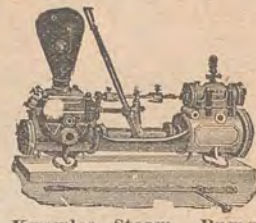
Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Knowles Steam Pump  
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

Cooper Union Institute  
 January 1 '85  
 10744

SEND FOR CIRCULARS.



1850.

1885.

**RANKIN, BRAYTON & CO.,**  
 BUILDERS OF  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

### WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



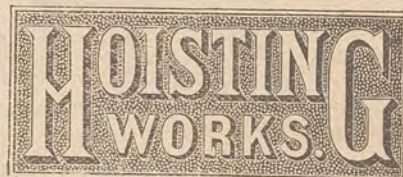
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



### BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700-pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE OF CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

**BEST SOFT LAKE SUPERIOR COPPER USED.**

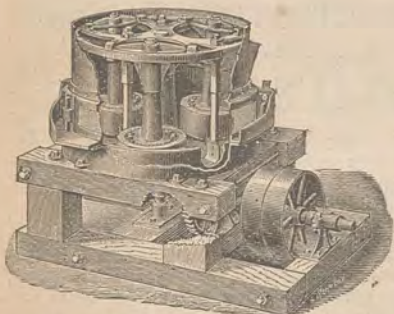
3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.**

**E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



Centrifugal Roller Quartz Mill.

### F. A. HUNTINGTON,

MANUFACTURER OF

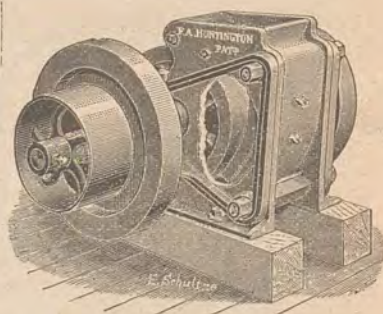
## Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS.

Mining Machinery of Every Description,

**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

## THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
 AIR COMPRESSORS—Rope Power Transmission.  
 HYDRAULIC PUMPING and Hoisting Machinery.  
 WROUGHT-IRON WATER PIPE a Specialty. **NOTE**—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.  
 SAW-MILL MACHINERY of all kinds.  
 STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
 SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.  
 MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.  
 WILSON'S PATENT GAS-PRODUCER.  
 STEAM BOILERS of all descriptions.  
 SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.  
 STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company

Send for Circular and Price Lists.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, OCTOBER 30, 1886.

VOLUME LIII.  
Number 18.

## Tin Ores.

Tin ore has long been known to exist in the Temescal range, San Bernardino county, California, and considerable money has been spent in prospecting. It is a region of granitic rocks, and tinstone occurs in many places, but chiefly at the Cajalca, where a shaft has been sunk following an irregular vein or mass of amorphous cassiterite of a brown or black color. The tin ore is disseminated in small quantity in small lodes and veins. The region, although affording tin oxide in many places over a considerable area, has never realized the hopeful expectations of those who have made efforts to work it. Several other places in the State have been said to show tin, but garnet is often mistaken for this ore, and no tin in quantity has been so far produced here. Under the cheaper conditions of supplies, labor, transportation, etc., it would seem high time to do some thorough prospecting of the San Bernardino tin fields.

Tin ore has been found in several places in the granitic region of Montana and Idaho, particularly in the Rocky mountains, at the headwaters of the Missouri and in the western drainage, including the streams flowing from the Bitter Root range, especially in the Snake and Salmon and their affluents.

Small quantities of tin ore have been found in New Jersey, Virginia (in several counties), Georgia, Alabama, Texas, and Missouri. By far the best deposits so far found in this country are those in the Black Hills of Dakota. The mines are in the central portion of the Black Hills, a few miles east of Harney Peak, near the dividing range of the region. The Etta, the principal mine, is on an isolated granitic hill rising about 250 feet above the valley, and at an elevation of 4500 feet above sea level. The granitic masses are very coarsely crystallized, and deposits of quartz, feldspar and mica are found. The quarrying for mica on the Etta claim brought the tin ore to notice. Since the discovery of tin at the Etta, it has been found in other similar granitic outcrops, especially at the Bob Ingersoll and Monarch claims, each of which has been worked for mica. The massive tin ore found in the Etta claim was a close association with quartz, feldspar (both orthoclase and albite), and a remarkably large variety of spodumene. There is, in addition, the granular form of the ore, in small crystalline grains, disseminated in the massive micaceous albite rock, which penetrates or is inclosed in the coarse granite irregularly. The ore in the Etta is massive, in bunches with spodumene, quartz or feldspar; or granular or disseminated on a micaceous aggregate or greisen. The area of the tin region of the Black Hills is being constantly extended. Some stream tin is also found. The mines are being worked vigorously.

A NUMBER of discoveries of coal veins have been made recently in various parts of Oregon.

## African Gold Fields.

Considerable attention is now being attracted to the gold fields in South Africa, and in other columns of this number of the PRESS we give a detailed description of the De Kaap and other regions in that country. This will be read with interest by miners, since it gives an intelligent account of the different mines. We were shown, a short time since, a number of specimens from the African mines, which were brought here by Mr. Gardner F. Williams, the well-known mining engineer, who spent last year in the gold and diamond fields of Africa. He, however, does not give any very rose-colored view of the gold mines there, and has condemned some of the properties on which large amounts had been expended. Some of the companies have employed people to lay out and conduct their works who were totally in-

## Two Good Camps.

A prospector who has been out all summer in Idaho and Montana and traveled over considerable rough country, writes us that he was in one camp on Horse creek and Owl creek, Lemhi Co., Idaho, which promises well for the future. There are large bodies of galena ore and some brittle silver. The ore is "smelting" and the ledges large, but with low-grade ore. There is plenty of timber and water. There are no roads to the camp, though one could be made from Bitter Root valley. The trail is 75 miles long. It is a good camp for capitalists, but not so for a poor man. There are 40 locations in the camp and plenty of timber along the trail.

Another good camp is at the Sweathouse mines, Missoula Co., Montana. The ores are high-grade gray copper and ruby silver. A

## A Small Quartz Mill.

There are several small mills in the market, some of which crush considerable rock, but are not good gold-savers. And some are cheaper than stamp mills in first cost, but are of such mechanical construction that the wear on them is great. The mill, a representation of which is shown on this page, is a patented one invented by a practical miner, and has been used by him and others successfully, though until now it has never been properly constructed or brought to the attention of the mining community.

The mill itself is so simple, as the cut shows, that the whole thing can be readily understood at a glance. It is claimed to combine the advantages of the regular stamp both as a crusher and gold-saver, while the cost is so reasonable that it is within the reach of all, and the expense of setting is nothing.

There is no part of this mill that can get out of order, and no chance for wear except on the shoes and dies; and these being large and made of hard metal will last a long time. All parts of the machine are simple and strong.

The operation is a reciprocating one, requiring very little power, for gravitation does half the work, the effect being to throw the weight of the boss (1200 lbs.) in unison with the force of the reciprocating power alternately and separately on each shoe, creating sufficient agitation to expel

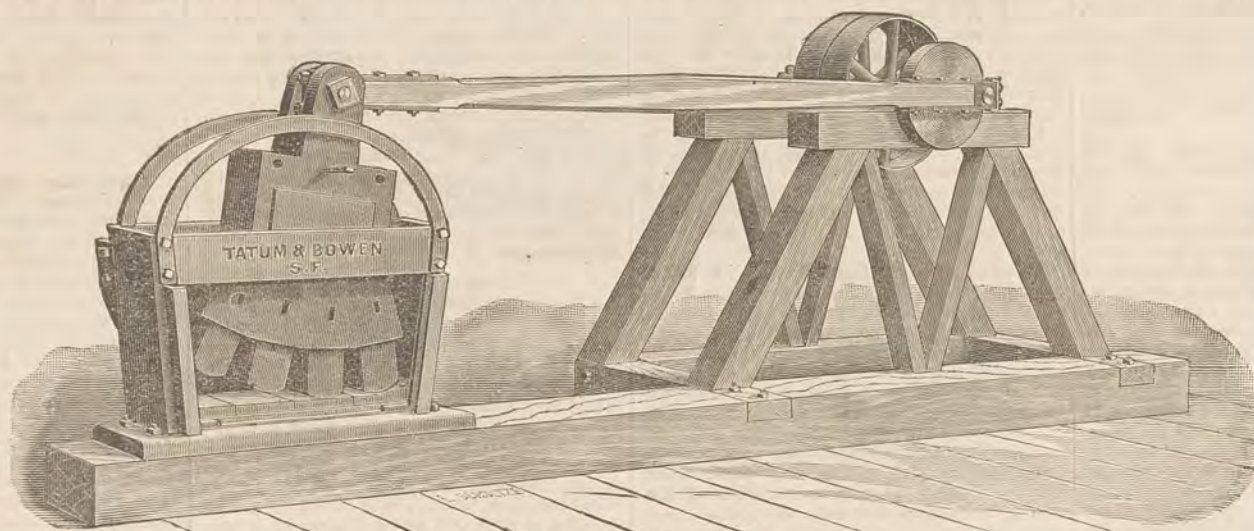
the pulp as fast as it is reduced, while the gold is retained in the mortar in amalgam.

The result is substantially the same as obtained in the regular stamp battery, which is known to be the best gold-saver. Messrs. Tatum & Bowen, of this city, the manufacturers, not desiring to overstate the capacity of the machine, place it at six tons in 24 hours through a No. 40 screen. The weight is about 3000 pounds and about four-horse power is required to run it.

MASTER IN CHANCERY S. C. HOUGHTON leaves for Plumas county next week to make a survey to determine certain boundary lines of the Sierra-Butte Mining Co.'s claim. There are several tracts in dispute before the U. S. Circuit Court. A number of the attorneys in the case will accompany Mr. Houghton.

THE Wallapai (Arizona) Tribune says: Mexicans are taking a great deal of gold out of the old placers near old Greenwood, this county. They have sunk a shaft to bedrock in the gravel, and found a great deal of coarse gold in the bottom. In three weeks, over \$1600 were taken out by a few workmen.

TURTON & KNOX, of Sacramento, have taken a contract to build the Westside & Mendocino Railroad from the town of Willows, Colusa county, through Round valley, Mendocino county, and to the head of Eel river.



JAMES' PATENT RECIPROCATING QUARTZ MILL.

experienced in gold mining, and the result has been large outlay on ground too poor to prove remunerative.

All accounts agree that the country is not one to which miners without means should go. Expenses of travel are great, and no "poor man's diggings" have been found. In gold quartz there, as elsewhere, capital is necessary to conduct operations. The routes to the mines are laid down in the article on pages 278 and 279, but people who have been thinking of going there should seriously consider the chances before starting. No doubt Mr. Williams, who is now in this city, would be glad to give any information on the subject to those who may call upon him.

EDWARD EDDY, of Omaha, and owner of extensive smelting works at Denver, has found a most active demand in London for first-class mining properties, especially where gold is to be had, and the holders of such properties are passing through New York and going to London to effect their sales, several very large ones having been made there during the past few weeks.

GOLD is not now being coined at the Mint, in obedience to orders from the Treasury Department. Silver coinage has been resumed, however, and by the end of the month \$300,000 worth of that precious metal will be turned into dimes and dollars.

wagon can be driven to the mines on the foothills of the Bitter Root valley. There is plenty of wood and water. The Pleasant View mine is owned by Captain Higgins, of Missoula—the banker—and Mr. McCormick, of Stevensville. Our correspondent predicts that this district will be a lively camp next summer.

THE MONO MINE.—The suit of Thomas Holt vs. John Bliss has been transferred from the Superior Court of this city to the United States Circuit Court. The action is brought to obtain possession of the property of the Mono Lake Hydraulic Mining Company. The plaintiff states that in 1882 the property was mortgaged for \$45,241.60. The mortgage was foreclosed in 1885. The premises were sold for \$45,585.44 in January, 1886, and the plaintiff claims to have been the highest bidder. But the defendant (Bliss) claims to own an interest and title in the premises, sold under a sale made by the sheriff on January 22, 1884, under an execution issued by the Superior Court for San Francisco on a judgment recorded in said court on December 19, 1883, in favor of George Leviston vs. the Mono Lake Hydraulic Mining Company, and under redemption made by one Joseph Wilson on January 7, 1885. It is now prayed that judgment be entered for the plaintiff in the present suit.

A NEW machine is being tried in Coos Co., Or., for separating gold from black sand,



## CORRESPONDENCE.

We admit, unaltered, opinions of correspondents.—Eds.

## Zinc Assay.

(Written for the MINING AND SCIENTIFIC PRESS  
by C. H. AARON.)

It is a hobby of mine to dispense with the use of hydrogen sulphide and ammonium sulphide in common assaying. Especially is this desirable in the assay of zinc, for, as every chemist knows, the zinc sulphide is a troublesome substance to handle. It is true that the volumetric methods avoid the necessity of settling, filtering and washing the zinc sulphide, which in some of them is not even produced, yet, in the case of complex ores they require the use of hydrogen sulphide for removal of other metals; moreover, the volumetric methods are only advantageous where zinc assays are tolerably frequent.

In the West it is seldom if ever necessary to assay zinc ores proper, but only to determine the proportion of zinc in our ores of gold, silver and lead, on account of its effect on the working expense, and therefore the selling price of those ores. As hydrogen sulphide is a troublesome and offensive reagent, requiring special appliances, and ammonium and sodium sulphides are liable to decomposition if long kept, while the separation of metals as sulphides is an operation requiring considerable care and skill, I have thought it desirable to devise a gravimetric method in which the formation of sulphides should be avoided, in which only stable reagents should be used, and in which special apparatus should be needless, while at the same time the method should be applicable to ores of considerable complexity.

After many failures, I have succeeded, not indeed in discovering any new reaction, but in applying what I believe to be a new combination of known reactions to the purpose required. If my process or a better one as regards the object in view is already known, my excuse for offering this description of it must be the comparative isolation of my present position which prevents my being as well posted as is desirable.

The ore may contain, besides zinc, the following elements, in combination with each other or with sulphur or oxygen: Fe, Mn, Cu, Ag, Pb, Hg, As, Sb, Sn, Cr, Al, Mg, Ca, Ba, Sr, Si (to which may doubtless be added Bi, Te, Se, and probably P. and Mo).

For the assay I prefer to take 36.5 grains, or an aliquot part or simple multiple of that quantity, according to the supposed richness of the ore and the delicacy of the balance in use. My reason for this preference is that the compound finally got for weighing is the zinc ammonium phosphate, which contains 36.49 per cent of zinc; so that, if 36.5 grains of the substance be taken, the weight of the final product, in grains, is equal to the percentage of zinc in the substance. With ordinary ores, half the quantity named would be ample, while with a rich ore one-tenth would suffice, and the weight of the product got would have to be multiplied in the ratio in which the standard quantity was divided. The same system may be adapted to gramme weights; for instance, if we take 365 mgs., the weight of the product in mgs. divided by 10 is the percentage of zinc in the ore.

One advantage of the determination as zinc ammonium phosphate is the high molecular weight of that compound, which enables one to work conveniently on small quantities of substance; another is that it can be used in the presence of ammonium salts, and the precipitate is collected and washed with quite as much facility as the carbonate, while not requiring to be ignited. This method of final determination is not confined to the process which I am now about to describe, but may be used with any process in which the zinc is got in solution as sulphate or chloride (doubtless also nitrate), free from earths and otherwise fit for precipitation as carbonate, except that, as above noted, the ammonium salts are no impediment.

Having weighed a suitable quantity of the powdered and dried ore, proceed as follows:

Digest in a boiling mixture of nitric, hydrochloric and sulphuric acids; let the nitric be in excess of the hydrochloric, and boil down with sulphuric until the other two are expelled, the heavy fume of the sulphuric acid is seen, and not much of the latter remains. Add some water; again boil, and, after the lapse of a few minutes to allow the soluble sulphates to dissolve, and still boiling, add solution of sodium thiosulphate as long as it makes a dark precipitate; this throws the copper down, lead, silver, antimony, tin, barium, strontium, having been converted into insoluble forms by the acid treatment.

Filter and wash. Heat the liquid to boiling and add crystals of potassium chlorate until the turbidity which is at first produced disappears, and a slight odor of chlorine is perceptible (it may be necessary to add a few drops of sulphuric or hydrochloric acid). To the clear liquid add ammonia in large excess, from three to five grains of ammonium carbonate, and,

after a few minutes, solution of sodium phosphate by drops as long as it seems to increase the turbidity, and a few drops more. The ammonia precipitates iron and alumina, and mercury; the carbonate throws down any alumina and lime that may have remained dissolved, also a portion of manganese if there is much of that; the sodium phosphate completes the separation of manganese and magnesia. As to whether the arsenic is removed or not depends on its state of oxidation and its proportion to the iron present; the question is unimportant. We have now to get rid of the chromium; this is effected by boiling for 10 minutes, after which filter, and wash slightly. Redissolve the residue by pouring slightly diluted sulphuric or hydrochloric acid upon it in the filter, receiving the solution in a clean vessel. Treat this solution exactly as before with ammonia, etc., finally boiling for 10 minutes. The object of this double treatment is to recover some zinc which goes down with the iron, etc. Filter through the same filter and into the same vessel as before, and wash thoroughly, first with ammonia and then with water. To the solution add a few drops of sodium phosphate solution, and let it stand a short time; this is to insure the complete removal of manganese and magnesia, so that, if a precipitate forms, you must filter again; but if enough phosphate was used before, there will now be no precipitate. To the clear liquid add sulphuric or hydrochloric acid, which may at first be strong, but later must be dilute, stirring meantime, until the reaction is faintly acid. If, as is probable, there should be a slight excess of sodium phosphate in the liquid, a white precipitate will form when the neutral point is approached, and this is a useful indication; in any case, as soon as blue litmus paper shows a slight purple tint when dipped in the liquid, add sodium phosphate as long as it precipitates, and then a slight excess. Now heat nearly to boiling until the precipitate curdles and settles, leaving the liquid clear. Filter, wash dry on the water-bath and weigh. The filter must be tared or counterpoised, and before washing the precipitate it is best to make sure that all the zinc is down, by adding to the filtrate a few drops of sodium phosphate. If that produces no cloud, divide the liquid in two parts; to the one part add a drop or two of dilute acid. If still there is no cloud, test the other part with a drop or two of dilute ammonia. If a cloud is produced by either test, the precipitation is imperfect and must be completed, and the liquid, after heating, must be again passed through the filter. If the work is properly done, no zinc can be detected in the liquid by means of ammonia and ammonium sulphide. The dried precipitate should be quite white, otherwise it is not pure. It may, however, retain a trace of chromium without serious detriment to the result, as a little zinc will in any case be lost. If magnesia is allowed to remain, it will not betray its presence by any color.

In my experiments I get from 98% to 99% of the taken weight of zinc. More accurate results may be got by proceeding as follows: After removal of copper and boiling the filtrate with potassium chlorate, convert the sulphates into chlorides by adding solution of barium chloride as long as it precipitates; then add moistened barium carbonate in excess and digest cold with frequent stirring for some six hours. This will precipitate the iron, alumina and chromium, also indium if present, which must be filtered out, and on addition of ammonia, ammonium carbonate and sodium phosphate, the lime, magnesia and manganese will precipitate. It is not now absolutely necessary to boil the liquid before filtering, yet it may be better to do so, as that will insure the complete removal of chromium and will cause the filtration to proceed better. After removal of this precipitate by filtering, proceed to determine the zinc as before.

In the absence of copper the treatment with sodium thiosulphate may be omitted, as also the boiling with potassium chlorate. In the absence of chromium, the boiling of the ammoniac solution is not necessary, as the ammonium carbonate will throw down a part of the manganese if there is much of that, and the sodium phosphate will remove the remainder. The process then becomes more simple, as follows:

Digest in three acids as directed, and filter. To the filtrate add ammonia in excess, ammonium carbonate and a little sodium phosphate; keep warm for some time and filter. If the precipitate is in considerable quantity, redissolve and repeat the precipitation in the same way.

Test the filtrate with a little sodium phosphate to see that no lime, magnesia nor manganese remains; if necessary, filter.

Make the liquid faintly acid and determine the zinc as above.

Some writers recommend the conversion of the precipitate of zinc ammonium phosphate into zinc pyrophosphate containing 42.76 per cent of zinc; if this be done, the taken weight of ore should be 42.76 or a multiple or aliquot part of that; but I have tested the conversion to pyro-phosphate and found no difference in the result, hence do not think it worth the trouble; it is effected by heating in a porcelain crucible until the weight is constant.

The dividend recently paid by the Martin White mine, of Nevada, was somewhat of a surprise. The company recently realized \$15,000 from the milling of 1100 tons of low-grade ore. This is the third dividend paid by this mine since May, 1879.

## New Gold Fields.

The De Kaap Mines, South Africa.

South Africa is a country of surprises. It is barely 20 years since the existence of diamonds along the Vaal river became known, and soon after followed the discovery of the Kimberley mines, which in richness and extent have quite eclipsed those of India and Brazil. The yield of precious stones of all kinds and qualities extracted from the diamondiferous earth since that time is estimated to have reached four or five tons weight, of the gross value of £40,000,000. Diamond mining has become one of our settled and permanent industries; underground shafts have supplanted open workings, a population of about 30,000 inhabit the townships at the four mines around Kimberley, and the ordinary expenditure distributed among the community for labor, machinery and material employed in working amounts to no less than £2,000,000 per annum; while from January to July last the amount paid out to shareholders in the dividend-paying companies was over £250,000.

Now, in another part of the country, says a Cape correspondent of the London Times, since the beginning of this year the existence of a great gold-field has been demonstrated beyond doubt; a series of auriferous quartz-reefs and lodes having been discovered and developed, some of them yielding as rich returns of the precious metal as have been found in any part of the world.

## This Auriferous Tract,

Generally termed the De Kaap Gold-fields, is situated on the eastern side of the Transvaal, where the uplands of the Drakensburg mountains slope off in a succession of terraces and broken hills and valleys to the lower range of the Lebombo, about 120 miles from Delagoa bay. The greater part of it is within the territory of the South African Republic, but it extends over the western and southern border into the adjoining native territory of Swaziland. The Crocodile river to the north, and the Komati river to the south, nearly encircle the area at present attracting attention. Midway between them the Kaap river, with its tributary, the Queen's river, flows through the picturesque Kaap valley, surrounded by an oval of hills, some abruptly rising to 1000 or 2000 feet high. The formation consists chiefly of argillaceous slates and schists, sandstones and conglomerate, in some places disturbed by granite and traversed by quartz-reefs and igneous dykes. The reefs are, for the most part, vertical and run almost due east and west with a southerly inclination. There has been more or less of alluvial ground worked in some of the hills and terraces within the area, but the search for and development of quartz-reefing is the industry on which all on these fields are absorbingly engaged.

## Gold Mining has been Pursued,

For years past, with the usual proportion of success and failure in the district of Leydenburg, immediately north of De Kaap; but it was not until 1883 that attention was drawn to this locality by the discovery of a reef on what is known as the Pioneer Hill. The ground on which the reef was situated formed part of a number of farms, which were the property of Mr. G. P. Moodie, formerly Surveyor-General of the Transvaal, and these were bought by a Natal company, which was at once formed with a capital of £240,000, and a directorate in Maritzburg, who threw open four of these farms to prospectors subject to licenses and royalty, retaining the others for further development. Early in 1884 several other gold-bearing reefs were found on Moodie's ground and also on adjacent Government ground lying to the north and eastward. The latter circumstance led to the Transvaal Government proclaiming the Government lands as a public gold-field in 1885. Messrs. Barber Brothers (from the Cape Colony) then discovered the Umcochiwa reef, and gave their name to the mining township of Barberton, which has sprung up around it.

The discovery of the Umvoti and Central reefs in the immediate vicinity soon followed, and subsequently

## Prospectors Gradually Extended Their Area

For a distance of 10 or 15 miles from Barberton, where the Sheba reef was found by Messrs. Hillary Brothers, and, later on, Messrs. Bray and Griffith hit upon what is known as Bray's Golden Quarry, near the Sheba reef—a huge dyke of quartz, and the quartzite standing out in mass on the hillside, which previous prospectors had passed by, not conceiving it possible to be, what it has since proved, gold-bearing rock of exceeding richness. This property was formed into a company named the Sheba Reef Gold-mining Company, with a capital of £15,000 fully paid up in £1 shares. They were able, after their first crushing, to pay a dividend and acquire some adjoining ground, in all about 10 claims, the capital of the company remaining the same. Later on they alienated six claims, and formed these into a company called the Edwin Bray Gold-mining Company, the shares of which (£25,000) were divided pro rata among the original shareholders. The company also purchased an interest in the Sheba Steam Tramway Company, formed for the transport of the quartz from the hill down to the mills at the river, six miles distant. These shares were also divided pro rata among the original holders. The reef on the Sheba Com-

pany's property is exposed to view, owing to the footwall having given way. It shows to a depth of about 500 feet, and is from 4 to 5 feet in width. Besides this reef the company possesses the before-mentioned Bray's Quarry, from which about 600 to 700 tons or more of quartz have been taken and crushed, giving a yield of 8 ozs. per ton. The tailings from these crushings have been tested, and proved to contain 4 ozs. per ton. The loss is owing to the sulphate of iron, which covers the gold in a thin coating, and prevents the quicksilver on the copper plates from catching the gold. Fifty tons of this ore have been bought, at £25 per ton, by Mr. Crawford, of Newcastle, who has shipped some to London for proper treatment. The quarry shows about 50 feet in width, payable, undefined walls, and about 50 feet deep. No limit has been discovered to the quarry, and the richness of the ore does not vary in going lower.

On the Sheba reef, the Oriental and the Nil Desperandum Companies have a series of claims, and the Standard Company have also some ground; but as yet no discovery has been made like the Quarry. The Oriental (owning 36 claims—each claim on these fields being 150 by 400 feet) have a drive at the low level, about 300 feet from surface, and have thoroughly established the permanence of the reef; the yield by the primitive method of "dollying" being reported equal to 8 ozs. per ton. The Nil Desperandum (Hillary's) have large reefs on their ground—the one is the Sheba proper and the other is a parallel vein of lesser width, but containing good gold. Another company—the Wheel of Fortune—have the reef exposed for nearly 100 feet. It is about 3 feet wide and vertical, with every advantage for mining. The last crushing gave  $4\frac{1}{2}$  ozs. per ton.

Running parallel with the Sheba reef, but on the north side, at the distance of about half a mile, is a piece of ground known as Thomas', the property of two brothers of that name, said to be Cornish miners. While the two brothers were prospecting, one of them was taken ill and sat down at a spot where he saw something glittering before him. He examined the shining substance, and the result was that they sunk a shaft which has yielded some of the very richest ore. It is doubtful whether it is a "reef" or only a "chimney," or fissure, they have found. The brothers, however, made £200 a week by crushing the quartz with a "dolly," the yield giving the magnificent return of from 25 ozs. to 100 ozs. A week or two ago they parted with their property for the sum of £60,000 cash, which was paid them by Messrs. Adler Bros., representing a syndicate of Cape, Natal, and English capitalists.

## While the Richness of the Sheba Hills

Is impressed upon us by facts such as the above, there are numbers of properties on which systematic work is being carried out for their development. The pioneer reef, on the ground of Moodie's Mining and Exploration Company, has been traced through the claims of the Bee Hive, Whitehead, Pioneer, Tiger Trap, and Natalia Companies. In most of the claims the reef has been developed down to the 250-foot level, and varies from 2 to 3 feet, with an average yield of about 2 ozs. per ton. All these companies have machinery erected or in course of erection, and work with water power. Whitehead has 12 gravitation stamps, worked by a turbine. The Pioneer Company have six stamps worked with a Pelton water-wheel. Tiger Trap has five stamps, worked with an overshot water-wheel. Natalia and Bee Hive have ordered machinery from England. The Union Company's block on the Allan reef have also ordered machinery, and have a reef about 3 feet in width, to work which will yield about 2 ozs. per ton. Companies are in course of formation to develop and work the extension of the Allan's reef and Ivy which are adjacent. From Brickhill and Millbourne's claims (the Alpine), according to the royalty paid to Moodie's Company, the yield has equaled 11 ozs. to the ton. The Golden Hill Gold-mining Company have two separate reefs, which, in the present low level drive, have been found to join issue and now form a large lode of from 3 to 4 feet in width—the yield is from 1 to  $1\frac{1}{2}$  oz. per ton, and can be worked with water power. Abbott's reef has been opened up to 150-foot level, and shows 2 to 3 feet, yielding about an ounce or more per ton to be worked with water power. Bredas and Endore reefs are undeveloped; both veins show visible gold freely, and have lately been acquired by the Moodie's Company. The Moodie's Gold-mining and Exploration Company have a 10-stamp Sandycroft mill at work, in Concession creek, which is driven by a turbine water-wheel. Just below its site the Rosetta Company are erecting a 15-stamp battery; they have opened their reef to a level of 100 feet, and have different shafts and tunnels; their ground is being stoped and stacked for milling. The width of the vein varies from 4 to 16 feet and yields from 10 dwts. to  $2\frac{1}{2}$  ozs. per ton. Prellers, Stevens, and other reefs, near Barberton, are in an undeveloped state, but have excellent prospects. There are other parties on equally hopeful ground, higher up the range. The Victoria Company, one of the earliest established, has given a return of 31½ per cent in their dividends on their capital since their formation. They, as well as the Caledonian, have batteries worked by water power. The Sheba Company have purchased the 10-stamp battery erected by Mr. J. C. Rimer. Altogether, there are over a dozen crushing mills at work on the fields, but for the extent of operations, this is very small and in-



adequate. When the means of transport of the quartz from the reefs to the mill is improved, and proper gold-saving machinery introduced, it is fully expected the profits will be considerably increased, as the yield of gold will certainly be greater when subjected to more economical, careful and scientific treatment.

Within the last eight months, during which the export of gold from South Africa is believed to have amounted to about £122,000, the importance of these fields gradually has been thoroughly impressed upon the colonial public. Natal was first in the field furnishing capital to work the various properties prospected; the Cape Colony and Kimberley especially are now investing and co-operating in their development; and from all parts of South Africa men are turning their eyes and hazarding their chances on the glittering possibilities of the Barberton and Sheba reefs.

#### Numerous Mining Companies.

Under the limited liability law of the South African Republic, have already been formed, with an aggregate capital of about three-quarters of a million. Here is a list of these associations already before the public, with the amount of their capital in £l. shares, but new ones are being added to it from month to month:

#### AMOUNT OF CAPITAL IN £1 SHARES.

Victoria .....	£12,000	Nil Desperandum .....	£25,000
Caledonian .....	20,000	New Bonanza .....	4,000
Sheba .....	15,000	Pretoria .....	20,000
Abbots .....	12,000	Rosenda .....	12,000
Barberton .....	15,400	Standard .....	10,000
Middleton .....	15,000	Figer Trap .....	12,000
Kidson .....	18,000	Edwin Bray .....	25,000
Golden Hill .....	3,000	Wheel of Fortune .....	25,000
Rosetta .....	15,000	Pigg's Peak .....	200,000
Central .....	15,000	Oriental .....	60,000
Union .....	20,000	Barberton Prospect .....	12,000
Blue Rock .....	15,000	Victory .....	30,000
Beehive .....	20,000	De Kaap .....	30,000
Colonial .....	60,000	Imperial .....	8,000
Natalia .....	8,000	Alpine .....	25,000

With the formation of companies, scrip-broking soon produced its usual consequences; dabbling in shares suddenly became a feverish passion with a large number of persons, and the scrip of nearly all the companies floated is now at high premiums—some at monstrously inflated prices—out of which a goodly number of the operators have made handsome profits. Fortunately, the banking institutions have given no encouragement nor offered any facilities for carrying on this speculative game; and the classes who have engaged in it are presumably men with available capital dealing with their own means.

#### Climate.

With regard to the climate of De Kaap, it is excellent on the high lands and elevated plateaux throughout the whole year; but after the rainfall of summer, from February to March and April, the lower levels and valleys are malarial. At present the direct passenger and postal route is from Cape Town to Kimberley by railroad, and thence via Pretoria to Barberton by passenger coach. The other route is by Natal; proceeding by rail from the port of Durban to Ladysmith; thence by stage 280 miles to Barberton. This place has now a population of 2000, with hotels, etc.

Besides these De Kaap gold fields, considerable attention has been excited by the more recent discovery by Mr. Struben of another gold field in the heart of the Transvaal, near the capital of the State. The field is about 35 miles south of Pretoria on a plateau forming the water divide of the Transvaal on the Heidleburg side of the Witerwater's Rand. There are some ledges in cement or conglomerate. A number of farms have been declared open to the public by the government, as they are traversed by gold reefs. The yield is from one to one and one-half ounces per ton.

From Bechuanaland there is news of quartz veins with gold near Mafeking. Meanwhile, within the Cape Colony, alluvial gold diggings have been found in the district of Krusna.

It must be borne in mind, however, that no "poorman's diggings" have been found in the country. To get gold, capital and intelligence, with energy and enterprise, must be forthcoming. But there is no doubt that, as after the discovery of the diamond fields, the country is now entering on a new course of prosperity, and that financially, socially and politically, a great future is in store for South Africa.

**IMPORTANT TO MINERS.**—Says the Ouray (Col.) *Solid Muldoon*: The fact that several of our exchanges have inserted two or more claims in one notice of forfeiture, and being in doubt as to the legality of such a notice, we wrote Hon. R. H. Morrison, of Georgetown, upon the subject and received the following:

**D. F. Day**—DEAR SIR: Yours received. The Supreme Court has decided that the affidavit of annual labor may include more than one claim. (McGinnis vs. Egbert, 8 Colo. 41.) I have no doubt that a forfeiture notice may also include more than one claim, but it should be specific and several as to each claim which it includes. The miner has the right to redeem any one lode and let the others go, and it should not be so worded as to apparently impose any condition upon his absolute rights. Instead of anticipating these points it is better, as a rule, to advertise each claim separately.

Yours truly,  
R. H. MORRISON.

WORK is to be resumed at the Mount Cory mine. The shaft is already down 100 feet below the water line, and will now be carried 100 feet lower. An assessment of \$100,000 has just been collected for that purpose.

#### The Great Statue.

The great statue "Liberty Enlightening the World" has been formally presented to the American people and dedicated to its work of sending forth radiance which shall symbolize to the world the light of liberty. The statue is a gift to the greatest Republic of the world from the greatest Republic in Europe—a tribute of honor and esteem to the oldest popular government from a sister nearly a century younger. The gift and its formal acceptance, with all the sentiments involved therein, may be looked upon as constituting one of the greatest events in the history of the world's progress.

On Thursday, October 28th, the formal dedication of the statue took place. The vener-

able De Lesseps, General Grevy, brother of the French President, and Senator Lafayette, great-grandson of the Lafayette whose name will live beside that of Washington, were among those present.

From the many allusions made to the statue in our columns, our readers may be considered informed upon the general facts of the origin of

to confer with Americans concerning his work. On his arrival he was struck with the beauty of New York harbor, and seeing Bedloe's island conceived the idea of a colossal statue which should be much larger than any hitherto erected. As Liberty has reached its highest estate in this country, it seemed right that the statue should represent "Liberty Enlightening the World." This would be a lasting acknowledgment of France's good-will and at the same time light up the harbor at night, embodying a lofty sentiment and conferring a practical benefit.

After he returned home the plan was put into execution, the money raised, and work commenced on the statue. It has occupied eight years of Bartholdi's time and the greater part of his fortune to complete the work.

The engravings on this page will be studied with great interest because the occurrence of the



LIBERTY ENLIGHTENING THE WORLD.—Bartholdi.

able De Lesseps, General Grevy, brother of the French President, and Senator Lafayette, great-grandson of the Lafayette whose name will live beside that of Washington, were among those present.

From the many allusions made to the statue in our columns, our readers may be considered informed upon the general facts of the origin of



BARTHOLDI.

the statue and many things about its progress from its inception to its completion. Suffice it to remind them that the money for the statue was collected by small voluntary contributions from the liberty-loving citizens of France. The task of embodying the sentiments of the contributors in fitting form was intrusted to the sculptor, Bartholdi. He came to this country

dedicatory ceremonies makes their appearance timely. There are many standards set up by which to estimate all efforts. Possibly allusions to the immensity of the figure are not the highest tribute which can be paid to it, and yet they are the most easily grasped. The statue is the largest in the world, and higher than any of the colossal statues of antiquity. The Colossus of Rhodes was only 105 feet high; this is 151.5 feet high. The height of the pedestal will be 91 feet and that of the foundation 52.1 feet. In position it will loom up 305 feet above tide-water. Its weight is 440,000 pounds, of which 176,000 pounds are copper and the remainder wrought iron. While it was being built 40 men found standing-room within the head, and men jumped with ease in and out of the tip of the nose. A six-foot man, standing on the level of the lips, just reaches the eyebrow. Ten people can stand with comfort inside the torch and 15 people may sit around its flame. This elevation can be reached by a staircase within the outstretched arm. The width of the eye is 28 inches, the length of the nose 3 feet 9 inches and the forefinger 7 feet 11 inches long.

This imposing statue, higher than the enormous towers of the great Brooklyn bridge or the steeple of Trinity church, which is the loftiest in the city of New York, by its rare artistic proportions, as well as by its stupendous dimensions, will add another to the wonders of the world. A word should be said of its artistic merit. The pose, stride and gesture, with its classic face, are pronounced perfect. The drapery is both massive and fine, and in some parts it is as delicate and silky in effect as if wrought with a fine chisel on the smallest scale. It stands on Bedloe's island (hereafter to be known as Liberty island), in New York harbor. It is one of the most accessible, as well as one of the most pleasant, breathing spots around New York. The solid granite walls of the old fort, which are in good condition, balance well the height of the statue and contrast nicely with the beautiful grass and shade trees with which the island is covered.

The telegraph announced that the exterior of the statue was finished October 14th. Another week was occupied in putting in the apparatus for the electric lights. It was decided to put up eight 6000-candle-power lamps at equal intervals on the balcony about the torch. Reflectors will be placed behind each lamp to intensify the light. The four on the south side, with a combined power of 20,000 candles, will be visible from 30 to 40 miles off. Besides the eight lamps on the torch, there will be four lamps, each of 6000-candle-power, at the base of the pedestal. These will be placed behind the parapets, out of view on the water, for the purpose of lighting the outside of the statue. By obscuring the lights at the base, the outlines of the statue will be clearly visible on the darkest nights.

The day of the dedicatory ceremonies was a general holiday in New York City, having been thus proclaimed by the mayor. Congress appropriated \$56,000 to pay the expenses of unveiling the statue, with the proviso that none of the money should be used for wines or liquors.

Auguste Frederic Bartholdi, the most distinguished living sculptor of colossal statuary, was born at Colmar, in 1833. He started life as a painter, but soon turned his attention to sculpture. At the age of 19 he produced a notable bas-relief of Francesca da Rimini, which won him his first laurels. During the Franco-German war he fought as a volunteer. In 1878 he produced the "Lion of Belfort," a colossal monument to the heroism of a beleaguered garrison, carved in solid rock. In recognition of this brilliant work the Government bestowed on him the Cross of the Legion of Honor. Among his other important work may be mentioned "Vercingetorix," the old Gallic patriot, and the graceful statue of "Lafayette" in Union Square, New York. At the Centennial Exhibition he was awarded the medal for bronze sculpture.

**THE EFFECT OF EARTHQUAKES.**—It is not generally known that the great slide which occurred on the C. S. road in the Cajon pass, on the morning of the 30th ult., was the result of a heavy earthquake. The foreman says that about four o'clock in the morning he was awake by a heavy rumbling and a violent vibration of the earth apparently from east to west. The noise was so loud and so long sustained that it awoke the whole camp. The men turned in again, however, on the cessation of the sound, and did not think, of course, of visiting the big cut, being quite a distance off from it. On going to work in the morning, they found that a disastrous cave had occurred and the railroad bed covered under a miniature Grayback. The side of the mountain from which the cave descended was cracked in various places, the gigantic splits being many of them at right angles to each other. Those great clefts were plainly visible in the moonlight to the writer, when passing, several nights afterward. Superintendent Victor and engineer Perris doubted the truth of the earthquake report at first, but having made a searching investigation among the laborers, they found the statement of the foreman convincingly corroborated, and were themselves convinced that the disastrous slide was the direct effect of an earthquake. Such accidents of course must be borne with resignation, but they are provoking all the same, especially when they apparently come upward from the supposed direction of Sheol. The company had taken every precaution possible; had done everything that skill and money could do to provide against even a possible slide. Swarms of men have been at work for months cutting off the crown of the impending giant banks. But no skill can provide against the ravages of exploding subterranean force. This company has done much for San Bernardino. It will do more still. We therefore feel a disaster occurring to their road as a direct injury to ourselves. But the damage has all been repaired and the trains are now running regularly.—*San Bernardino Courier.*

**THE MANUFACTURERS' ASSOCIATION.**—The Manufacturers' Association is exerting itself to extend its influence and usefulness. At a recent meeting, which was largely attended, a number of amendments to the by-laws, believed to be essential prior to the beginning of the fourth fiscal year, November 1st, were adopted. The following changes were made: First—Reduction of the number of directors from 11 to 7, as experience of all successful organizations show that a small, compact and industrious body is more united and efficient than the larger. Second—The modification of several articles so as to extend the field of membership and create an auxiliary influence from among a large body of citizens who may be directly or collaterally interested in the success of local enterprises, as, for example, owners of property occupied for manufacturing purposes, commission men who handle time products, stockholders in manufacturing corporations, etc., many of whom have shown interest for and disposition to encourage these industries. Third—Reduction of entrance fee to nominal rate of \$5, and quarterly dues to \$3, so as to make the expense of maintenance within co-operation of every one engaged in these industrial pursuits. Life membership was also placed at \$100. The thanks of the association were tendered Senator Stanford and Congressmen Morrow and Felton for their efforts in procuring to the State its share of Government patronage in work and supplies on public institutions.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week	1 month	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

## SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

## SAN FRANCISCO:

Saturday Morning, Oct. 30, 1886.

## TABLE OF CONTENTS.

**EDITORIALS.**—Tin Ores; African Gold Fields; Two Good Camps; A Small Quartz Mill, 277. Passing Events; Subsidies to Mining in New Zealand; Clays; Hydraulic Mines not all Shut Down, 280. Pike's Improved Gold Sluices; The Black Copper Group; Mineral Products of the United States, 281.

**ILLUSTRATIONS.**—James' Patent Reciprocating Quartz Mill, 277. Liberty Enlightening the World; Bartholdi, 279. Pike's Improved Gold Sluice; Fig. 1—Plan of Black Copper Group, Arizona; Fig. 2—Section of Group at Right Angles to Diorite Dyke, 281.

**CORRESPONDENCE.**—Zinc Assay, 278.

**MECHANICAL PROGRESS.**—New Process of Manufacturing Seamless Copper Tubes; A New Process of Welding; Influence of Cold and Strains on Iron and Steel; A Valuable Invention; Compressed Wood for Tooth Gearing and Shuttles; The Wire Age; Locomotive Improvements; Steel Direct from the Ore, 282.

**SCIENTIFIC PROGRESS.**—First Appearance of the Grasses; Influence of Magnetism on Chemical Reaction; New Uses for Potatoes; Important Discovery in Glass; Scientific Poetry; A Curious Sort of Barometer; A Wick for Gaslight; Electrified Bubbles; A New Metal; Origin of Dew, 282.

**ENGINEERING NOTES.**—An Immense Drainage Enterprise; Drainage of the City of Mexico; Another Great Railroad Enterprise; The International Yacht Controversy; An Immense Span, 283.

**USEFUL INFORMATION.**—How to Judge Canned Goods; How to Lay a Tin Roof; A Novel Contrivance to Loosen Keys and Wedges; Shining Black Ink; Antiquity of Hot-air Furnaces; Varnish for Metals; Down Draught in Chimneys; An Ink River; Sympathetic Ink; Iron in Alum; Rapid Weighing, 283.

**GOOD HEALTH.**—A Word to the Wise; The "Noble Forehead" Fallacy; The Science of Drinking; A Remedy for Round Shoulders, 283.

**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 284-85.

**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 288.

## Business Announcements.

D. W. Stone Wanted—G. A. Gellen, Vallejo, Cal.  
Assessment Notice—Santa Anita M. & M. Co.  
Assessment Notice—Aultman M. & M. Co.  
Assessment Notice—Acme M. & M. Co.  
Patent Truss—J. G. Henderson, Grizzly Flat, Cal.

See Advertising Columns

## Passing Events.

Interests connected with politics and the coming election attract more attention just now than anything else. In this State the political situation is very much "mixed," there being so many party tickets and independent candidates in the field.

Light rains have fallen in many parts of the State, and in the more mountainous portions the snow has come. In California, with the exception of very few localities, mining is carried on all winter, though outside prospecting operations are more or less stopped, as elsewhere.

Silver continues to advance, much to the delight of silver miners. In fact, not only silver but copper and quicksilver have also gone up. Iron has advanced slightly in the East, but here shows no improvement so far. Lumber on this coast has also advanced slightly, for the first time in many months.

The dedication of the Bartholdi statue, of "Liberty Enlightening the World," in New York harbor, which took place on Thursday, with appropriate ceremonies, is an event of more than ordinary moment, showing, as it does, the sympathy existing between the two great republics of the world.

The mining stock market is very active just now, for the first time in many months, and sales at increased prices bring joy to the heart

of the broker. Not only Comstock but outside mines feel the effect. Ore developments in some of the Comstock mines have brought this about. It is to be hoped that the expectations of the sanguine will be realized.

## Subsidies to Mining in New Zealand.

The gold mines, both alluvial and quartz, of New Zealand, are making an excellent showing, and are apparently increasing their output, after a long depression. Up to the close of the last financial year the total gold yield from the various mining districts in the colony was 10,849,261 ounces, representing a value of £42,566,135; while the separate return for last year gives 233,068 ounces, of the value of £931,628. There are in the colony 11,778 miners altogether, working in gold, coal, etc. The average earnings in the gold fields per miner last year were equal to £80 5s 5d. In quartz mining, comparing the value of gold obtained from such workings against the number of men employed, the average earnings of each amounted to £185 5s 5d.

Of the total value of exports of produce and manufacture last year, the mineral products composed one-fifth. Deducting the value of wool from the total, the mineral product was 39 per cent.

The capital invested in registered companies carrying on gold-mining operations amounts to the nominal sum of £7,089,393, which is the aggregate of 451 companies; the amount of paid-up capital is £1,575,983.

The total quantity of quartz crushed during the past year was 94,016 tons, which yielded 111,432 ounces of gold; while the quantity crushed the previous year was 92,872 tons, producing 88,299 ounces, thus showing a very satisfactory increase.

What to us in this country seems rather a curious feature is the fact that the Government aids the miners in building roads, prospecting, etc. The cost of roads and tracks undertaken by counties in the gold fields last year amounted to £54,137, out of which subsidies paid were £35,630; and the cost of similar works undertaken and wholly paid for by the department of mines was £16,275. So far as the Mines Department is responsible, the total cost of such works constructed and in progress will be, when complete, £150,164. Several roads are being built to open up new mines. From time to time Government aid has been given to prospecting, with the object of developing the mineral wealth of the colony. This assistance has been extended to prospecting associations, companies working at deep levels, and latterly, under regulations made by the Governor-in-Council, based on recommendation to the Minister of Mines by the Gold-fields Committee, to the local bodies, and, under special circumstances, to individual parties engaged in prospecting in outlying districts.

Subsidies in aid of the purchase of diamond drills have been given. The Minister of Mines, however, does not believe in this, and has sent to America to try and find a light and portable machine which can bore 500 feet.

In the last four years the total amount authorized by the Government for the construction of water-races, drainage and tailings channels, roads and tracks, diamond and other drills, and aid to prospecting in the gold fields, has been £244,447, and otherwise paid by way of subsidies the sum of £131,044. Last year the sum authorized for similar works was £76,804. They recognize that roads and trails are very important to open up new districts, and spend a great deal of money in this direction to encourage miners to go to new regions.

The Elkhorn Mining Company, of Montana, paid a dividend of five cents per share, or \$5000, on the 1st, making \$50,000 this year. This is the 27th monthly dividend. It is in contemplation to pay 10 cents per share next year.

The U. S. assay office, at Denver, Colorado, received and purchased last month \$213,500, of which only \$1922 was in silver. The sum of \$192,117 was from the Colorado mines; the rest from Idaho, New Mexico and Wyoming.

The reported discovery of gold at Alpine Station, on the Southern Pacific Railroad, north of Los Angeles, is creating much excitement.

There are now only two men in Meadow Lake mining district, Nevada Co., all others having come out for the winter.

## Clays.

The different varieties of clay found in the United States play quite an important part in our industrial interests, owing to the magnitude of the industries connected with them. In this State, in addition to the clays used in making common brick, there is an abundance suited for making the various kinds of pottery. Porcelain clay has also been found, but not utilized. The useful clays of varying degrees of excellence are known to exist in considerable abundance at the following localities in California, their presence having also been observed at many other places: At Lincoln, Placer Co.; Antioch, Contra Costa Co.; in the vicinity of San Francisco, Oakland, San Jose and Sacramento cities; near Mokelumne Hill, Calaveras county; Calico, San Bernardino county; and at various places in Humboldt, Mendocino, Napa, Sonoma, Tehama, El Dorado, Inyo, Santa Barbara and Los Angeles counties.

We make plenty of the coarser kinds of crockery, tiles, sewerage pipes, etc., but no tableware. We make in California about 250,000,000 bricks annually. There is probably \$1,000,000 invested in the brick-making business in the State. In our potteries a capital of about \$400,000 is employed, and the aggregate yearly value of products is \$375,000.

As showing the value of clay deposits, the following list of articles manufactured from clay in the United States is given:

Building Materials—Common building brick; front building brick (pressed brick, molded in taglio or ornamental brick); hollow brick; glazed brick; roofing tile; flue linings; door-knobs and hardware porcelain; terra-cotta lumber; hollow tile, fire-proofing or castings.

Refractory Materials—Fire-brick; gas retorts; retorts for zinc works and for other metallurgical purposes; glass pots; stove and furnace linings; chemists' and assayers' materials.

Pottery—Stoneware; earthenware (yellow ware, Rockingham ware); granite or ironstone ware; whiteware; porcelain (as part of mixture).

Ornamental Ware—Encaustic tile, for walls or floors; ornamental pottery; ornamental terra cotta.

Miscellaneous—Sewer pipe; drain pipe or drain tile; flower-pots; garden border edging; telegraph insulators; well-tubing; receivers for acids; water filters and coolers; lampstands.

This classification is, of course, arbitrary, for a single article might properly come under two or more of these heads. The catalogue is not complete, but includes all lines of manufacture of any great importance. People who have deposits of clay on their lands should examine them so as to ascertain their value. If the deposit is of any extent, analyses can be made of the material, so that the possibility of its utilization in any particular branch may be determined.

THE PHOTOGRAPHING PROCESS.—The San Francisco Photograving Co., No. 659 Clay street, has issued a handsome "proof-sheet" showing engravings made by their process. Machinery, animals, maps, portraits, etc., are readily represented by this system at a much less cost than woodcuts. Their specialties comprise views of buildings, scenery, curiosities, plants, flowers, paintings; mineral, geological, and other natural specimens; samples of crockery, gas-fixtures, and fancy goods; machinery, implements, new inventions, mathematical and scientific instruments, etc., for trade purposes. Enlarged or reduced facsimiles are readily made. The finished cut made by the photo-engraving process may be used for circulars, newspapers, books, etc., and may be readily duplicated. The cuts shown in the proof-sheet show what good work can be done. Copies will be sent on application, and those desirous of procuring engravings without great expense will do well to examine these samples before ordering cuts on wood.

THE Great Western Quicksilver mine, situated on the line of Sonoma and Lake counties, struck quite a bonanza on Thursday last, 90 flasks of quicksilver being turned out from the retorts in a few days.

THE principal business buildings of Quincy, Plumas county, were destroyed by fire on the 25th inst.

CONCENTRATING WORKS, consisting of long tailings sluices, are to be put up at Camp creek, Idaho.

## Hydraulic Mines not all Shut Down.

A New Field for this Industry Opening in the North.

We observe that some portions of the press abroad, remarking upon the subject of hydraulic mining in California, speak as if they supposed this class of mines had all been closed by legal process. As many people, even in this State, appear to be laboring under a like impression, we deem it important that these mistaken notions should be corrected, inasmuch as we have here a great extent of hydraulic deposits the working of which has not been prohibited by the courts, nor is it ever likely to be. The only mines of this class on which operations have been stopped are those that discharge their tailings into some one of the numerous confluent of the Sacramento or the San Joaquin river. This includes, it is true, the largest and most productive hydraulic mines in the State, being those located along the main gold belt and extending from Tuolumne county north to Plumas. South of Tuolumne county the hydraulic gravel deposits, though in places quite rich, are not extensive nor have they ever been outfitted or worked on a large scale. In the range of mining counties, however, reaching a hundred miles or more to the north, occur many very extensive and valuable beds of hydraulic material, this being the region of the deep banks and the "Dead Rivers" proper. Throughout all this territory hydraulic washing has been restrained, though the miners are not without hopes that, through some modification of the restraining orders, through the more effectual impounding of the mining debris, the employment of hydraulic elevators, and perhaps other equally effective contrivances, they will yet be permitted to resume washing operations, at least in part; nor do they wholly despair of obtaining some relief through the action of Congress and the State Legislature. However this may be, certain it is hydraulic mining is for the present repressed in what were formerly the most important and largely productive localities in California.

Meantime this branch of mining has been gradually extending in the northwestern counties of the State, where the business has not as yet been embargoed, and where, as above remarked, there is no likelihood that it ever will be. In these counties, which consist of Trinity, Humboldt, Siskiyou and Del Norte, there occur along the principal rivers and their tributaries, vast ranges of auriferous gravel under the most favorable conditions for their being successfully handled by the hydraulic process. Though worked in spots and in a limited way for many years, not until recently have these northern mines come into much notoriety. With the interdiction of hydraulic piping further south, this region began to attract additional notice, and it is just now receiving a good deal of attention from mine investors or their agents.

The Klamath, Trinity, Smith and Salmon rivers and their branches constitute the streams along which these auriferous gravel banks are mainly found. While the "Dead Rivers" of the Pliocene epoch are not here present, or at least not so well marked as in Sierra, Butte, Yuba, Nevada, Placer or Tuolumne counties, this same class of deposits exists, but of a later period, carrying usually one or more extremely rich channels, while the entire bed of gravel here is more apt to be auriferous throughout than in the counties last mentioned. Not only so, but there is here an almost entire absence of that indurated material so often met with in the old Pliocene channels, and which it costs so much to disintegrate; nor does the miner in this section encounter any volcanic or other barren matter overlying his claim, often so hard and in such quantity as to prevent its being worked. Water is more abundant in this region than in any other part of the State, short and inexpensive ditches sufficing, as a general thing, to introduce it upon the mines under any needed amount of pressure. The outlet is almost everywhere ample, the most of the mines being situated well above the streams into which they discharge.

Nearly the whole of this country is drained by the Klamath river and its three principal branches, the Trinity, Scott and the Salmon, all of which have numerous confluent, the main Klamath having also many minor tributaries. These various streams are separated by high ridges or by lofty mountains, the latter



carrying on their northerly slopes heavy bodies of snow throughout the year. Hence the copious supply and the long continuance of the water season, few of the streams ever drying up, and the larger being kept at a high stage until late in the summer. Without storage of water most of the hydraulic miners here have enough to continue piping from 8 to 10 months in the year. Through recourse to reservoirs the majority of them might run their claims the year round, there never being enough snow or ice here to seriously interfere with washing operations.

None of the rivers in this northwestern angle of the State are navigable, nor are there any bays, harbors or even estuaries suitable for giving shelter to shipping at their mouths. They run swiftly over rocky beds and debouch directly into the ocean. Such being the case, no amount of sediment sent down them, whether from the mines or otherwise, can do any harm. What little farming land there is along these streams lies, for the most part, above high water. And were it otherwise, the owners and cultivators of these little strips of land would be the last to ask for a closing down of the hydraulic mines, since these alone afford them a market for what they raise. As there can, under these conditions, be no interest, property or calling liable to be injured by the debris discharged from the hydraulic mines, it is not to be expected that any objection will ever be made to this branch of mining in that section of the State.

Satisfied of this, and influenced by the generally favorable conditions that exist there, we are advised that a number of sales of mining properties have lately been made in that region, negotiations for others being in progress. These purchases, made partly on San Francisco and partly on foreign account, were conducted so quietly that not until recently did the fact of their having been consummated reach the ear of the public. At Happy camp, on the Klamath, a hydraulic property sold two years ago to Eastern parties has since reimbursed its owners their entire outlay out of its net earnings, amounting now to about \$60,000 per annum. Three San Francisco parties own a hydraulic mine on Hurdy-Gurdy creek, a branch of Smith river, Del Norte county, and which they have for some time past been running with great success, and yet we must confess that only quite lately did we for the first time hear of the enterprise.

Obviously, there is going to be opened in the country here spoken of a wide field for hydraulic mining, and one in which the business will be carried on with better average results perhaps than in the older districts, since the mines here can not only be outfitted, but afterward operated at much less cost than there. It will be a long time before hydraulic mining becomes wholly an extinct industry in California.

THE STRONGEST WOOD IN AMERICA, according to Professor Sargent, is that of the hickory of the Arkansas region, and the weakest the West Indian birch (*bur seva*). The most elastic is the tamarack, the white or shell-bark hickory standing far below it. The least elastic, and the lowest in specific gravity, is the wood of the *Ficus aurea*. The highest specific gravity, upon which in general depends value as fuel, is attained by the bluewood of Texas.

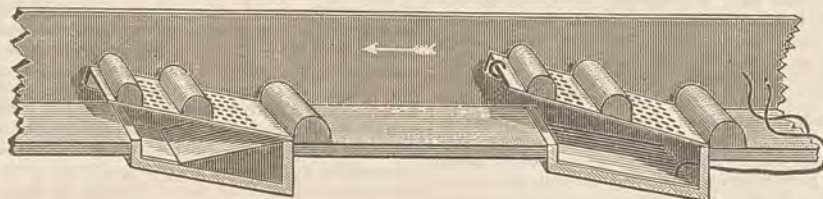
THE CONGO COUNTRY. — Notwithstanding the glowing accounts which have been published in regard to the splendid opportunities for business, for Europeans, which are presented in the newly-discovered Congo country, Africa, M. de Brazza, the explorer, says that after nine years' experience he has come to the conclusion that the West African territory and the basin of the Congo must be left to be developed by the original inhabitants.

ATTENTION is called to the advertisement in another column of W. A. Goodyear, for many years connected with the California State Geological Survey, and latterly Government Geologist of Salvador. Mr. Goodyear has returned to this coast, intending to settle here again.

THE El Paso Times declares that the "boom" is still booming at Kingston, New Mexico, and that the rich developments and influx of capital there indicate an era of prosperity for that camp.

### Pike's Improved Gold Sluice.

The accompanying illustration shows two sections of Pike's improved sluice for saving fine gold usually lost in mills and placers and the floured quicksilver and amalgam which escapes from silver mills. The sluice is simple in construction, one fixed box, about two feet long, being inserted every six feet in an ordinary tailings sluice. The width of the boxes is such as to carry a moderately fast sluice current about one inch in depth. For silver mills, where the settler discharge is irregular, the boxes should be made two feet wide. The depth of the fixed box at the upper end is about three inches; at the lower end, an inch or an inch and a half. The general pitch or set of the boxes is about an inch to the foot. The bottom of the fixed box is covered with an amalgamated plate, or a thin bath of quicksilver, and over this is another amalgamated



PIKE'S IMPROVED GOLD SLUICE.

plate, about one-half of which is perforated by one-eighth inch holes. An oval-shaped riffle three inches high is placed before the upper perforated plate, another riffle half that height is placed across the center, and still another small one may be placed near the end. Thus the tailings passing through the box receive the regular riffle action and are thrown back on the amalgamated plate, are carried through the

saving of \$6 in 12 hours, without any electrical attachment. Edward Pike, Salt Lake City, Utah, is the patentee.

### The Black Copper Group.

A very interesting series of mining claims in Arizona is shown in Figures 1 and 2, and described by Mr. Wendt in the paper quoted from on the first page of the Press last week. They are known as the Black Copper group, consisting of the Copper Queen, Black Copper, Little Big Bonanza, Gray Copper and Copper Jack claims, all located end to end. They occur in a belt of gneiss rock, cut by a dyke of diorite, occasionally intersected by a subsequent intrusion of trachyte.

The gneiss rock for a width of some 40 feet is cut by innumerable small veins and strings of copper ore, following generally the strike of the gneiss and dipping, a little faster than that

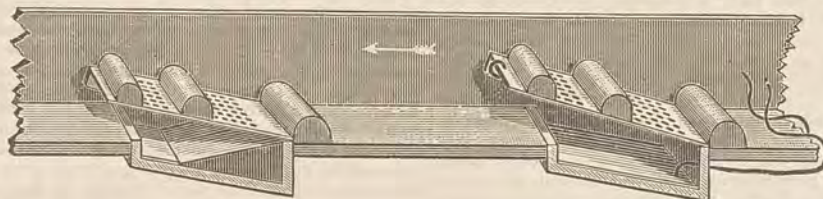


Fig. 1.—PLAN OF BLACK COPPER GROUP, ARIZONA.

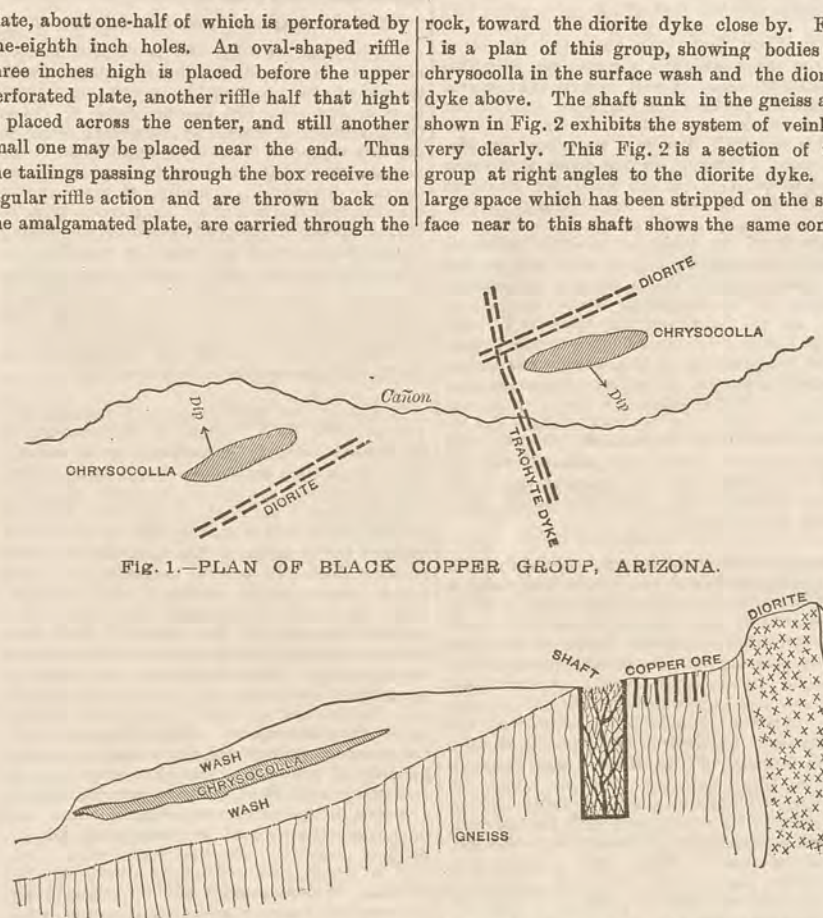


Fig. 2.—SECTION OF GROUP AT RIGHT ANGLES TO DIORITE DYKE.

perforations, and another chance for amalgamation is afforded on the plate or quicksilver below before they are carried into the main box again.

The application of electricity to the first section is shown in the engraving, the positive and negative wires being attached to the upper and lower plates respectively. The electric current is completed by the sluice stream which falls between the two plates. By the use of a powerful electric current, which may be furnished from a strong galvanic battery, or preferably from a small plating dynamo, the quicksilver is kept bright and lively, flouzing and sickening is to a great extent prevented, and the finest particles of gold are readily absorbed. The electro-amalgamation in this box is certainly the most simple yet brought into practical use, and the results on free gold are represented to be all that can be desired.

The second section is shown without the electric attachment, and shows a method of obviating any "filling up" when the gangue may be very heavy. This is done by placing a wedge-shaped block at the bottom of the fixed box, as shown in the cut. The cost of construction of this amalgamator is little more than the ordinary sluice, and the Murray (Idaho) Sun mentions one experiment there at the end of a common riffle which showed up a

tion of affairs. The ore in the shaft and on the surface is malachite and chrysocolla. The widest of the seams is only two inches; the whole mass forms a *stockwerk* too poor to pay for working. Down the hill from this system of veins or *stockwerk*, and below the diorite dyke, a vein of ore is found lying almost horizontally in the drift. Analyses prove it to be a typical chrysocolla. This bed of ore is undoubtedly of secondary origin, and derive from the veins up the hill near the diorite. It has been stripped of a number of places, and has been found, by cuts sunk through it, to have a thickness of four feet of pure chrysocolla. The occurrence is remarkable, as showing the formation of a bed of copper ore in very recent times, and in the wash. Some of the ore from one of these blanket deposits has been hauled to the Old Dominion smelter; but its characteristic decrepitation when heated has prevented its use in the blast furnace. The ore will have to be calcined and made into adobes before it can thus be used.

The making of adobes from fine ore, Mr. Wendt remarks, is generally carried out in all the copper districts of the Southwest. The fine ore is either simply put through a pug-mill, with 10 per cent of clay, or it is pressed into cakes in a regular brick machine, air-dried and smelted.

### Mineral Products of the United States.

The value of the mineral products of the United States is increasing annually. The statistics of last year show an increase in value over previous year of \$15,306,616. In 1885 our mineral products were valued at \$428,521,356; in 1884 the value was \$413,214,728. These products, both metallic and non-metallic, comprise a great many substances, and include gold, silver, copper, lead, zinc, coal, petroleum, lime and many other things, all of which are of commercial value. We have many things on this coast not mined elsewhere, and we have many things also which are not yet mined which elsewhere are found profitable to work. California is the largest gold-producer in the United States. It is the only producer of quicksilver, and, with the exception of Nevada, the only producer of borax. Of chrome iron, too, California is the only producer.

It is interesting to note the number of substances of mineral nature now produced in the United States. We append a table from the advance sheets of the third volume of "Mineral Resources of the U. S.," shortly to be issued by the U. S. Geological Survey. It gives the amount of production and the value of the mineral products of the United States in 1885:

METALLIC PRODUCTS IN 1885.		
	Quantity.	Value.
Pig-iron, spot value...long tons	4,044,525	\$64,712,400
Silver, coining value...troy ozs.	39,910,279	51,600,000
Gold, coining value...troy ozs.	1,538,376	31,801,000
Copper, value at N. Y....lbs	170,962,607	18,292,999
Lead, value at N. Y....short tons	129,412	10,469,431
Zinc, value at N. Y....short tons	40,688	3,539,856
Quicksilver, value at S. F. flasks	32,073	979,189
Nickel, value at Philadel'a.lbs.	277,904	191,753
Aluminum, value at " troy ozs.	3,400	2,550
Platinum, value, crude, at N. Y....troy ozs.	250	187
Total.....		\$181,589,365

\*Including copper from imported pyrites.

NON-METALLIC MINERAL PRODUCTS IN 1885 (spot values).		
	Quantity.	Value.
Coal*.....long tons†	64,840,668	\$82,347,648
Penns'a anthracite...long tons†	34,228,548	76,671,948
Petroleum.....bbls.	21,842,041	19,193,694
Building stone.....		19,000,000
Lime.....bbls.	40,000,000	20,000,000
Salt.....bbls.	7,038,653	4,825,345
Cement.....bbls.	4,150,000	3,492,500
South Carolina phosphate rock.....long tons	437,856	2,846,064
Limestone for iron flux.....		1,694,656
Mineral waters.....galls. sold	9,148,401	1,312,845
Natural gas.....		4,854,200
Zinc, white.....short tons	15,000	1,050,000
Concentrated borax.....lbs.	8,000,000	480,000
New Jersey marls.....short tons	875,000	437,500
Mica.....	92,000	161,000
Pyrites.....	40,000	220,500
Gold quartz, souvenirs, jewelry, etc.....		140,000
Manganese ore.....long tons	28,258	190,281
Crude barytes.....long tons	15,000	75,000
Other.....long tons	8,950	43,575
Precious stones.....		60,000
Bromine.....pounds	310,000	39,000
Feldspar.....long tons	13,600	68,000
Chrome iron ore.....long tons	2,700	40,000
Asbestos.....short tons	300	9,000
Slate ground as a pigment.....long tons	1,975	24,687
Sulphur.....short tons	715	17,875
Asphaltum.....short tons	3,000	10,500
Cobalt oxide.....pounds	68,723	65,373
Total.....		\$239,431,991

\*Comprising bituminous coal, brown coal, lignite, and anthracite, mined elsewhere than in Pennsylvania.

†The commercial product, that is, the amount marketed, was only 63,569,284 tons, valued at \$80,640,564.

‡The commercial product, that is, the amount marketed, was only 32,265,421 tons, valued at \$72,274,544.

RESUME OF THE VALUES OF THE METALLIC AND NON-METALLIC MINERAL SUBSTANCES PRODUCED IN THE UNITED STATES IN 1885.

Metals.....	\$181,589,365
Mineral substances named in the foregoing table.....	239,431,991
Estimated value of mineral products unspectified.....	7,500,000
Grand total.....	\$428,521,356

A WRITER in the *Southern Cultivator* says: It is now being declared that the willow is quite as useful for malaria districts as the blue gum, and even more so, and well deserving the name of the anti-fever tree. The malarious shores of the Levant, from which fevers and agues are never absent, have been rendered perfectly healthy by the extensive planting of willow trees.

THE U. S. Mint, at Carson, is again open for business as far as the assay, melting and refining departments are concerned. The coining department will probably start up when bullion deposits are sufficiently large.

THE Santa Rita Land and Mining Company purpose to work the San Xavier mine, Arizona. The lease of Mr. Conlee having expired, the company will continue the work, but probably on a larger scale.

THE Young America Consolidated Mining Company, of Sierra county, paid a dividend of four cents per share, or \$30,000, on the 9th of September, making \$145,000 this year.



## MECHANICAL PROGRESS.

## New Process of Manufacturing Seamless Copper Tubes.

The English correspondent of the *American Manufacturer*, in one of his late letters, says: A new process in tube manufacture which promises to be of much value from an economical and mechanical point of view has recently been introduced into the works of Messrs. Ralph Heaton & Sons, of Birmingham, Eng., for the manufacture of seamless copper tubes. The principle employed is one by which the friction of bodies in contact, which are being moved over each other in one direction, can be greatly reduced. As it is applied to tube mandrils the resistance to a bulb mandril being passed straight forward through a tube can be reduced to about one-sixtieth by revolving it. Most saving in power seems to be effected when the cross motion is about equal to the longitudinal traverse.

## Description of the New Manufacture.

Described briefly, the process is as follows: Round bars or "billets" of metal are fixed firmly in a matrix. The "billet" is then pierced to the required diameter by the mandril, which revolves, and is pressed forward with great force. This is accomplished without taking any metal out of the "billet," the metal being laved or spun aside by the mandril, as it forces its way through. This necessarily elongates the metal, and at one thrust a billet 2 feet 3 inches long is transformed into a "shell tube" four feet long. In this state the shell may be taken to the ordinary draw benches, and finished into tubes of required diameter.

## In the Making of Iron and Steel Welded Tubes

The process has already been in use for a considerable period in several of the large tube manufacturing in this country, but its application to copper tubes is entirely new. The inventor is Mr. J. Robertson, of Glasgow, who claims for it considerable advantages over the processes previously in use. The result of the application of the invention to the making of cold-drawn tubes is that they can be made at less cost than by any mode of casting them.

**A NEW PROCESS OF WELDING.**—Mr. William Anderson, of Erith, recently read a short paper on "The Lafitte Process of Welding Metals" before the British Association. With a view to overcome the difficulties in spreading borax or other fluxing materials over the heated surfaces in making welds, M. Lafitte had invented plates, usually consisting of a very pliable wire gauze, on both sides of which the flux, being highly vitrified, is evenly spread. Paper may be also used as a support. In cases of small surfaces it is often sufficient to form a sheet of the flux and metal filings agglomerated together. The plates are simply placed between the surfaces in place of the powder being sprinkled on, the wire gauze being welded in between the surfaces. A table of tests made was shown on the wall, the results being highly favorable to the system. Mr. Anderson attributed a great part of the success to the much lower temperature at which the welding could be accomplished. Examples of welding by this system were also shown, all of great interest; perhaps the most remarkable was the case of a hammer-head in which a face of tool steel had been welded on to an ordinary hammer-head forging. This hammer had been in ordinary shop use for six months. To weld tool steel to iron is certainly a remarkable achievement, and one that marks an era in the history of the blacksmith's handicraft.

**INFLUENCE OF COLD AND STRAINS ON IRON AND STEEL.**—B. Papkoff gives in the *Russian Mining Journal* an account of an extensive series of experiments on the influence of cold on the strength of iron and steel in various forms and under various kinds of strains, but circumstances obliged him to abandon his intentions after a very few tests had been made. He thinks, however, that the results he was able to obtain are worth being made known, because they seem to point to conclusions totally opposed to those generally received. All the specimens tested were taken from soft steel and iron plates, three samples being cut from each plate. One sample of each group was tested at the ordinary and two at the low temperature. It was found that both the ultimate strength and percentage of elongation increased very sensibly with the decrease of temperature; the author remarks that such a result was to be expected, because the contraction caused by cooling has the effect of bringing the particles of matter closer together, and consequently of intensifying the force of cohesion, but he also observes that a law which may be found general for strains gradually imposed may not apply at all when they assume the nature of shock or of impact.

**A VALUABLE INVENTION.**—Henry Loeser, of Boston, has invented and patented a machine for cutting leather lacings by machinery. Until this invention was brought out leather lacings for shoes, beltings, horse-nettings and the like have been cut by hand, of necessity a slow process, and when the millions of these little necessities annually consumed is taken into account, it will be seen that the work required altogether a very large number of hands. A company has already been formed for operating

these machines, which are said to be producing astonishing results, promising to revolutionize entirely the business heretofore prosecuted by hand. Not only does one of these appliances turn out about 10 times as many lacings as a man could do, and at half the cost, but it utilizes the merest bits of leather, chopping little shreds, almost worthless, into the most perfect laces, turning them out of uniform length and exact proportions. The shavings remaining are manufactured into shoe heels. Already 26 hands are engaged in working the machines thus far put in operation, and there is an unlimited demand for the goods.

**COMPRESSED WOOD FOR TOOTH GEARING AND SHUTTLES.**—The *London Engineer* describes the compression of beech and other woods by means of hydraulic presses, under the patent of Robert Pickles, of Bromley, England, who makes this wood a specialty for shuttles and for gearing. The compression of the wood improves its wear-resisting qualities to a degree that would be deemed impossible. The wood is first sawn into sizes necessary for making shuttles or cogs and naturally dried. It is then put under a pressure of about 15 tons per square inch, in a rectangular space in the press, holding six shuttle blocks, three side by side and two deep. Above is a metal block made so as to fit the space in the ram. The depth of the blocks before compression is 2½ inches, which is reduced to 1½ inches. The woods generally used for this purpose are beech, cornel and persimmon. The grain is very close and the weight of compressed beech is considerably greater than that of boxwood, and when compared with uncompressed beech, it is remarkably heavier. In regard to the wear of the wood for cogs it is stated that it will last a long time, and run very easily.

**THE WIRE AGE.**—We have had the stone age, the bronze age, the iron age, and it is likely the future annalist will describe this period of American history as the wire age. In no part of the economy of daily life are we separated from wire. Sleeping, we repose on wire mattresses. Eating, we see foods that have passed through sieves, and which are sheltered from the flies by wire-covers. Calling, we pull wires to ring curled-wire gongs. Traveling, we are conveyed by cable or electric railways, hoisted by elevators hung on wires and hurried over wire bridges. We announce our coming by telegraph or telephone wires, we talk by wires, and we thread our way by night through streets lighted by means of electric wires. Across the prairies of the west are stretched thousands of miles of barbed wire fences, against which dumb brutes protest, cowboys swear and draw the knife, and lawyers, judges and reporters whet their intellectual blades. Our clocks are set by wires, our watches run by wires, our books are stitched with wires, our pictures hung on wires, and our politics managed by wire-pullers.

**LOCOMOTIVE IMPROVEMENTS.**—Precisely what form the locomotive of the future will take it would be unwise to predict, but there are many evidences that the largest locomotives have nearly or quite reached the limits of size and capacity possible with the present plans of construction. In this connection it may be stated that a novel and ingenious device for ejecting water from the cylinder of a locomotive has recently been invented by William McKenzie, general foreman of the New York, Pennsylvania & Ohio Railroad machine shop, in Meadville. The steam ports on either side of the locomotive are connected with a small pipe, to which is attached an automatic valve directly back of the saddle. When the locomotive is under steam pressure this valve remains closed, and opens the moment the pressure is shut off, thus allowing every drop of water that has accumulated in the ports to escape.

**STEEL DIRECT FROM THE ORE.**—Considerable interest is awakened in experiments now proceeding in Pittsburg, which seem to prove that excellent steel can be made directly from iron ore, by mixing in small pieces with 20 per cent of Rhode Island graphite, reduced in an ordinary heating furnace to a spongy mass; the phosphorus and other impurities flowing off with the slag, and the mass being ready to be drawn in two hours. Specimens have been hammered into knife blades, developing fine qualities. —*Pittsburg Times*.

**A NEW FORM OF SCREW-DRIVER** has been devised, which by simply pushing on the handle revolves and readily drives home any small screw. In drawing a screw the device is so "set" that the tool may be used as an ordinary screw-driver—the same in all heavy work. It will be seen that the use of this tool does away with much of the tiresome turning of the hand and twisting of the wrist, the work of driving the screw being accomplished by simply pushing.

AMERICA now makes one-fifth of the iron and one-fourth of the steel of the world and is second only to Great Britain. In steel, America will probably lead the world in 1890. We already lead the world in Bessemer steel. In 1870, we made only 40,000 tons. In 1882 we made 1,500,000 tons. —*Power and Transmission (Mishawaka, Ind.)*

THERE are about 690 iron furnaces in the United States. These turned out, in 1885, over 5,000,000 tons of pig iron.

## SCIENTIFIC PROGRESS.

## First Appearance of the Grasses.

At the meeting of the Geologists' Association, held at London, April 2, 1886, J. Starkie Gardner discussed the points bearing on the geological period at which grasses first began to assume a preponderating position in vegetation. Their value and importance at the present day were first sketched, and it was remarked that they occupy, under cultivation, one-third of the entire area of Europe, inclusive of lakes and mountains. There are over 3000 species fitted to occupy most diverse stations and to overcome nearly every kind of competition, under no matter what conditions, with the result that about 95 per cent of the plants growing in ordinary meadow land are grasses.

The conclusion arrived at was that there was no great development of grasses until toward the close of the Eocene, no definite remains being associated with any of the older Eocene floras of temperate latitudes. A number of facts were brought forth to show that grasses could by no possibility have failed to become associated with the remains of other plants in beds deposited under such conditions as those of the Eocene, had they existed in any profusion then; while, further to support this argument, it was stated that the very similar Oligocene and Miocene beds all over Europe are crowded with them. Further, it was shown that the dentition of all the early Eocene herbivora was adapted for crushing fruits, snapping twigs, and grubbing roots, rather than for browsing on such food as grass; so that the evolution of true graminivora must be postdated to the appearance of the grass itself.

## The Geological History of Insects.

At the same meeting, the geological history of the whole class of insects was reviewed, with the object of supporting the conclusion arrived at as to the post mid-Eocene date of grass. Older remains of grass may, however, occur in the last series of Tertiary deposits in Spitzbergen, but as yet their age has not been accurately correlated. Finally, it was shown that the introduction of an aggressive type in vast numbers, of different habits, to pre-existing vegetation, exerted an influence upon terrestrial life altogether without parallel, and for the first time rendered possible the development of a meadow and prairie vegetation distinct from that of marsh, scrub, and forest, with all the attendant forms of animal and vegetable life to which such vegetation is indispensable.

**INFLUENCE OF MAGNETISM ON CHEMICAL REACTION.**—Mr. E. L. Nichols, in the *Journal of the Chemical Society*, describes a set of experiments with aqua regia, nitric acid, hydrochloric acid and sulphuric acid to illustrate the phenomenon that when finely divided iron is placed in a magnetic field of considerable intensity and exposed to the action of the acid, the chemical reaction differs in several respects from that which occurs under ordinary circumstances. With aqua regia, it was found that the speed of reaction is greater in the magnetic field than without, and that the heat of chemical union is much greater. With nitric acid, the effect of the magnet was to greatly increase the speed, reducing the average time from eight minutes to less than one minute. With sulphuric acid, the reaction was uniform and complete, and apparently of the same chemical character within and without the fluid. The magnet was found, however, to increase the speed of reaction and to decrease the amount of heat produced. A series of measurements was made with nitric acid, in which powdered copper was substituted for iron. The reaction in the field was found to be identical with that which occurred when the magnet was not in action.

**NEW USES FOR POTATOES.**—Two new uses for potatoes have recently been discovered, one of which is for the production of sugar, the other for the production of alcohol. A Lyons sugar manufacturer has devised a process whereby the potato is treated in much the same manner as the sugar beet. Hitherto only glucose has been extracted from the potato, but it appears that, by means of the electric current, not only glucose, but also saccharose, may be obtained therefrom. Satisfactory results having been obtained from trials made in the Azores, on the failure of the orange crop, to utilize sweet potatoes for the production of flour and spirit, a French chemist, connected with the French Antilles, M. Ralu, has lately taken out patents for improvements in these two new industries. The latter seems likely to obtain large proportions. The sweet potato of Martinique yields 15 litres of alcohol at 100 degrees per 100 kilos weight of roots, and it is probable that the produce of other islands and of the Southern continent of America will yield about the same quantity. Ordinary potatoes only yield about 3 to 4 litres.

**IMPORTANT DISCOVERY IN GLASS.**—Berlin papers copy from the *Germania* an account of an important discovery in glass manufacture made by Friedrich Siemens, of Dresden. He has succeeded in casting glass in the same way as metal is cast, and obtaining an article corresponding to cast metal. This cast glass is hard, not dearer in production than cast iron, and has the advantage of transparency, so that all flaws can be detected before it is applied to practical use. It will be much less exposed

to injury from atmospheric influences than iron. The process of production is not difficult, the chief feature being rapid cooling. Experiments are being just now carried out at the Siemens glass foundry, at Dresden, with the purpose of ascertaining to what industrial uses the new material can be applied. Its hardness and resistance are so great that it is thought possible it may be used as a substitute for iron in the manufacture of rails for railroad use. Experiments are now being made in that direction.

**SCIENTIFIC POETRY.**—The natural rate of respiration is from 16 to 24 breaths per minute, the average being 20; and Dr. Oliver Wendell Holmes has explained the popularity of the eight-syllable verse by the fact that it follows the natural rhythm of respiration more exactly than any other. Experiments with the poetry of Scott, Longfellow and Tennyson show that an average of 20 lines will be read in a minute, so that one respiration will suffice for each line. The articulation is so easy, in fact, that it is liable to run into a sing-song. The 12-syllable line, on the other hand, as in Drayton's "Polyolbion," is pronounced almost intolerable on account of its unphysiological construction. From this it follows that, while the poets disregard science in many ways with impunity, nothing in poetry nor in vocal music is likely to win favor that is not calculated with strict reference to the respiratory functions.

**A CURIOUS SORT OF BAROMETER.**—A scientific journal speaks of a curious sort of barometer in use in the canton of Geneva, Switzerland, where some dried-up wells are employed by the natives to forecast the weather probabilities. These wells are tightly closed at the top by means of a cover, in the center of which an orifice, about an inch in diameter, is made. When the air pressure outside diminishes, on the approach of a storm, the air in the well escapes, blows a whistle in connection with the orifice, and in this way gives notice of the storm's approach. If, on the contrary, the pressure increases, a different sound is produced by the entry of the air into the well, and the probability of fine weather is announced.

**A WICK FOR GASLIGHT.**—We have already made reference to the introduction of a new invention which, it is claimed by gas engineers, will revolutionize the present system of gas lighting. It is the invention of Dr. Auer, of the chemical laboratory of the Vienna University. Briefly described, the invention may be said to consist in rendering a cottonwick incombustible by impregnating it with a metallic liquid. Thus treated, the wick, instead of burning, merely glows, emitting a radiance not unlike that of the electric light. The whole process is very simple, and the great advantage of the invention is that it may be applied to any gas-burner.

**ELECTRIFIED BUBBLES.**—At the Royal College of Greenwich, England, soap bubbles were blown of a cylindrical form and in a vertical position between two concentric platinum rings which served as electrodes. When the bubbles are left to themselves they exhibit a series of colors in horizontal band, which gradually enlarge and descend; a black band soon appears toward the top and also extends downward. Electric currents tend to transport the liquid to the negative pole, thus retarding the motion of the bands if the negative electrode is at the top, and accelerating it if the negative electrode is at the bottom.

**A NEW METAL.**—A new metal, called by the inventor, Albert Assman, of Rahway, N. J., "assayme," is produced by a special treatment of tin. It has all the good qualities of the latter, can be pressed into any shape, or cast into statuary, or used for plateware of any description. A beautiful bronze color can be given to the metal, or any shade from bronze to a silver color; and as it does not in the least corrode, it is especially valuable as a silver solder. It melts at a temperature of 432 degrees, or 18 degrees less than tin.

**THE SWIFTEST BIRD** on the wing is the frigate bird, a sort of nautical bird of prey. Sailors believe that it can start with the peep of dawn from the coast of Africa, and, following the trade winds, land on the American coast before sunset. It can undoubtedly fly more than 200 miles an hour, but we do not know of any trustworthy record of the speed of which it is capable.

**ORIGIN OF DEW.**—It is common to hear people speak of dew falling; it does not fall—it rises, as one might say. Dew forms on vegetation precisely as the moisture forms on the surface of an ice-pitcher in a warm room. Dew is the deposition of moisture in the atmosphere on the cooler surface of the earth.

**WIND PRESSURE** is generally supposed to increase as the square of the velocity when the opposing surface is at right angles to the direction of the wind, and in such cases Smeaton's rule is to divide the square of the velocity in miles per hour by 200; the quotient is the pressure in pounds per square foot.

**WONDERFUL PROGRESS** is being made in microscopical science, the president of the British Microscopical Society recently pointing out that results are now attained which mathematicians five years ago declared to be impossible.



## ENGINEERING NOTES.

## An Immense Drainage Enterprise.

The Russian Government is engaged in one of the most extensive drainage enterprises ever undertaken in any portion of the world. The location is what is known as the Pinsk marshes, in the southwest of Russia, near the borders of Galicia. This region is so extensive as to secure special designation on the ordinary map of Europe, and, in point of area, is very much larger than Ireland. They have become famous in Russian history as a refuge of all manner of romantic characters, and have remained an irreclaimable wilderness up to within the last few years. In 1870 the Russian Government first took in hand seriously the abolition of this wild expanse, owing to being perpetually more or less submerged and covered with a jungle growth of forest, preventing not only communication between the Russian districts on either side, but also between Russia and Austro-Germany. A large staff of engineering officers and several thousand troops were draughted into the region, and these have been engaged upon the undertaking since. Up to the present time about 4,000,000 acres have been reclaimed by means of the construction of several thousand miles of ditches and of canals so broad as to be navigable for barges of several hundred tons burden. Just now the engineers are drawing up the program for next year, which comprises the drainage of 350,000 acres by means of the construction of 120 miles more of ditches and canals. Of the 4,000,000 acres already reclaimed, 600,000 acres consisted of sheer bog, which has been converted into good meadow land; 900,000 acres of "forest tangle," which have been prepared for timber purposes by cutting down the underwood and thinning the trees; 500,000 acres of good forest land—forest oases in the midst of the marshes—hitherto inaccessible, but which have been connected more or less by navigable canals, and thereby with the distant markets; and finally 2,000,000 acres have been thrown open to cultivation, 120,000 acres of which have already been actually occupied. Besides making the canals and ditches, the engineers have built 179 bridges, bored 577 wells from 20 to 80 feet deep, and have made a survey of 20,000 square miles of country hitherto unmapped. When their task is finished, Russia will have effaced from the map of Europe one of the oldest and toughest bits of savage nature on the continent. From an engineering, geological and scientific point of view, generally, the work is one of special interest.

**DRAINAGE OF THE CITY OF MEXICO.**—The City of Mexico, though several thousand feet above sea level, is flat and hemmed in by mountains and a shallow lake, which latter has received all its sewage up to this time. The lake is filthy and is rapidly filling up, and on several occasions of late has threatened to overflow the city. Efforts have been made for several years to secure a proper drainage for this sheet of water, and various engineers have been consulted in the matter. Works are now being constructed under the direction of Robert S. Mayol, engineer of the City of Mexico. The sewage and surplus waters of the lake will be conveyed in a canal 30 miles to a tunnel, which is now being pierced six miles through the base of a mountain, the ground on the other side being much lower than the city. The whole cost will be \$6,000,000. The city is supplied with an abundance of pure water by means of those aqueducts which conduct the water from the mountains.

**ANOTHER GREAT RAILROAD ENTERPRISE.**—The grand scheme of a railroad from the ocean, at Charleston, to the Lakes, is once more talked of. Perhaps the best assurance of the good faith of the projectors of this important railway enterprise is contained in the fact that Col. Frank Coxe, now a resident of North Carolina, has been elected president of the company. Col. Coxe possesses large business capacity, owns valuable landed and coal interests in North Carolina and Pennsylvania, was formerly the successful president of the Commercial Bank, of Charlotte, N. C., is a member of the wealthy firm of Coxe Brothers & Co., extensive coal miners in Pennsylvania, and is now the vice-president of the Western North Carolina Railroad.

**THE INTERNATIONAL YACHT CONTROVERSY.**—A veteran naval officer suggests that the relative merits of the sloop and cutter type will not be settled until one of our sloops conquers in English waters. He says the performances of cutters in the rough seas and thrashing winds of the British channel and narrow seas are really wonderful, and confirm him in the belief that they are the best rough-weather boats he has ever seen in nearly 40 years' service in all quarters of the globe.

**AN IMMENSE SPAN.**—The Sakkur bridge, now being constructed in India, by an English firm of bridge builders, consists of a single span of 790 feet between abutments, 173 feet to top of bridge timbers. It is constructed on the cantilever principle, and spans the river Indus at the Sakkur. It is 100 feet wide, and is designed for both a railway and for common travel.

The Napa county quicksilver mines sent down 349 flasks in September.

## USEFUL INFORMATION.

## How to Judge Canned Goods.

A hint now about tinned goods, meat especially. Note, when about to purchase, the condition of the tin; if bulged outward, don't have it, even as a gift! We will explain the process of canning to give weight to our warning.

The meat is packed in tins while raw, then sealed and cooked in an outer vessel of boiling water, with sometimes the addition of a chemical to raise the temperature. When cooked, the can is pierced, and, as soon as the air and steam have been expelled, it is soldered. Experts know when it is ready for soldering; a moment too soon, and the mischief is done, because if the air is left in, the tin bulges, and the meat will not be good. On the contrary, if the tin has sunk, it is an infallible sign of goodness; it proves a vacuum, which is natural, as the meat shrinks when no air is left in the tin.

Some may say, what matter if air be left in the tin? Simply this: Nitrogen, an element of air, imparts to bodies with which it comes in contact a tendency to change and decay.

Often on opening a tin of preserved goods, people are heard to say, "the air is escaping," instead of which, the slight hissing sound is the result of the air rushing in, another proof that there was a vacuum. Well, we go so far as to say that, assuming the outward sign of goodness above referred to; a label bearing the name of a good exporter or importer, and also a reliable venter of the article, whether meat, fish, milk, soup or vegetable, the chances are a million to one against any being injured, much less poisoned, by tinned goods.

Another caution, though: Always look out for any little globules of solder that sometimes find their way inside the tin; and take care, especially in the case of salmon and lobster, to empty the contents as soon as opened into an earthenware vessel. This is necessary for everything except milk.—*Cassell's Magazine.*

**HOW TO LAY A TIN ROOF.**—I notice by communications in your valuable paper that a diversity of opinion exists in regard to how a flat seam tin roof should be laid. The only substantial way, I think, is never to use tin larger than 14x20, and clip the corners sufficiently so that the tin will look on well. Turn an edge three-eighths of an inch and commence at the eave so that the water will run over the seams. Use tin nails with large heads, and hammer down well and smoothly, using five nails to the sheet. Use dilute muriatic acid, and solder well with half-and-half solder—never poorer. If the roof has over 4 inches fall to 10 feet, never lay it down flat, but always with a standing seam. When the pitch is less than 4 inches in 10 feet, lay down a flat seam. I believe all my brother tanners will agree with me.—*American Artisan.*

**A NOVEL CONTRIVANCE TO LOOSEN KEYS AND WEDGES.**—An Eastport engineer has been in the habit of using a novel contrivance to loosen keys and wedges on large pieces of machinery in steamboats when the space around the machinery was too contracted to work with ease. He made a small mortar, carrying an elongated bolt, which struck the key head without entirely leaving the gun, which was perforated at the sides, well forward, with holes through which, after the bolt had passed, the charge escaped. The force required was regulated by the quantity of powder used. The apparatus proved highly successful, and recently, in taking out and putting in the *New Brunswick's* shaft, it was loaded and discharged about 100 times. By its aid several days were saved in doing the work on that steamer.

**SHINING BLACK INK.**—The best shining black ink, used for mourning paper, and the manufacture of which has up to the present time been kept a secret by the makers, may be prepared, according to the *Papier Zeitung*, of lampblack, borax and shellac. The ink is made as follows: In one liter of hot water 60 grains of borax are dissolved, and to this solution three times the quantity of shellac is added. After this mixture has been properly dissolved, the necessary quantity of lampblack is added, the whole being constantly stirred. Should the luster not be satisfactory, more shellac is added.

**ANTIQUITY OF HOT-AIR FURNACES.**—The younger Pliny, writing to one of his friends about one of his country seats, mentions among other things that next to the smaller drawing-room there is a semi-circular room with windows arranged so as to get the light of the sun all day. He says: "Out of this is a bedroom which can be warmed with hot air." He also refers to the "bath with its cooling room and its hot room." As Pliny, Jr., lived A. D. 62-116, we may assume that hot-air furnaces are no new thing.

**VARNISH FOR METALS.**—A green transparent varnish for metals may be made by grinding a small quantity of finely-powdered chromate of potash, and adding a sufficient quantity of copal varnish thinned with turpentine.

**DOWN DRAUGHT IN CHIMNEYS.**—The difficulty that is experienced in some chimneys

with a strong down draught is said to have been entirely obviated by an English device. It consists of a number of grooved rings placed over each other with spaces between, and made of metal or clay. The grooves are so shaped that when the wind strikes them it is so deflected that it draws air up the chimney, and in this way effectually prevents down draught.

**AN INK RIVER.**—In Algeria, there is a small stream which the chemistry of nature has turned into true ink. It is formed by the union of two rivulets, one of which is very strongly impregnated with iron, while the other, meandering through a peat marsh, imbibes gallic acid. Letters have been written with this compound of iron and gallic acid, which unite to form the little river.

**SYMPATHETIC INK.**—An ordinary solution of gum camphor in whisky is said to be a permanent and excellent sympathetic ink. The writing must be done very rapidly, as the first letters of a word have disappeared by the time the last are written. Dipping the paper in water brings it out distinctly, and it becomes invisible again when the paper is dried. It can be brought out repeatedly without affecting its vividness.

**IRON IN ALUM.**—In order to ascertain whether alum is free from iron, prepare a solution of the alum to be tested and add to it a few drops of a saturated solution of ferrocyanide of potassium. If the solution remains clear and unchanged, there is no iron present in the alum. If iron is present it will be shown by a blue coloration of the liquid.

**FIRES FROM BURNING OIL** are inextinguishable with water, but may readily be smothered by throwing flour on the burning oil. If clothing be set on fire by spilling oil or by the bursting of a lamp, a handful of flour thrown on immediately may be the means of quenching the flames and thus saving life.

**RAPID WEIGHING.**—A method of weighing freight cars while in rapid motion has been contrived by the use of an electrical apparatus applied to the scales.

The gathering of "witch hazel," so called, is becoming a recognized industry in Southern Vermont. It is bought for medicinal purposes at \$3 a ton.

The bridge of Ayr, immortalized by Burns, and 650 years old, is to be demolished.

## GOOD HEALTH.

## A Word to the Wise.

[Written for the PRESS by JEWELL.]

For the foolish will not heed my words; they are wise in their own estimation already. This is the season when sickness prevails, because the people do not take the precaution to keep warm. A sudden change in the temperature demands a change in the clothing also, so as to keep up a normal action of the skin. Fires should be kept also in sitting-rooms, and no member of the family be allowed to sit with cold feet or to go to bed chilled. If the pores of the skin are allowed to become closed, making "goose flesh," as the old saying is, there is likely to be a determination of blood to the lungs or to the bowels, causing an attack of pneumonia or bilious fever, or other sickness, which could have been avoided by care and warmth. Then, too, when a cold snap comes, after weeks of warm weather, and all are used to the breathing of pure, fresh air, if no fires are started to warm the living-room every door and window is of necessity closed, and all are obliged to breathe confined, unoxygenized air, thus vitiating the blood and so weakening the lung tissues, making them less able to resist disease germs that are floating in the atmosphere ready to be absorbed by just such organizations as described. Mothers should look to their young children, especially those liable to throat-ailings and croup. See that they are warmly clad and go to bed with warm feet, and are happy, not cross or peevish, which is a sign of ailing. If they are going to school, see that their lunches are composed of solid, wholesome food; cake and pie are bad food to study on. Sweet bread and butter, with a taste of jam or jelly, eggs, or some cold meat or oysters for a change, are all easily digested, greatly enjoyed and easily prepared. Adding an apple or pear or grapes to the bill of fare gives the meal a hearty relish if it is cold, supplying good brain food and requiring but a simple supper of bread and milk perhaps at early bedtime. Children should never be allowed to eat later than five or half-past at night, and always a light meal. Any parent or guardian can test the truth of this by trying to sleep with a child after it has been eating a late, hearty supper.

It is the duty of every teacher, school trustee or parent to see that there is a stove in the schoolroom, ready for a fire on cold days. All danger of sickness is thus averted, by keeping the room agreeably warm, and having the door or windows open. No child old enough to go to school is too young to understand a few of the simple laws of their being necessary for health, and all teachers, parents, or guardians are culpable if they are not thus instructed. Indeed it is a grave mistake of our State Nor-

mal schools that there is no "Chair of Hygiene." What wonder that so many of the brightest and best of the classes receive their closing honors and diplomas, either physical wrecks of their former selves, or else go home to die of diseases the seeds of which were most surely implanted in their systems during the years they were so earnestly striving for the pearl of great price—an education—and losing their life in its attainment?

Is this necessary, think you? Parents, are you willing to sacrifice your girls and boys on the altar of an education? Do you not believe God's physical laws equally as important and binding upon us as His moral laws? Who is to be the one to demand of the faculty that the students entrusted to their care be instructed in all that pertains to their physical welfare?

Physiology does not teach it; anatomy does not teach these laws. Hygiene alone, practically studied and obeyed, will reach these living questions.

Los Gatos.

**THE "NOBLE FOREHEAD" FALLACY.**—It is popularly supposed that the high forehead is essential to a good brain, and intellectual superiority is usually associated with the conception of a "two-storied brow." Dr. Wm. H. Mays ably combats this idea in the *Western Lancet*. He says: "The size of the forehead depends much on the line of growth of the hair that limits it. A man may have what is called a low forehead; but if the hair could be removed to the height of four or five inches, the same individual would present as fine a specimen of the traditional 'noble forehead' as could be wished, a perfect 'dome of thought,' particularly if the frontal sinuses happened to be large or protuberant. Again, a low forehead has ever been held a sign of beauty in woman, and has certainly never been regarded as an impeachment of her mental capacity. The truth is, the front part of the brain has very little to do with the intellectual process. It is the posterior lobes of the brain with which the higher faculties of the mind are associated. Gower assigns to the frontal lobes, excepting their lower and hinder portions, a negative position as regards psychical importance. Only man possesses posterior or occipital lobes; they are the latest achievements in the long line of cerebral development. In the higher apes they may be found in a very rudimentary condition; the lower mammals possess frontal or anterior lobes only. In the lower savages, and in congenital idiots, the occipital lobes are often ill developed, approaching the brute type, giving a flattened appearance to the back of the head. In the Stockton asylum are several interesting idiots, some of whom, while possessing quite respectable foreheads, show a striking deficiency of back head. The neck and back of the head are in one line, and it is worth remarking what a foolish appearance such a contour gives an individual. When you see a lack of the rounded sweep or projection of the back of the head above the neck, you will find with it a low order of intellect. The idea that a high forehead is, taken alone, the index of mental superiority is as baseless as any of the exploded propositions of phrenology, with which pseudo-science it deserves to be classed.

**THE SCIENCE OF DRINKING.**—Consul Tanner, of Chemnitz, reports to the Secretary of State that the beer production of Germany in 1885 was 1,100,000,000 gallons, enough to form a lake more than one mile square and six and a half feet deep, or it would make a running stream as large as some of our rivers. He says the consumption of intoxicants in Germany per head is four times as great as in the United States, yet there are a thousand hopeless drunkards in the United States to ten in Germany. The difference arises largely, if not entirely, he says, from the manner of drinking in vogue in the two countries. "This science of drinking," he writes, "consists simply in the tardiness of drinking. All drinks are taken sip by sip, half of three quarters of an hour being consumed for a glass of beer. This is so simple that one is liable to ridicule for laying stress upon it, and yet on this one point hinges, in my opinion, a question of vast importance to Americans. By this manner of drinking the blood is aroused to greater activity in so gradual a manner that there is no violent derangement of the animal economy. By slow drinking the German accomplishes the object of drinking, and gives his animal economy a chance to say, 'hold enough,' which only slow drinking will do." Mr. Tanner says that since his arrival in Germany he has to see his first glass of water drunk.

**A REMEDY FOR ROUND SHOULDERS.**—A correspondent writes as follows to the *New York Tribune*: More than 30 years ago I acquired the habit of being round-shouldered. In trying to find a remedy, the following plan, which grew out of my knowledge of anatomy, came in sight: Hook the fingers of the hands together; raise the elbows as high as the shoulders and pull like a shoemaker. The muscles about the shoulder-blades, to keep them in place, are thus strengthened and in a short time enabled to fulfill their proper office. When lying on the back, press the head on the pillow so as to raise the chest up from the bed on which you are reclining. This strengthens the muscles which should hold the head erect. When standing or sitting where the head can press against something solid, repeat the operation. By a little thought at other times to use these muscles, the difficulty may be overcome.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**KENNEDY MILL.**—Amador *Sentinel*, Oct. 20: The Kennedy mill is now running 32 stamps and the new machinery works to the perfect satisfaction of all interested.

**KENNEDY.**—Amador *Ledger*, Oct. 23: The new 40-stamp mill just completed at this mine, has been running pretty steadily all the week. But 35 stamps can be run at present, owing to the inadequacy of the water supply. The pipe crossing the Oneida valley will not carry sufficient water to run the 40 stamps. About 100 inches is all that can be obtained at present, whereas it will take 120 or 130 inches to run the full works. To obviate this difficulty an additional pipe will probably be laid after awhile across the Oneida valley. The mill works as well as could be expected. All new machinery of such magnitude requires more or less fixing before it is got into perfect running order. The mine continues to look well, and there is any amount of rock to work upon. There are between 60 and 70 men employed about mine and mill. When in regular running order, it is thought the works will give steady employment to about 60 men.

**MISCELLANEOUS.**—The Quartz Mountain mill has commenced operations, with a large amount of rock ready for crushing. A new 10-stamp mill is in course of construction at Lower Rancheria; machinery and lumber nearly all on the ground. The water-power hoisting works at the McKay mine in Hunt's gulch are in successful operation.

**SUTTER CREEK.**—One of the best safeguards against the overflow of Sutter creek in flood times is being erected by Knight & Co. It is in the form of a bulkhead on the banks of the creek just above the foundry. The bank is badly washed, and in time of flood the water would pour into Eureka street, and overflow a considerable portion of the town. The bulkhead is made of the heaviest slabs, well loaded down with rocks, and when finished, the town will be comparatively secure from high water. Knight & Co. have completed the job of roofing the foundry with iron. It is one of the finest roofs to be found in the State. They have also embellished the entire foundry with a coat of paint. J. R. Tregloan, superintendent of the South Spring Hill, has accomplished a very skillful and delicate piece of work in the way of mining. He has made an upraise of 400 feet, and has run a tunnel 250 feet long to intersect. He did the surveying himself and it has proved satisfactory in every way. The upraise is intended for ventilation, and also as a means of escape to the miners in case of accident.

## Butte.

**THE GOLDEN EAGLE.**—Chico *Enterprise*, Oct. 22: This mine is situated two miles west of Paradise, in Butte county. The ore that is obtained has long been known to contain gold, but it was so combined that heretofore all efforts to separate it had baffled the skill of the most proficient assayists. By a new process called the Frisby, which was recently discovered, it has been found possible to extract the gold in a pure state from the sulphurets in which it was bound up. The mine is now a complete success, and the company who have charge of it are receiving rich returns. Very extensive works are already in operation, and it is the intention to put up a 20-stamp mill soon, as the one now used has not sufficient capacity. There are other such mines as this in the county, which have heretofore been considered valueless because the gold could not be extracted from the native ore they yield. This new process introduced so successfully at the Golden Eagle will undoubtedly lead to the opening up of these other mines.

## Calaveras.

**SHEEP RANCH.**—Calaveras *Prospect*, Oct. 22: For months past, J. B. Haggan and W. H. Clary, comprising a company owning the Pioche mine, west of town, have been pushing a tunnel in search of a quartz vein. Their labors were recently rewarded by the discovery of an excellent lode of good-paying ore. The vein is evidently the extension of the famous Sheep Ranch mine, the rock being precisely the same in character and richness. The tunnel is now in 500 feet, and the work is still being diligently prosecuted. Being a tunnel claim, it can be worked to every practicable advantage. In the near future, it is hoped, glowing accounts can be given of this property. Upon its development depends much of the welfare of our people and the longevity of our village. E. W. Forrest & Co., of the All Hope mine, near Cave City, continue to feel highly encouraged over their very flattering prospects. Good ore is being extracted from their shaft, which is at present being sunk within their tunnel. Excessive water is feared during the coming winter months, so that operations may be temporarily suspended. The company contemplates the early erection of an arastra, and arrangements for the purchase of cog gearing have already been made.

**RATHGEB.**—The Rathgeb brothers have purchased the Brenoli and Frazier ranches and the Georgia ditch. They have now a clear water-way and have about completed a large ditch to the Union mine. There is, at present, 150 men employed on the improvements at the Union mine. The water used in turbine wheels at the new mill will have a 174-foot fall.

## El Dorado.

**BLUE ROCK.**—Georgetown *Gazette*, Oct. 23: The Flynn Brothers and George Reau, of the Blue Rock mine, owing to scarcity of water, have resumed work on their quartz lode a short distance up the canyon, which they have not worked for seven years, and from which they took out 90 ounces. The quartz will be hauled to their mill (1/4 mile) and crushed.

## Inyo.

**A GOOD MINE.**—Register, Oct. 24: Reub. Spear is the owner of a mine in the Inyo range, situated about one and one-half miles from Lone Pine station. P. Caffrey has this mine under lease, and is working four or five men. He two weeks ago struck 22 inches of ore, which has a working value of 150 oz. of silver per ton, and 45 per cent lead. With this

showing Caffrey, for the last two weeks, has been averaging about \$50 per man, and hopes to continue to do well while his lease lasts, which expires Jan. 1st.

**NOTES.**—Prescott *Courier*, Oct. 22: Mr. Bryson and other miners, of Black Canyon creek, 45 miles south of Prescott, will make shipments of ore this month. N. Ellis has examined the New Era mine, and is satisfied with it. It is about four miles east of the mouth of Black Canyon creek, and carries considerable gold. There is a five-stamp mill on the ground. Jack McDonnell and other miners of Dorris camp are taking out silver ore for shipment. Messrs. Linn and Rodenburg came in yesterday from Bradshaw, with samples of gold and silver material from ledges. Messrs. T. J. Nolan and J. B. Farish took a look at some Groom creek ledges yesterday. Specimens from the Middleton mine, Big Bug district, will soon be on exhibition at Bones' ore rooms. Gentlemen who came here with Gov. Tritle will, we learn, examine the mineral resources of this section, with a view of putting in sampling and general reduction works.

**RUNNING STEADILY.**—Wood River *Times*, Oct. 22: The new mill at the Bannock Mining Co., at Era, which was completed recently at a cost of \$80,000, was given a trial run last week in the presence of all the owners, and worked to their entire satisfaction. It is now running steadily, and Captain Owens and his crew of millwrights have gone.

## Los Angeles.

**MARBLE.**—Los Angeles *Tribune*, Oct. 22: Some time ago a party having a large lime contract with the railroad company, while prospecting for limestone, discovered a large body of pure marble. Experts pronounce it superior to Italian marble, as samples submitted to ex-Governor Stanford for examination as to its fitness for his Leland Stanford, Jr. university buildings have stood every test by acid or otherwise, and the question of adopting this stone for those buildings is receiving serious consideration. The company is incorporated under the mining laws of California and the area located embraces 320 acres. The quarries are three miles from Victor station, and the fact that the California Southern Railroad Co. have concluded to construct a switch from their main line to the quarries testifies to their confidence in the enterprise. Marble of 11 different shades of color—from purest white to almost black—has been discovered—all of finest quality and taking the highest polish.

**ANAHEIM OIL WELLS.**—Anaheim *Gazette*, Oct. 23: Truckloads of black, sticky-looking casks filled with crude petroleum from the oil wells to the railroad station, and truckloads of well pipe, machinery and empty casks from the depot bound to the wells, are frequent sights on our streets, and evidence of something being done at the wells just north of Anaheim. What that something is, and its importance, seems to be but slightly understood. The work has been conducted quietly but diligently, and with such success as to satisfy the projectors that they will strike it big. The McFarland-Stewart Oil Co. is now drilling night and day on land owned by the Chandler Oil Mining Co. Their well is now down to the depth of 500 feet in fine pebble sand, yielding light oil. Heavy oil has been obtained for a considerable distance above. This well is one of four to be drilled by this company to the depth of 1500 feet. The Chandler & Maxwell Co. is sinking a well one-half mile east of the McFarland-Stewart well, which has reached a depth of 325 feet, with 11-inch casing to the bottom. Work has been temporarily suspended on this well, owing to a defective boiler, but will be resumed on Monday next with everything on the ground for a deep well. The Puente wells are but three miles west in the same belt, and are producing 120 barrels of fine oil per day. A pipe line connects these wells with Puente station, seven miles distant, which delivers the oil on the cars by simply turning a faucet. The sixth well is now being put down. The gentlemen now engaged upon the Anaheim wells having the necessary experience, financial ability and determination to succeed, will undoubtedly get what they are after. Oil is there, and they are bound to have it. A pipe line, one of the attendant necessities of the enterprise, we are assured will be laid as soon as required, and any day may bring the expected flow of oil to the surface.

## Mariposa.

**DOING WELL.**—Mariposa *Gazette*, Oct. 23: The Red Cloud mine, which is situated some 12 or 15 miles above Coulterville, in Mariposa county, we are pleased to learn is doing well, and is fast growing in importance. Every few days we hear of a fine body of ore being struck, that the vein is from 10 to 15 feet thick, and that the whole body of ore is being crushed. They have a 20-stamp mill with steam power, and plenty of wood in the vicinity. It is said they have a very lively camp over there, some 10 or 12 dwelling-houses, two or three boarding-houses, one store, two saloons, election precinct established there, expect soon to have a postoffice, a school, a church, etc. Mr. Carter, the superintendent, is erecting a fine home for himself and family, and it is located on a commanding position near the works. The mine has come to stay, and gets better as it goes down. Another shaft of 100 feet will start sinking in a few days. Alonzo Dexter, we believe it is, has taken a contract to furnish wood for the mill for one year. It can't be said but what at least one mine on the north side of the river, in the vicinity, is prosperous.

## Mono.

**THE STANDARD CON.**—Bodie *Miner*, Oct. 25: Ore shipped to mill, 324 tons. Ore bodies in mine looking well. Bulwer Standard and Standard mills running steadily.

**THE BODIE.**—West crosscut from south upraise on 700 is extended 14 feet. South drift on 800 is extended 24 feet. East crosscut from south drift on 800 is extended six feet.

**THE MONO.**—Taking out rich ore below the 700.

**THE BULWER CON.**—Report for week ending Oct. 24, 1886: Crushing 55 tons daily; the average pulp assay is \$29.65. Everything in mill and mine is running satisfactorily. There were employed 25 miners.

**THE DUDLEY.**—The south drift 700 is extended 12 feet.

## Nevada.

**KENTUCKY FLAT QUARTZ.**—Foothill *Tidings*, Oct. 22: To-day a load of quartz from Kentucky Flat,

Rough and Ready township, went through town to Rodgers' mill, where a trial crushing will be made. The ore looked very well, and Rodgers will see if it pays. The ledge is a good big one and the location is near the Beesley ranch. No name has yet been given to the ledge, but if it pays there will be a christening.

**HORSETOOTH MINE.**—*Tidings*, Oct. 20: We saw some quartz going through town to-day, and bound for Riley's custom mill. The rock was from the Horsetooth ledge, which is situated in the east part of Rough and Ready township, not far from Grass Valley township boundary line. The ledge is about 18 inches in thickness, and the rock shows some free gold. The shaft is down only 40 feet.

**EXCITEMENT IN SILVER.**—Nevada *Transcript*, Oct. 24: There is considerable excitement over recent developments at the Central mine, about a mile and a half nearly south of Banner mountain, in this district. In September, 1885, the Fowler brothers and others bonded it as a gold claim. They ran a tunnel in on the ledge a distance of 900 feet, giving backs of 500 feet, and found that it varied from 1 to 10 feet in thickness. Having erected a gold mill, they suddenly discovered the ore to be exceedingly rich in ruby silver, and to give only from \$3 to \$5 in gold as the maximum depth to which it has been developed was attained. Assays for silver give from \$40 to \$130 a ton in that metal. The stockholders, who have expended something like \$11,000 in money and labor, now find their financial means exhausted and are unable to erect by themselves the necessary machinery for silver saving; but other parties have taken a deep interest in the property and it is probable that capital will soon be forthcoming with which to sink a shaft and buy the necessary machinery. J. D. Channell, of this city, James Gluyas, of Grass Valley, and other experienced silver miners have within the past week examined the property, and they pronounce it "another Comstock." They are of the opinion that a very rich and extensive silver mine can be opened there.

**PAID WELL.**—Nevada *Herald*, Oct. 20: D. R. McKillican & Co. have sold six tons of sulphurets and tailings, from their quartz mine on the Middle Yuba river, to the Selby Smelting Co., of S. F. The sum realized was \$14,500. This is certainly a splendid showing and most encouraging to the owners of the mine, which is situated near Orleans Flat. The mill now in use is not very complete. A new mill and hoisting works, with all the improved appliances, will shortly be erected. When Mr. McKillican went below to dispose of the sulphurets, his partners expressed the belief that they would have to declare an Irish dividend, but after the sale they were surprised to learn that it would be a dividend of the other kind. The money realized, exclusive of all expenses, is sufficient to pay for the new works that are to be put up.

## Placer.

**FOREST HILL.**—Cor. Placer *Argus*, Oct. 20: The Live Oak mine, near Forest Hill, has moved its works over to the Brushy Canyon side, and will tap their present works through a tunnel about 1700 feet in length. The tunnel is the old Dutch Washington, which is in a distance of 1200 feet, thus leaving only several hundred feet to run. Ground is being cleared and timbers hewn for a 10-stamp mill which is soon to be built.

## Shasta.

**IGO.**—Cor. Shasta *Courier*, Oct. 22: Capt. E. H. Atkins has bought Robinson & Cooper's interest in the Chico mine and mill. He is now arranging for the erection of a Russell furnace. Messrs. Bennett & Little have the two Duncan concentrators formerly at the Chico in place at the Continental mill, and are ready to start crushing ore as soon as the water supply permits. The shaft is bailed out, and more ore will soon be added to that already out. Assessment work is being done on the Chicago, Confidence and some other claims. D. Enbanks & Sons have their arastra about ready to start, and expect a successful winter's run. Smith & Everet have found a body of good gold ore on a ledge south of the Continental mill. E. L. Ballou's arastra is running on Manzanita ore. The Meek arastra is running on Hubbard & Shirland's Atlantic ore. The mine is looking well. Robinson & Cooper are taking out some ore at the Central. O. Engle and H. Dunham are doing some work on their Kanaka gold ledge. The Hardscrabble Co. is preparing for its winter's run.

## Sierra.

**THE YOUNG ITALY.**—Sierra *Tribune*, Oct. 22: Work was begun last Monday on the Young Italy mine, which is located above the Cleveland. The claim is owned by Messrs. Sam Stevenson, Chas. Quirollo, John Corolla and Jack Lagamorcino. They have a 4-foot ledge which prospects well.

**YOUNG AMERICA.**—The company is still driving the new tunnel ahead on the other side of the upper Sardine lake.

**RED ROCK.**—Mountain *Messenger*, Oct. 23: Mr. W. M. Towle, from Red Rock, was in town this week. Red Rock is a small mining camp, situated on the west side of the Mojte Cristo ridge, comprising the ground, some 500 acres, lying between the famous old mining camp of Monte Cristo, where two million dollars of gold has been taken out, and the Shamrock mine, at Fir Cap, which has yielded over \$400,000. His tunnel is about midway between the two places, and is running in on an apparent outbreak from the ridge that carries some gold. The outlook is good for the development of another of Sierra's valuable mines. The Wide Awake Co. have given out a contract to run 200 feet of tunnel at their mine on Craycroft Hill. The portable steam sawmill for the Empire mine at Gold Valley passed up a few days ago. The company is putting on all the men it can get, in order to get things fixed so it can work this winter. We hear that 40,000 brick are in kiln, ready to burn. Mr. Hill is again running his arastra night and day.

## NEVADA.

## Washoe District.

**CON. CALIFORNIA AND VIRGINIA.**—Work is being rapidly pushed on the 1300, 1400, 1500, 1650, 1750, 1850 and 1950 levels in Con. California and Virginia ground, the battery assays from the ore being extracted on these different levels during the past week averaging \$30 to the ton.

**ALTA.**—Virginia *Enterprise*, Oct. 23: The winze is now down 40 feet, and at the present time

is altogether out of ore, owing to its dip, as it is being driven down on an angle of 45 degrees. It is, however, in good working ground. The upraise from crosscut No. 1 is up about 48 feet from the 725 level, and is in quartz giving low assays. It looks very favorable in the upraise for ore at a future date.

**OCCIDENTAL.**—The old workings are still being retimbered west of the main tunnel line. The upraise has been advanced about 20 feet. In Gold Hill the Yellow Jacket, Kentucky, Crown Point and Belcher are taking out and shipping the usual amount of ore, with no change in the different workings of the mines.

**BENTON CON.**—They are running south on the Keystone drift and in very hard rock. There is no material change from the last report. The Lady Washington drift is out 112 feet and is in vein formation giving occasional good assays, there being rich bunches and streaks of ore in the face of the drift.

**SIERRA NEVADA.**—On the 520 level, west crosscut No. 4 started at a point 160 feet south from west crosscut No. 3 from the north lateral drift, was advanced about 20 feet; total length, about 120 feet. West crosscut No. 5 is still being advanced.

**CHOLLAR.**—There are about 30 men at work in the old Chollar shaft, engaged in repairing drifts and cleaning up generally. Work will soon be commenced and prospecting done for the ore that must have been left in early days.

**OSBISTON SHAFT.**—All work in the Osbiston shaft has been stopped. The pumps are still running on the 2500 level. Work will not be renewed until it is proven whether the water from the Combination will affect the shaft.

**SAVAGE.**—The drift on the 600 level is running south to connect with the old Savage shaft, there being no change in the character of the ground. The drift is in 430 feet south from the Savage north line.

**HALE AND NORCROSS.**—All work has been stopped for the present. It is expected that work will soon be commenced in the upper levels, conducted through the old Hale and Norcross shaft.

**BEST AND BELCHER.**—The main northeast drift on the 600 level of Best and Belcher is being still continued, with no change from the last report. All work in the southeast drift has been discontinued.

**GOULD AND CURRY.**—The station on the 425 level in the Bonner shaft has been cleaned out and retimbered. The main west drift from the station has been reopened and retimbered a distance of 400 feet.

**UNION CON.**—West crosscut No. 1, on the 700 level, and the joint Mexican and Union west crosscut at the south line, are being pushed rapidly ahead.

**UTAH.**—The station on the 472 level has been completed. The west crosscut has been advanced 54 feet; total length, 150 feet.

**OPHIR.**—Repairs and retimbering are still going ahead on the 1465 level.

## Aurora District.

**PROSPECTS.**—Walker Lake *Bulletin*, Oct. 20: Mr. Alfred E. Ann, managing director of the Consolidated Esmeralda, passed through Hawthorne, last Friday, on his way to England. Under the management of A. E. Ann and R. R. Colcord, the general superintendent, the prospects of the company are very much improved. Samples taken from the Durand assay over \$2000 per ton. The vein is tapped in two different places, 180 feet apart, and in the deepest winze, drifting has commenced north and south, all in rich ore. The appearance now indicates an enormously rich mine which will cause some excitement in the old town of Aurora. The ore is being hauled to the mill and crushing will commence Nov. 1st. The purchase-money has all been paid and the deeds duly recorded here.

## Belmont District.

**ORE.**—Belmont *Courier*, Oct. 23: Ernst & Esser's team pulled out for Eureka, on Monday, laden with ore belonging to Deputy Sheriff John N. Griffin. This ore was taken from the Highbridge mine, East Belmont, and is sent to Eureka for reduction.

## Dun Glen District.

**THE GOLDEN CHARIOT.**—Silver *State*, Oct. 20: The new mill recently erected by Thomas & Hendra on the Golden Chariot mine, at Dun Glen, is running steadily and successfully under the superintendency of C. S. Leonard, an experienced millman, who thoroughly understands gold amalgamation. The mine is looking splendidly, the vein being between four and five feet thick.

**ENCOURAGING.**—Silver *State*, Oct. 24: Reports from the Dun Glen gold mines are very encouraging. The Ross mine is looking better than for some time past, and the mill is running steadily. The Golden Chariot mill, recently erected by Thomas & Hendra, is doing excellent work under the supervision of C. S. Leonard, and is turning out gold bars pretty rapidly.

## Garfield District.

**A GOOD PROFIT.**—Carson *Index*, Oct. 20: Chas. H. Rutison, of Garfield Mining District, has sold a quantity of ore to the new Reno Reduction Works, and says he is more than satisfied. His ore is worth about \$300 per ton. He got \$16 per ton more for it than if he had sold to Joe Douglas at Dayton; \$33 more than if sold in San Francisco, and \$25 to \$30 more than it would bring at Denver. At the latter place the working charge is \$15, at Reno \$14, while both work the ore up to 95 per cent. At San Francisco they only work it up to 90 per cent and charge \$20 for working. At Dayton they calculate on about the same figures.

## Eureka District.

**A GOOD SHOWING.**—Eureka *Sentinel*, Oct. 23: Notwithstanding the cry of dull times heard from many of our business men, the mines of Eureka District continue their output of ore in good shape. The number of producing properties form a favorable comparison with any district on the coast, if the quantity produced does not. This latter feature is due, in no small degree, to the few men that are employed in mining here, not one of the properties aside from the Richmond, Eureka Con. and Dunderberg, employing over a dozen miners, and in most cases but two or three each. No reliable information can be obtained of the productions of the two first-named mines, but judging from the trains of ore



oftentimes seen coming down from them, they are by no means exhausted to the water levels, below which little prospecting work has ever been done. The Eureka Con. Company has of late months done considerable work of a practical character, of which more will be said hereafter. Among the improvements added to their smelting plant recently is a new refinery, and yesterday the company made its first shipment of refined bullion (three bars, valued at \$5095.44) through Wells, Fargo & Co.'s express. A week ago, the four owners of the Silver Connor mine, on Prospect Mountain, declared a dividend of \$250 each, and a shipment of 60 tons of ore was sent down from the property on Thursday last to the Richmond reduction works. This, together with what ore is on the dump, is sufficient to warrant another like division of net profits next month. The ore works from \$50 to \$100 a ton, most of which is gold. The Jackson mine, the stock of which is listed on the San Francisco Board, has on its dump over 50 tons of rich ore that assays higher in gold than silver ready for shipment. This company declared on Wednesday last a dividend of 10 cents a share on its capital stock, and judging from information at hand, another like disbursement will be made before many weeks. From Superintendent Powell, the *Sentinel* learned yesterday that a new body of ore was, the other day, discovered on the third level of the mine, by miners working for day's pay. About all the ore produced from the property during the past year has been by tributaries. It was only a few weeks ago that the management decided to prospect new ground at their own expense and risk, and it must be encouraging to have their efforts and judgment rewarded in so short a time. About a dozen miners, in all, are employed in the property. During the past week, the Dunderberg Company shipped from their mines on Prospect Mountain, to the Eureka Con. reduction works, 30 tons of ore. From the Macon City, on Adams Hill, 1 ton was sent down; from the Bullock, on McCoy Hill, 2 tons; the Summit, on Prospect Mountain, 1½ tons; Eureka Tunnel, same section, 4½ tons; Lord Byron, 8 tons; Geddes and Bertrand, Secret Canyon, 3 tons; North Star, on the range immediately west of Prospect Mountain, 3 tons. During the same period, shipments were made to the Richmond reduction works, from mines on Adams Hill, as follows: Silver Lick (rich ore), 23 tons; Members, 9 tons; Oriental and Belmont, 47 tons; Bullwhacker, 18 tons. From the Hamburg mine, on Prospect Mountain, a shipment of 33 tons was made, and from the Geddes and Bertrand, Secret Canyon, 48 tons. From the White Pine mine near Hamilton, 4½ tons were shipped to the Richmond works, and from the Featherstone property in Robinson Canyon, 12 tons to the Eureka Con. works. Everything considered, the above is a good showing for the mines of this district. Several tributaries are said to be holding back their ore, in anticipation of better prices for silver and lead, neither of which metals is selling for what they should. With silver at even \$1.20, and lead at 5 cents, a prosperous era would soon follow, for there would be more active operations inaugurated.

**ANOTHER SILVER CONNOR DIVIDEND.**—Eureka *Sentinel*, Oct. 17: Another shipment of ore of 61 tons was made the other day from the Silver Connor mine on Prospect Mountain to the Richmond smelters that worked \$41 in silver and \$59 in gold to the ton. As has been stated in these columns, the property is owned by four citizens, and yesterday they decided to declare a dividend of \$250 each. They have at their mine ready for shipment 40 tons more of the same kind of ore, which insures them another dividend equally as large next month. At present there are but four miners at work in the property.

#### Mount Rose District.

**SUPT. McCURDY'S REPORT.**—*Silver State*, Oct. 20: Milling ore, 120 tons, 920 pounds; delivered to the mills. Average assay value, per ton, 48.69 oz. silver; 0.30 oz. gold. Mill run 191½ hours; worked 118 tons. Mill-work—Three Huntington centrifugal roller mills; six Triumph concentrators. Number of men on pay-roll, 132. No change in appearance of the mine at different points of working to report for the week past. Everything in and about the mill and mine moving along smoothly.

#### Ophir District.

**BULLION.**—Belmont *Courier*, Oct. 23: The Chicago Mining and Reduction Co.'s bullion output from their Ophir mining property continues steady.

#### Patterson District.

**COMING TO THE FRONT.**—*Pioche Record*, Oct. 20: Old Patterson District is again coming to the front. Ed. L. Robertson and others interested in mining property there, we learn, are having a quartz mill brought into the district. All who have seen the mining property owned by these parties speak very highly of it. All water rights, etc., were secured several months ago.

#### Pioche District.

**MEECH PROCESS.**—*Pioche Record*, Oct. 20: A plant for the new leaching process arrived in Bullionville on last Sunday. It is called the "Meech Process." It is hoped that this new method will prove a success and it is said that a thorough test of the tailings was made before the plant was shipped. If this plant will do what it is said it will, it will not be of pecuniary benefit only to the stockholders, but to the people of the county at large.

#### Tuscarora District.

**BELLE ISLE.**—*Times-Review*, Oct. 22: Belle Isle and Navajo joint crosscut, 150-foot level, has been extended 27 feet during the past week; total length from west vein 402 feet. The formation shows no material change.

**NAVAGO.**—No. 1 winze, east vein, 350-foot level, has been sunk 8 feet; total depth, 36 feet. The vein is carrying down a fair grade of ore. Cutting out for No. 1 winze, same level on west vein, has been completed, and sinking commenced. Have commenced cutting out for a winze on the east lateral vein, same level. The vein at this point is showing some very high-grade ore. Crosscut east, 150-foot level, has been extended 20 feet. South drift, west vein, same level, extended 12 feet. Good progress has been made with the work at all other points.

**NORTH BELLE ISLE.**—Main gangway drift on the 150-foot level has been extended to the line, and the Nevada Queen Co. takes the work at this point and continues the drive on north. No. 1 winze has been sunk 7 feet the past week, and the large width of high-grade ore continues on down. South drift from No. 1 crosscut has been connected with north

drift No. 2 crosscut, as they did not meet on end lines, as the latter was driven in the hanging wall of the vein and the former in the foot wall portion of the vein exposing about 20 feet in width of the vein. Work has been suspended in the south drift from No. 2 crosscut, as it is in this drift that No. 2 winze has been started. The station has been cut out and sinking commenced. The winze has been started down in a good width of first-class ore. Intermediate crosscut between Nos. 2 and 3 crosscuts has been extended a total distance of 59 feet. The vein at this point shows a width of 8 feet of fair-grade milling ore. The main gangway north from 300-foot level has been extended a total distance of 125 feet; progress the past week 14 feet. To-day the force in the face of this drift has been doubled and reduced to eight-hour shifts, in hopes of making a rapid drive, to the line between the North Belle Isle and the Nevada Queen. Good progress is being made with the work on the ore road, orehouse and all work in and about the mine.

#### Tybo District.

**FINE ORE.**—Belmont *Courier*, Oct. 23: Some very fine ore has been encountered in Luse's mine, Tybo, and the find is showing every indication of proving extensive. All that is needed to make Tybo a large bullion producer again is capital to properly open and develop its mines.

#### ARIZONA.

**NEW DISCOVERY.**—Mohave *Miner*, Oct. 17: Messrs. Holloway, Moses and Trembath are working vigorously on their new discovery, and are taking out quite a quantity of ore. There is everything in the appearance of their claim, as they go down to warrant the belief that they have struck it rich.

**SORTING.**—J. J. Hyde has now five men employed in sorting the Keystone dump. There has been only one shipment of ore made since the work began; but this, having made a paying return, encourages the prosecution of the enterprise. If anybody was ever sincere in wishing success to an undertaking, we are in wishing it for this one.

**THE SILVER KING.**—Tucson *Citizen*, Oct. 24: Mr. W. B. Pierce is here from the Silver King. He says there is little being done in mining circles there outside of the King, which is working a force of 140 men and making regular shipments of bullion to the value of about \$80,000 monthly. A winze has been sunk from the 700 to the 800-foot level, which is all in ore varying from \$50 to \$10,000 per ton, the low grade largely predominating, however. He says there is no truth in the rumor that the 800-foot level is destitute of mineral; that there is very little of the sparkling silver found above but plenty of low grade, less handsome ore. There is no semblance of a ledge, the entire mine appearing as an immense blow-out without regularity and character. The King Co. now owns the Bilk mine which they are re-timbering preparatory to resuming operations this winter. By many this mine is esteemed second only to the King. The Woodpecker, which lies 14 miles to the southeast, is at present working but a small force of men, pending the arrival of machinery which is expected the coming month. Mr. E. O. Kennedy is the superintendent, and expresses great faith in the ultimate importance of the camp. Mr. Pierce left for the East this morning.

#### COLORADO.

**NEW STRIKE AT CARIBOU.**—Boulder *Herald*, Oct. 22: One hundred and ten sacks of ore were received to-day at Potter's agency, from the Eureka mine, near Caribou, being about two miles north-west on the southern slope of Bald Mountain. This mine is owned by W. H. Barber, George Lytle and R. K. Thayer, the first two owning a quarter interest each and the latter a half interest. It is not a new find, only new working on an old find. It must be the value of the find was not recognized years ago, for when working on it began lately, at the depth of 10 feet ore was found which went as high as 800 ounces to the ton. The sacked ore as run through the mill has yielded from 68 to 130 ounces silver to the ton. It is peculiar ore, too, as it is soft and can be shoveled out without any hard work. Blasting is not necessary. The shaft is now 30 feet deep, the pay streak 30 inches wide, and two men daily raise 50 sacks of the good ore. There is considerable ruby silver in the ore. A tunnel is now being run by two shafts further down the hill, so as to be ready for the miners when the cold winter weather comes on. The finding of this rich mine has had a beneficial effect on that section. It shows that ore can be found even off Caribou and Idaho Hills, for the Eureka is two miles off. The consequence is that there is to-day more prospecting done in the neighborhood of Caribou than there has been since the exciting days of the first discovery of the Caribou mine.

#### DAKOTA.

**THE TERRY'S PEAK MINES.**—*Tribune*, Oct. 20: The Terry's Peak mining region is full of rich mines, and new ones are being found constantly. Many prospectors own claims in that region who have been driving tunnels and sinking shafts for the past 8 or 9 years, and had, until a short time ago, developed but little. Not a few of them did not know the value of their property until quite recently. They had sunk their shafts and driven long tunnels in the slate rock, ignoring the flat quartzite which caps nearly every ridge in the vicinity of Terry's Peak, thinking it was barren rock; some thought it was granite. They have learned recently that the flat ledge of quartzite, which was disdained because it was flat more than for any other reason, contains large bodies of rich gold ore—that is rich enough to ship to Omaha, and return a handsome profit to the owner. The ore bodies, without exception, occur in direct connection with a yellowish-gray porphyritic rock, though there are numerous instances of such a contact of quartzite and porphyry where there is little or no ore. The known extent of this mineral district is being daily extended. There are a number of streams which head at the foot of Terry's Peak, and every ridge, without a single exception, is capped with the Cambrian quartzite, carrying ore bodies. The area of the district, thus far only partially opened, is fully 2000 acres. Of course, a large portion of this is taken up with gulches and barren ground. Probably one-half of the area is included in gulches, and of the remainder, probably not more than one-tenth is underlain with ore, but even this is something enormous. Presuming the

ore bodies to have an average thickness of four feet, it would indicate upward of a million and a half tons of ore, much of which will average over \$50. In the present state of development, it is impossible to make even an approximate estimate, but we believe that district to be one of the richest in the world. It is but from three to five miles distance from Lead City, and many of our best citizens are interested there. The working of these bonanzas will furnish employment for several hundred miners, and will place in circulation hundreds of thousands of dollars.

#### IDAHO.

**LOCAL NOTES.**—*Idaho Statesman*, Oct. 19: Jake Reeser, of Rocky Bar, has sold his one-third interest in the Vishnu mine to E. C. Thompson. Barclay & Winder recently had eight tons of Vishnu ore crushed which yielded them nearly \$3000. The Minnie Moore mine shipped 700 tons of ore last month, and it is expected to ship 1000 tons this month. It is claimed that there is \$2,000,000 worth of ore in sight in the Minnie Moore mine near Bellevue, Wood river. The ore runs from \$125 to \$160 per ton. Discoveries of high-grade, free-milling ore, in large quantities, have recently been made in Deadwood by Boise City persons. Assays run into the hundreds. Placer mining in Southern Idaho has nearly ceased for this year, except a few claims on Snake river and a few claims in Boise county run by Chinamen. The season has been a fair one and an average yield of dust has rewarded the miners. Sheep Mountain is coming to the front as a camp rich in silver deposits. A number of big ledges have been discovered and located in that district this summer. Assays run all the way from \$100 up into the thousands. Work on the Gold Hill mill, Quartzburg, is being rapidly pushed forward, and in a little while there will be no remaining evidences of the late fire, except to see a better mill in the place of the old one. Harry Bahr left some samples of ore at this office, taken from recent discovery in Deadwood. Some of his ore assays \$800, and his ledge is 30 feet wide. We congratulate Harry on his good fortune and hope he may yet be numbered among the bonanza kings. From the amount of mining supplies going into Flint we judge a busy camp will be maintained there all winter. Considerable capital has been invested there during this year, and the investors evidently do not intend that their investments shall be idle capital. All doubts about the richness and permanency of the Shoshone county mines (Cœur d'Alene) have been removed. This season's work and developments indicate that deposits of great richness cover a vast extent of country and that scarcely a commencement has been made, all of which goes to prove that Idaho as a whole contains more mining ground than any of her sister Territories. Although no report was made to Assayer Wild last year in regard to the production of precious metals in Idaho county, the claim is made for that county that it is the third largest producing county in the Territory. We think the claim is erroneous, though a good deal of gold is produced every year. Assayer Wild is now in Idaho county gathering statistics for his report for the production of 1886. Work in many of the quartz mines in Alturas, Lemhi and Custer counties will cease this month for the season. In the districts lying high up in the mountains snow falls so deep that it is impossible to get in and out to the mines, and unless special arrangements are made operations have to cease during the winter months. In some of the best paying mines, however, every arrangement has been made for the comfort and safety of the miners, and work will be prosecuted all winter.

#### MONTANA.

**VIRGINIA CITY.**—Butte *Miner*, Oct. 23: The New York & Montana Mining and Milling Co. are successfully treating the different ores that are brought to them. At the present time they are sinking on their own property, the Alameda mine, and have time to do some custom work. They have just made a contract to treat 100 tons of ore from the Prospect mine, with the privilege of as many more tons, up to 100, as the owners of the mine may see fit to furnish. This mine is one mile west of Virginia City, and is owned by George Layton and S. B. Rice. There is probably more development work done on it than on any other mine in that vicinity. About 1200 feet of tunnels have been run on the ledge and some stoping has been done. The ledge matter varies from 5 to 15 feet in width, and a large number of samples taken by a party who was experting, the mine averaged between \$30 and \$40 per ton. In the lower level of the mine a shaft was sunk to a depth of 110 feet to water level and this develops the mine from top to bottom, 500 feet, and throws an immense body of ore in sight. Above the water level a portion of this ore is free milling, but the richest is refractory, and will require roasting to successfully treat it. There are many other mines here with more or less developments and fair prospects. The placers are all worked by bedrock flumes and although the water supply has been short the usual amount of dust has been extracted. From a reliable informant I learn that each 100 feet of old Alder gulch, notwithstanding the fact that it has been repeatedly worked over, still yields \$7000 in bankable dust and proves the fact that it is a good property to hold fast to and work. There are a dozen bedrock flume companies working at different points with good results.

#### OREGON.

**QUARTZ AND PLACER.**—Jacksonville *Times*, Oct. 22: Everything is in readiness for a good water supply at the Sterling Co.'s mine. The Portland Reduction Works are up and the machinery is being placed in position. Some very good quartz has been struck in Grob & Brändel's mine on Jackson creek. The California Co. have suspended operations on their ditch near Kerbyville for this season. The Wagner Creek Mining Co.'s quartz mill still lies idle, and when it will be started again is not known. Work continues day and night at the Hope ledge on Wagner creek, which is proving remunerative. John Miller is rigging his hydraulic claim on Farmer's flat for winter and expects to make a better run than ever. Capt. Ankeny says he will operate the Blue Gravel hydraulic mines on Galice creek during the coming season. J. N. Casteel has sublet the contract of digging C. C. Beekman's tunnel on Jackson creek to a miner from abroad.

Blalock Bros. have purchased a lot of pipe and will work their diggings on Pleasant creek in the most improved style. There is considerable activity in quartz mining in the Wagner creek district, some excellent ledges having been struck there. L. D. Brown & Co.'s new quartz mill, which is situated about two miles from Gold Hill, commenced to crush quartz this week. Wm. Bybee has purchased Isaac Skeeter's interest in his mines in Waldo precinct, but they will be operated next season by Mr. S. Burrage & Pomeroy have commenced tunneling into their iron mine near Rock Point, and will do considerable prospecting there at once. Wm. Hurst and E. T. Bartlett, of Ashland, who have been prospecting the placers of Cottonwood creek, Cal., report excellent discoveries. Klippel, Howard & Co. will commence sluicing at their diggings on Applegate in a short time, having run a ditch to them from the Applegate. Bybee & Hall's placer mines on Canyon creek, Josephine county, are in readiness and will be operated on a large scale during the coming season. The Sterling Mining Co. is negotiating for the purchase of Saltmarsh & Co.'s mines near Sterlingville, and we learn that a sale has been effected. G. B. Caldwell & Son have already started their hydraulic in the Steamboat district, having plenty of water, and will make an extended run. Preparations for the mining season continue unabated, and should there be plenty of rain, more gold will be taken out during the coming winter than for several past. Simmons, Decker & Co., who recently purchased Desselles & Connell's mines on Scotch gulch, Josephine county, are enlarging the ditch which carries the water. Klippel, Baume & Co.'s new quartz mill on Shively gulch is about ready to commence operations. It is a first-class one and will, no doubt, be of great benefit to this section. The Wines mines in Jump-off-Joe district are being fitted up with hydraulic pipe and giant by Cornelius & Co., the new proprietors. They will commence operations soon. C. W. Cornelius, of Portland, has purchased an interest in L. D. Brown's quartz mill and contract, and is on the ground, in company with Messrs. Braden & Haskell, who are also interested. The mineral exhibit of Baker county continues to be one of the most attractive features of the Mechanics' Fair, and is opening the eyes of capitalists to the fact that there is something else in Oregon besides wheat. It is reported that another strike has been made not far from the residence of Jos. Douden, on Rogue river, which is said to equal the far-famed Gold Hill discovery in richness. We have been unable to ascertain the full particulars as yet. John Wright, Fred. Bloch and Jack Hepburn, of Union, who returned from the Pine creek mines last week, have numerous specimens of quartz that are literally loaded with gold, the sight of which will make an ordinary man's eyes open very wide.

#### NEW MEXICO.

**HERMOSA.**—Black Range, Oct. 22: The Palomas Chief made a shipment of ore this week. Geo. Leaming has commenced assessment work on the Atlantic Cable. The Eagle is looking well and is producing shipping ore. Frank Reavis will commence work on the Small Hopes, which adjoins the Argonaut. J. C. McCoy is taking out and sacking ore which runs from 160 to 360 ounces from his Big Tree mine. A new strike has been made on the Argonaut Con. mine. The new strike consists of the two kinds of ore, one a chloride ore and the other galena containing brittle silver. This new ore is thought to run about 500 ounces to the ton.

#### UTAH.

**REVIEW.**—Salt Lake *Tribune*, Oct. 22: The week has seen the oncoming of the autumn storms, which appear to have materially checked the movements of the metals. The special event of the week has been the successful starting of the Hannock mill, on Lava creek, Idaho, the stock of the company being mainly held in Salt Lake City. The receipts in this city for the week ending October 20th, inclusive, were: Of bullion, \$60,580.67; of ore, \$25,574.72; a total of \$86,155.37. For the previous week the receipts were \$188,181.66, of which \$127,475.55 was in bullion and \$60,655.11 was in ore. The output of the Ontario for the week was 16,001.81 fine ounces of bullion; no ore sales. The Daily produced eight bars of fine bullion during the week, 9735.70 ounces. Base bullion receipts for the week were valued at \$16,400; fine bars, \$14,215.67; gold bars, \$8000. The Hanauer smelter produced during the week \$19,080 in bullion. The Stormont sent up during the week \$2885 in silver bars. Ore sales during the week: By Wells, Fargo & Co., \$1375; by McCormick & Co., \$17,990, including \$4530 Queen of the Hills and \$4460 Crescent; and \$6209.72 by T. R. Jones & Co.

**ORE AND BULLION SHIPMENTS.**—During the week the Crescent shipped 500,105 pounds of concentrates, and 120,000 pounds of first-class ore. For the week ended yesterday the Mackintosh sampler received 424,890 pounds of Ontario ore, 60,780 pounds of Daly, 85,820 pounds of Sampson and 21,640 pounds of Apex ore; total, 593,130 pounds. The output of Daly bullion from the Marsac mill for the week was seven bars, containing 6743 fine ounces of silver. The Ontario bullion product for the week was 24 fine bars, containing 16,001.81 ounces of silver.

**PARK NOTES.**—*Record*, Oct. 23: The Apex is shipping ore again. John O'Donovan and others are pushing work on the Silver Key group near the Apex, with very good results. On Scott Hill, Mr. Kennelly is pushing development work, principally by driving a tunnel into one of his claims from Iron Canyon. The batteries at the Ontario mill are undergoing repairs, mainly by having new stems, shoes and dies put in. The mill is running as usual and better results will be forthcoming. The grading of the hill on the Crescent company's ground is finished and in the spring the \$30,000 hoisting works will be erected. The tramway brings down about 100 tons of ore a day, and that and the concentrator will be kept running till Dec. 1st, if weather permits. Jas. M. Kennelly is working 13 men on the Kennelly group, between the Anchor and Daly, and five on his Scott Hill group. The tunnel on the Great Basin is in about 130 feet and development work is being prosecuted on the Marshall, Marshall No. 2, Great Basin No. 2, Helen, Little Edith and Minnehaha claims also. Work will be prosecuted all winter on these claims, and Mr. Kennelly says he intends erecting steam hoisting works on his property next spring.



## Dewey & Co., American and Foreign Patent Agents.

PATENTS obtained promptly; Caveat filed expeditiously; Patent Reissues taken out; Assignments made and recorded in legal form; Copies of Patents and Assignments procured; Examinations of Patents made here and at Washington; Examinations made of Assignments recorded in Washington; Examinations ordered and reported by Telegraph; Rejected cases taken up and Patents obtained; Interferences Prosecuted; Opinions rendered regarding the validity of Patents and Assignments; Every legitimate branch of Patent Soliciting promptly and thoroughly conducted.

Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons; and our success and business are constantly increasing.

The shrewdest and most experienced Inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

### Foreign Patents.

In addition to American Patents, we secure with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and thoroughly established.

Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) SOONER than other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of most inventions discovered here than any other agents.

Situated so remote from the seat of Government, delays are even more dangerous to the inventors of the Pacific Coast than to applicants in the Eastern States. Valuable patents may be lost by extra time consumed in transmitting specifications from Eastern agencies back to this coast for the signature of the inventor.

### Confidential.

We take great pains to preserve secrecy in all confidential matters, and applicants for patents can rest assured that their communi-

cations and business transactions will be held strictly confidential by us. Circulars of information to inventors, free.

### Home Counsel.

Our long experience in obtaining patents for Inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees intrusted to our agency.

### Engravings.

We have superior artists in our employ, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

### DEWEY & CO.,

United States and Foreign Patent Agents, publishers Mining and Scientific Press and Pacific Rural Press, 252 Market Street. Elevator, 12 Front St., S. F.

## Practical Hydraulics.

By P. M. RANDALL.

A Book for Civil Engineers, Miners, Millmen, Hydraulicians, Mining Engineers, and Irrigators.

This new work is by one of the most experienced hydraulicians of the country. It abounds with useful tables for ready reference, in which the results of abstruse calculations are all placed in a form so that one can find what he wants in a moment. For the engineer the principles, formulae, coefficients, etc., are given; and for those not familiar with higher mathematics, examples, rules, and tables are prepared. Thus the needs of the scientist and the practical miner or millman are each met. It is the most complete work on the subject yet published, and is specially applicable to the Pacific Coast.

### Table of Contents.

The following brief abstract of the contents will give an idea of the branches of the subject treated: General Plan; Discussion of the Principles of Hydraulics; Rules Deduced from Formulae Obtained; Examples and Calculations; Extensive Tables for Ready Reference; Fundamental Laws of Hydraulics Demonstrated, and Expressed in Formulae and Rules; Flow of Water through Openings; Weir Coefficients; Triangular Weirs; Flow of Water Over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow Through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water Through Short Tubes and Compound Tubes; Flow of Water Through Pipes; Tables of Velocities and Cubic Feet Flows for Given Fall per Mile and Diameter of Pipe; Coefficient for Bend—Circular and Angular; Flow Through Nozzles; Inverted Siphons; Flow of Water in Open Channels; Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

Price, \$2.00, post-paid. Sold by DEWEY & Co., Publishers, 252 Market St., San Francisco.

**JOHN A. ROEBLING'S SONS CO.**  
**WIRE ROPE**  
 GALVANIZED SHIP RIGGING, MINING, TILLER, ELEVATOR, TINNED, & COPPER ROPE, SASH CORDS. LARGEST WIRE ROPE WORKS IN THE WORLD.  
**IRON & STEEL WIRE OF EVERY KIND.**  
 TELEGRAPH WIRE, HARD & SOFT COPPER WIRE INSULATED FOR ELECTRIC USE. SWEDISH IRON WIRE, CRUCIBLE STEEL WIRE, FENCE WIRE.  
 TRENTON, N.J. & 14 DRUMM ST. SAN FRANCISCO, CAL.

## CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and

## HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

**No. 1 (XX) is the Strongest Explosive Known.**

**No. 2 is superior to any powder of that grade.**

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street - - - San Francisco, Cal.

## SAN FRANCISCO PHOTOGRAVING CO.

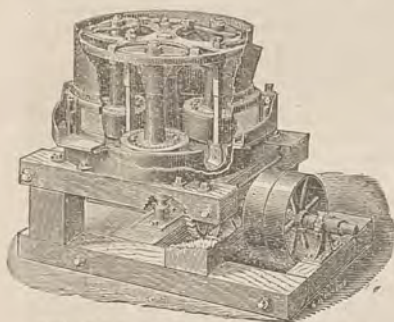
659 CLAY STREET.

## PHOTO SPECIALTY GALLERY

Engravings made from photographs, drawings and original designs, for newspaper, book, card and job printing. Engraved prints enlarged or reduced, cheaply and quickly. Also copies of manuscript, legal documents, wills, contracts, signatures, portraits, buildings, machinery and printed documents reproduced with accuracy. Photographs, stereoscopic views, etc., duplicated, enlarged or reduced. Slides for magic lanterns made from photographs, lithographs, and steel or wood engravings, etc. Satisfaction guaranteed. Agents wanted in all cities and large towns. Address, for further information, S. F. PHOTOGRAVING CO., 659 Clay St., S. F., or the office of this paper.

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.

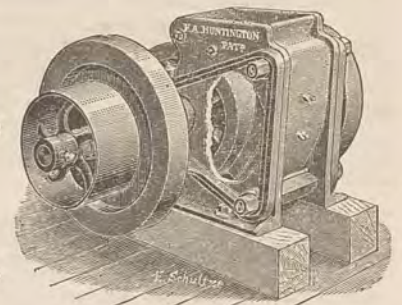


Centrifugal Roller Quartz Mill.

**F. A. HUNTINGTON,**  
 MANUFACTURER OF  
**Centrifugal Roller Quartz Mills,**  
**CONCENTRATORS AND ORE CRUSHERS,**  
 Mining Machinery of Every Description,  
**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - - SAN FRANCISCO, CAL.



ORE CRUSHER.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed. BEST SOFT LAKE SUPERIOR COPPER USED.

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.**  
**E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St. NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



SEND FOR CIRCULAR.



## STURTEVANT MILL.

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in lead-  
ing smelting works  
and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

## FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

UTAH OFFICE—SALT LAKE CITY, UTAH.

Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,  
JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

## Metallurgy and Ores.

**SELBY**  
SMELTING and LEAD CO.,  
416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY  
And Assay Office.

Highest Prices Paid for Gold, Silver and  
Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,  
LEAD PIPE,  
SHEET LEAD,  
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,  
Under Chamberlin Patent.

J. KUSTEL. H. KUSTEL.

**METALLURGICAL WORKS,**  
318 Pine St. (Basement),  
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my  
Process.  
Assaying and Analysis of Ores, Minerals and Waters.  
Mines Examined and Reported on.  
Practical Instruction given Treating Ores by im-  
proved processes.

G. KUSTEL & CO.,  
Mining Engineers and Metallurgists.

C. H. AARON,  
ASSAYER AND METALLURGIST,  
NOGALES, ARIZONA,  
Will attend to business in connection with mines in So-  
nora or Arizona.

WM. D. JOHNSTON,  
ASSAYER AND ANALYTICAL CHEMIST.  
514 Kearny Street,  
SAN FRANCISCO, - CALIFORNIA  
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

W. A. GOODYEAR,  
Civil and Mining Engineer  
MINING EXPERT and GEOLOGIST.  
Address care of Dewey & Co., 252 Market Street, San  
Francisco, Cal.

JOHN TAYLOR & CO.,  
IMPORTERS AND DEALERS IN  
ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,  
CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists,  
Mining Companies, Milling Companies, Prospectors, etc.,  
to our full stock of Balances, Furnaces, Muffles, Crucibles,  
Scorifiers, etc., including, also, a full stock of  
Chemicals.

Having been engaged in furnishing these supplies since  
the first discovery of mines on the Pacific Coast, we feel  
confident from our experience we can well suit the de-  
mand for these goods, both as to quality and price. Our  
New Illustrated Catalogue, with prices, will be sent on  
application.

Our Gold and Silver Tables, showing the value per  
ounce Troy at different degrees of fineness, and valuable  
tables for computation of assays in grains and grammes,  
will be sent free upon application. Agents for the Patent  
Plumbago Crucible Co., London, England. Also for E.  
G. DENNISTON'S Silver Plated Amalgam Plates. The  
plates of this well-known manufacturer are thoroughly  
reliable, and full weight of Silver guaranteed. Orders  
taken at his lowest prices.

JOHN TAYLOR & CO.

Nevada Metallurgical Works.

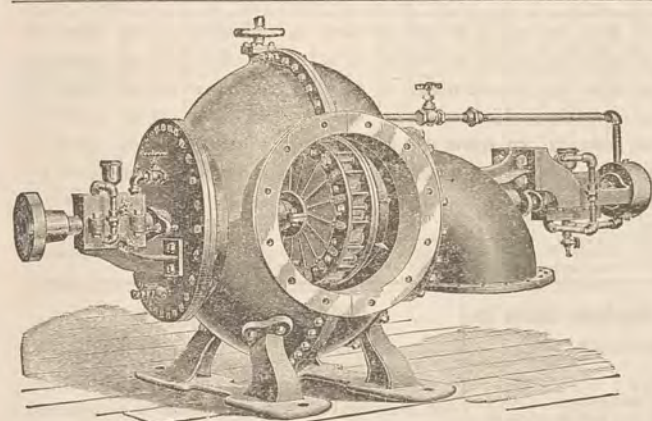
NO. 28 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869

Ores worked by any Process.  
Ores Sampled.  
Assaying in all its Branches.  
Analyses of Ores, Minerals, Waters, etc.  
Working Tests (practical) Made.  
Plans and Specifications furnished for the  
most suitable Process for Working Ores.  
Special attention paid to Examinations of  
Mines; Plans and Reports furnished.  
C. A. LUCKHARDT & CO.,  
(Formerly Huhn & Luckhardt, )  
Mining Engineers and Metallurgists.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500  
South 10th St., Philadelphia. Branch Of-  
fices—47 Rose St., New York, and 40 La Salle  
St., Chicago. Agent for the Pacific Coast—  
Joseph H. Dorety, 529 Commercial St., S. F.



## JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and  
high heads are utilized, and are guaranteed to give more power with less water than  
any other wheel made. Being placed on horizontal shaft, the power is transmitted  
direct to shafting by belts, dispensing with gearing.  
Estimates furnished on application for wheels specially built and adapted in  
capacity to suit any particular case.  
Further information can be obtained of this form of construction, as well as the  
ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost,  
by applying to the manufacturers.

JAMES LEFFEL & CO.,  
Springfield, Ohio, or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents,  
Chicago, Ill., and Denver, Col.

PARKE & LACY, General Agents, San Francisco, Cal.



**FLOUR AND OTHER MILLS.**  
Quartz Mill Screens a Specialty.  
147 Beale Street, San Francisco.

NATIONAL ASSURANCE CO.,  
OF IRELAND.

ATLAS ASSURANCE COMPY,  
OF LONDON.

BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.

H. M. NEWHALL & CO.,  
GENERAL AGENTS,  
309 & 311 Sansome St., San Francisco, Cal.

COAL MINES OF THE WESTERN  
COAST.

A few copies of this work, the only one ever published  
eating of Pacific Coast Coal Mining, have been obtained,  
and are for sale at this office for \$2.50 per copy. It was  
written by W. A. Goodyear, Mining and Civil Engineer,  
formerly of the California State Geological Survey.

A Good Opportunity for a Ma-  
chinist.

A variety of good Tools, Patterns, etc., with business  
for sale cheap by a party retiring from business. A  
splendid opportunity for an enterprising mechanic.  
Address A. B. O., care of this paper.

THE RUSSELL PROCESS COMPY.

C. A. STETEFELDT, President.  
NEW YORK OFFICE, 18 BROADWAY  
Room 709.



## THE CONSUMERS' COMPANY. VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.  
SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,  
The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank  
Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**  
218 California Street, San Francisco, Cal.

## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

**GIANT POWDER or DYNAMITE,**  
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and  
GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast-  
ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and  
saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

**BANDMANN, NIELSEN & CO.**

CAPS and FUSE for Sale. GENERAL AGENTS, SAN FRANCISCO, CAL.

## THOMAS PRICE'S ASSAY OFFICE, CHEMICAL LABORATORY,

BULLION ROOMS and ORE FLOORS,  
524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed  
of in the Open Market to the Highest Bidder.



The Jackson and Powell-street Railroad Company has given the Pacific Rolling Mills an order for \$50,000 worth of rails and girders for the road.



Refuse.....	do	do	do	20 00
Merchantable	do	do	1x6, 1x6, 1x6	25 00
Refuse, Surfaced and Rough, 1x6, 1x6, 1x6, 2x8	do	do	do	18 00

## TONGUED AND GROOVED.

Merchantable, 1x6, T. and G., 12 feet and over.....	24 00
Refuse.....	do do do..... 18 00
do do 7 to 11 feet .....	20 00
do under 7 feet.....	17 00

## TONGUED, GROOVED AND BRADED.

Merchantable, 1x4, 18 feet and over long.....	26 00
Refuse..... do do do .....	20 00
Merchantable, do 12 and 14 feet long.....	24 00
Refuse..... do do do .....	18 00
do 7 to 11 feet long.....	20 00
do under 7 do .....	17 00

## PANEL STOCK.

Short.....1 inch, Rough Clear, under 12 feet..	18 00
--	-------

## TANK STOCK.

Short.....2 and 3 inch, Surfaced or Rough	20 00
---	-------

Clear, under 12 feet.....

On a credit of 60 days, or a discount at the rate of one per cent per month for anticipated payments, and not less than one per cent per month added for extension of the same. Extra Freight added to above rates for delivery at southern coast ports of California.

## Coal.

The following is from the circular of J. W. Harrison, coal and metal broker, October 23, 1886:

Since the departure of the last Australian steamer the following vessels have arrived from Sydney and Newcastle: "Eurasia" (via San Pedro), 1000 tons; "Duchess of Albany," 2643 tons; "Libussa," 2400 tons; "Aigburth," 2697 tons; "Waterloo" (via San Pedro), 1000 tons; "Clynder," 1780 tons; "Moacambe Bay," 1700 tons; "Stockbridge," 3000 tons; "Lancaster Castle," 3200 tons; "British Ambassador," 2400 tons; "Forrest Hall," 3120 tons; "Ardencaple," 2000 tons; "Ben Cruachan," 1982 tons; "Hospodar," 2450 tons; "Celestial Empire," 2000 tons; "Wynnstar," 2400 tons; "Star of Scotia," 1560 tons; "Star of Denmark," 1440 tons; "Cambrian Chieftain," 2030 tons; "Samoa," 1757 tons; "Melpomene" (via San Pedro), 500 tons; "Knight of St. Michael," 3001 tons; "Blairhoyle," 1750 tons. Total, 48,919 tons.

## PRICES "TO ARRIVE."

Per Ton.	Per Ton.
Australian.....\$6 12 @ 25	Cardiff.....\$6 37 @ 6 50
Liverpool Steam 5 62 @ 75	Lehigh Lump.....13 00 @ 13 50
West Hartley.....6 75 @ 7 00	Cumberland bk 8 00 @ 8 50
Scotch Splint.....6 25 @ 6 37	Egg, hard.....9 75 @ 10 00

## SPOT PRICES.

Per Ton.	Per Ton.
Australian.....\$8 00	Cardiff.....\$6 75
Liverpool Steam.....5 75	Lehigh Lump.....13 50
West Hartley.....7 00	Cumberland, bulk.....9 50
Scotch Splint.....6 50	Egg, hard.....10 50

## New York Metal Market.

Telegraphic advices dated Oct. 27th give the following New York prices:

BORAX—5 1/2 @ 6 1/2 c.  
COPPER—LAKE—\$11.25 @ 11.37 1/2.  
IRON—No. 1, \$17 @ 18.00.  
LEAD—\$4.85 @ 4.95.  
QUICKSILVER—54 @ 55c.

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Steady, spot closing @ 11.40 @ 11.75c. Transferable Notices (Lake) issued at 11.50. Transferable Notices (Chili Bars) issued at 14.41 5/8. LEAD—Dull at \$4.05 @ 4.20c spot. Transferable Notices issued at \$4.12 1/2. TIN—Quiet at \$22.15 @ 22.30. Transferable Notices issued at \$22.05.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.00 @ 22.75; Billiton Tin, \$23.00 @ 23.25; Banca Tin, \$23.00 @ 23.50; Baltimore Copper, \$10.20 @ 10.50; Orford Copper, \$10.25 @ 10.75; P. S. C. Copper, \$10.25 @ 11.00; Foreign Lead, \$4.35 @ 4.60; Foreign Spelter, \$4.85 @ 4.90.

MAKER'S PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18.50 @ 19.50; No. 2, \$17.50 @ 18.00; Grey Forge, \$16.00 @ 16.25. Hudson River, Grade No. 1, \$18 @ 19.00; No. 2, \$17.50 @ 18.00; Grey Forge \$15.50 @ 16.00. Southern, Grade No. 1, \$18.00 @ 19.00; No. 2, \$17.00 @ 18.00; Grey Forge \$15 @ 16.

## San Francisco Metal Market.

## (WHOLESALE.)

THURSDAY, Oct. 28, 1886.

ANTIMONY—French Star.....	9 1/2 @
BORAX—San Bernardino.....	@ 8
Armago.....	@ 62
IRON—Glenbrook ton.....	@ 22 50
Eglinton, ton.....	@ 21 50
American Soft, No. 1, ton.....	@ 24 00
Oregon Pig, ton.....	@ 23 00
Clippier Gap, Nos. 1 & 4.....	@ 23 00
Clay Lane White.....	@ 21 50
Shots, No. 1.....	@ 23 50
STEEL—English, lb.....	@ 25
Black Diamond, ordinary sizes.....	@ 10
Plow.....	@ 5
Machinery.....	@ 6
Sanderson Bros.....	@ 10
COPPER.....	@ 18 1/2
Bolt.....	@ 19
Sheathing.....	@ 12
Ingot.....	@ 13
LEAD—Pig.....	@ 5 00
Bar.....	@ 5 50
Pipe.....	@ 8
Sheet.....	@ 8
Shot, discount 10% on 500 bag Drop, 7 bag.....	@ 1 05
Buck, 7 bag.....	@ 1 85
Chilled, do.....	@ 2 05
ZINC—German.....	@ 8 @ 9
Sheet, 7x3 ft, 7 to 10 lb, less the cask.....	@ 6 1/2
QUICKSILVER—By the flask.....	@ 39 00 @ 40 30
Flasks, new.....	@ 1 05
Flasks, old.....	@ 85 @
TINPLATE—Coke.....	@ 5 00 @ 5 50
Charcoal.....	@ 6 75 @ 7 25

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
G. W. INGALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
R. G. HUSTON—Montana.  
GEO. McDOWELL—Fresno and Tulare Cos.  
O. F. BERGMAN—Tehama and Colusa Cos.  
J. H. SMITH—Plumas and Sierra Cos.  
J. C. SWEENEY—Sonoma and Mendocino Cos.

CAPT. JAMES B. EADS has been purchasing mining machinery in Denver, Colorado, for El Bancos Mining Co., Durango, Mexico.

## List of U. S. Patents for Pacific Coast Inventors.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 252 Market St., S. F.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

FOR WEEK ENDING OCTOBER 19, 1886.

- 351,087.—SPRAYING NOZZLE—John Bean, Los Gatos, Cal.  
351,088.—SPRAYING PUMP—John Bean, Los Gatos, Cal.  
351,154.—PLOW—J. A. Bilz, Pleasanton, Cal.  
351,092.—CLOTH WINDER—A. Brown, Mendocino, Cal.  
351,309.—PRINTING PRESS GAGE—F. F. Byington, Oakland, Cal.  
351,102.—PANTS HANGER—A. Fieger, Portland, Or.  
351,104.—HAY PRESS—E. Gallagher, Bodie, Cal.  
351,028.—GANG HOE—F. T. Gilbert, Walla Walla, W. T.  
351,105.—SYRINGE BOTTLE—N. S. Hamlin, Marysville, Cal.  
351,266.—BLOTTER—A. S. Johnson, Sprague, W. T.  
351,062.—WASHING MACHINE—B. F. Mathews, San Bernardino, Cal.  
351,119.—GATE—M. C. Meeker, Occidental, Cal.  
351,337.—GATE—C. E. Plumley, Byron, Cal.  
351,209.—TELEPHONE—Paul Seiler, S. F.  
351,350.—VEHICLE RUNNING GEAR—John Zeek, Canby, Or.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

LIFTING-JACK.—Melvin C. Meeker, Occidental, Sonoma Co. No. 350,597. Dated Oct. 12, 1886. This is a jack such as is used for lifting and logging purposes. The object is to provide a simple and effective jack, in the operation of which but a small exercise of power is required, and this patented construction of devices accomplishes this.

GATE.—Chas. E. Plumley, Byron, Contra Costa Co. No. 351,337. Dated Oct. 19, 1886. The invention relates to that class of gates which are adapted to be readily opened or closed by the traveler without alighting from his vehicle. By peculiar construction and combination of devices the inventor provides a simple and readily operating gate of this class.

SYRINGE BOTTLE.—N. S. Hamlin, Marysville, No. 351,105. Dated Oct. 19, 1886. This new syringe bottle consists in a bottle having a neck-opening in its side and a removable elastic band covering said opening and encircling the bottle. The object is to provide a bottle the neck-opening of which can be easily and tightly closed by means of an elastic band, and which is also readily removable for the insertion of the point of the syringe.

PLOW.—John A. Bilz, Pleasanton, Alameda Co. No. 351,154. Dated Oct. 19, 1886. This is an improvement in gang plows. The object is to provide a plow which is specially adapted for use in orchards and vineyards, where the plowing must be done close to the trees and yet not injure them. A peculiar bend in the beam enables the inventor to place two plows on a single beam, and by coupling the whiffletree the center draft can still be obtained, no matter how close the plow may be running to the trees or vines.

GATE.—Melom C. Meeker, Occidental, Sonoma Co. No. 351,119. Dated Oct. 19, 1886. This is a gate which is opened or closed by the traveler without having to get out of his wagon. The invention consists in the peculiar bearing-plate or casting adapted to be readily bolted to the bottom of the gate, near its hinge end, the bent lever pivoted to the casting and guided and limited thereby, the operating levers in the roadway and their connections with the pivoted bent lever, the connections between said bent lever and the gate-latch, and the arrangement of the latch itself and its construction, whereby it is caught and released. These attachments can be easily and effectively applied to any gate.

HAY PRESS.—Eugene Gallagher, Bodie, Mono Co., assignor of one-half to Morten Anderson. No. 351,104. Dated Oct. 19, 1886. The invention relates to that class of baling presses in which a reciprocating follower works within a single double-ended chamber whereby a bale is pressed upon each stroke of the follower, the feeding of one bale taking place during the completion of the other. The invention consists in the chamber having a discharge at each end, the reciprocating follower in said chamber, the novel means for operating the follower, the arrangement of feed and discharge doors and their fastenings, the means for automatically passing the bales and releasing them, and various details of construction.

WRENCH.—Wm. J. Palleam, Chico, assignor of one-half to Allen Henry and A. M. Barley. No. 350,602. Dated Oct. 12, 1886. This is a wrench specially adapted for adjusting the nuts

on the teeth of thrashing cylinders. The invention consists in a short stock for entering the cylinder, a handled shank pivoted in said stock and projecting outwardly between the cylinder-bars, a socketed piece or jaw pivoted on the stock for engaging the nut from within, gears by which the rotation of the shank is transmitted to the socketed piece or jaw, a clamp on the stock for engaging one of the cylinder-bars, and holding the stock steady, and a jaw or holder on the shank for engaging the tooth and keeping it from turning. This device will tighten or loosen nuts, securing teeth of a thrashing cylinder without having to reverse the cylinder.

LOUR-CHEST.—Joseph Ozenberger, Middletown, Lake Co., assignor of one-half to R. H. Sanders. No. 350,600. Dated Oct. 12, 1886. This flour-chest consists in a casing having within its back portion, and arranged vertically, a flour compartment, and in its front portion an endless traveling elevator communicating at its lower end with the lower end of the flour compartment, a sifter into which the elevator discharges, a removable bread-board closing the upper front portion of the casing, a suitable arrangement of shelves in the lower front portion of the casing, and a small drawer-sieve, together with mechanism for operating the elevator and sifter, and various details of construction. The object is to provide a flour-chest the parts of which are so arranged that the greatest convenience can be obtained in the use of the chest.

It is stated that in Butte, Montana, a new railroad company has been started with sufficient capital to build lines to all the principal mining camps.

D. W. Stone,

Who mined at Murphy's Camp in 1882 and at Sonora in 1885, will please address, G. A. GELIEN, VALLEJO, CAL.; very important.

## Assessment Notices.

Acme Mill and Mining Company.—Location of principal place of business, San Francisco, Cal. Location of works, Volcano Mining District, Amador County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 25th day of October, 1886, an assessment (No. 9) of two and one-half cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 29th day of November, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 20th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Sec'y. Office—Room 4, 309 California St., San Francisco, Cal.

Aultman Mill and Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Georgetown Mining District, El Dorado County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 26th day of October, 1886, an assessment (No. 3) of two and one-half cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 29th day of November, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 20th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Sec'y. Office—Room 4, 309 California St., San Francisco, Cal.

Santa Anita Mill and Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Nevada County, Cal.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 26th day of October, 1886, an assessment (No. 10) of one and one-half cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 29th day of November, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 20th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Sec'y. Office—Room 4, 309 California St., San Francisco, Cal.

## HENDERSON'S PATENT TRUSS

Comfortable and Reliable.



This simple truss can be worn without inconvenience, and gives all the comfort to the wearer that can be obtained from a perfect-fitting, pliable apparatus. The pad is soft and yielding, and on account of its peculiar construction and the connections of its securing bands, cannot get out of place. It will remain in place no matter what position the wearer may assume. The engraving shows the construction of the appliance. It is simplicity itself, and is comfortable and reliable. Address, JESSE G. HENDERSON, Grizzly Flat, El Dorado Co., Cal.

HEALD'S BUSINESS COLLEGE, 24 Post St. S. F. Send for Circular.

## Books on Assaying.

By C. H. AARON.

## PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

## Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Chugging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorchification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 12mo. pages, with illustrations, well bound in cloth; 1884. Price, \$1, postpaid. Sold by DEWEY & Co., Publishers, No. 252 Market street, San Francisco.

## PARTS II AND III.

Lead, Copper, Tin, Mercury, etc.

Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

## Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Manipulation, etc.; Lead Ores; Copper Ores; Volumetric Assays; Parkes' Process; Amalgamation; New Process; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of Zinc Ores, New Method; New Assay of Nickel and Cobalt; Assay of Chromium; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Salt; Appendix to Part I; Notes on Crucible Assays; Weighing by Oscillations; Appendix to Part III; The Assay of Lead; The Assay of Copper.

There are 160 12mo. pages with illustrations in the volume which is bound strongly in cloth. Price postpaid, \$1.75. Sold by DEWEY & Co., Publishers, No. 252 Market St., S. F.

## Testing and Working Silver Ores.

An illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protoclauride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patches' process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroebe's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

Price, post free, \$2.00. Sold by DEWEY & Co., Publishers, 252 Market St.

## Books on Working Ores.

By GUIDO KUSTEL, M. E.

ROASTING OF GOLD AND SILVER ORES (Second Edition) and the Extraction of their Respective Metals without Quicksilver. By GUIDO KUSTEL, M. E. 1880.

This rare book on the treatment of gold and silver ore without quicksilver is liberally illustrated and crammed full of facts. It gives short and concise descriptions of various processes and apparatus employed in this country and in Europe, and the why and wherefore. It contains 154 pages, embracing illustrations of furnaces, supplements and working apparatus. It is a work of great merit by an author whose reputation is unsurpassed in his specialty. PRICE, \$3, cloth, postage free. Sold by DEWEY & Co., Publishers, 252 Market St., San Francisco, Cal.

By C. H. AARON.

AARON'S LEACHING GOLD AND SILVER ORES, the most complete hand-book on the subject extant; 164 pages octavo. Illustrated by 12 lithographic engravings and four wood cuts. Fully indexed. Plainly written for practical men. In cloth, \$3. Sold by DEWEY & Co., S. F.

## American Exchange Hotel, SANSOME STREET.

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50 PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.



**NOTICE TO  
MINING MEN,  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.**

**Engineers' Tables of Progress**

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimate address:  
**INGERSOLL ROCK DRILL CO.,**

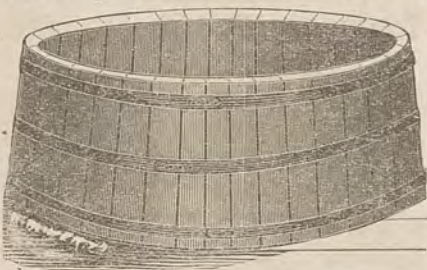
REPRESENTED BY

**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

**Mining Vats and Tanks.**



**LEACHING VATS with FALSE BOTTOMS.  
PRECIPITATING VATS,  
SOLUTION and WATER TANKS**  
For Mining Purposes.

**WELLS, RUSSELL & CO.,**  
Mechanics' Mills, San Francisco.

**N. W. SPAULDING  
SAW COMPANY**

Manufacturers of

**SPAULDING'S  
Inserted Tooth**

AND

**CHISEL BIT**

CIRCULAR

**Saws.**

**SAW MILLS AND MACHINERY**  
Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

**RICHARD C. REMMEY, Agent,  
Philadelphia Chemical Stoneware Manufactory,**  
1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of

all kinds of

Chemical Stoneware

—FOR—

Manufacturing

Chemists.

Also Chemical Brick

for Glover Towers.

**QUARTZ BREAKERS!**

—AND—

**Pulverizers Combined**

To Run by Hand or Power.

Mining Machinery of Every De-

scription; Drawings, Plans

and Specifications.

**E. I. NICHOLS, 316 Mission Street, S. F.**

**INVENTORS, TAKE NOTICE**

**L. PETERSON, MODEL MAKER,**  
258 Market St., N. E. cor. Front (up stairs), San Francisco.  
Experimental machinery and all kinds of metal, tin,  
and Brasswork.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake. The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**  
316 California St., San Francisco.

## FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

(ESTABLISHED IN 1855.)

Office, 220 Fremont St.,

MANUFACTURERS OF

San Francisco.



BABCOCK & WILCOX BOILERS.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish

Tanks for Salmon Canneries.

OF EVERY DESCRIPTION.

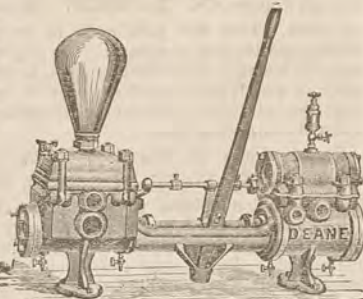
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

**GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.**

—ALSO—

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

**LOCOMOTIVE AND MARINE FORGINGS.**

ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. **STEEL RAILS** from 12 to 45 pounds per yard. ALSO, **Railroad and Merchant Iron**, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**

## FRASER & CHALMERS.

CHICAGO, ILL.

U. S. A.

General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

**PERFORATED METALS FOR  
REVOLVING AND SHAKING-SCREENS,**

**JIGS & STAMP-BATTERIES.**

Denver  
Office:  
No. 248  
18th Street,  
Denver,  
Colo.

NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.

Mexico  
Office:  
No. 11  
Calle  
de Sanchez  
de Chihuahua,  
Mex.

UTAH OFFICE—SALT LAKE CITY, UTAH.

## Iron and Machine Works.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

—BUILDER OF—

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines

Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. **237 ORDERS SOLICITED.**

### UNION IRON WORKS,

SACRAMENTO, CAL.

**ROOT, NEILSON & CO.,**

MANUFACTURERS OF

Steam Engines, Boilers,

AND ALL KINDS OF

**MACHINERY FOR MINING PURPOSES.**

Flouring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front St., bet. N & O Sts., Sacramento, Cal.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

**Mold-Board AMALGAMATORS,**

**Golden State Pressure Blowers.**

First St., between Howard & Folsom Sts.

THOMAS THOMPSON THORNTON THOMPSON

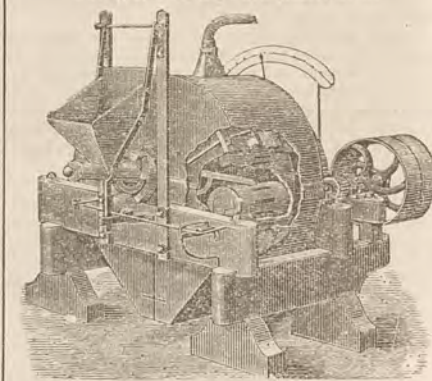
**THOMPSON BROTHERS,**

**EUREKA FOUNDRY,**

139 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

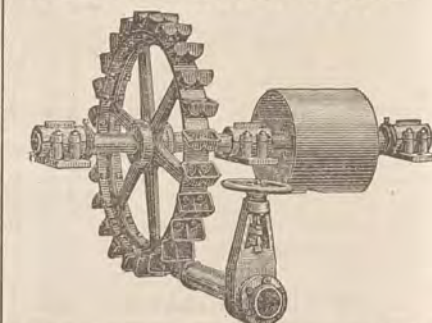
**Tustin's Pulverizer  
WORKS ORE WET OR DRY  
FULTON IRON WORKS, S. F.**



MANUFACTURED BY

HINCKLY, SPIERS & HAYES,

**PELTON'S WATER WHEEL.**



THIS WAS ONE OF THE FOUR WHEELS TESTED  
by the Idaho Company at Grass Valley, Cal., and  
gave 90 2 per cent., distancing all competitors. Send for  
Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street  
San Francisco, Cal.

### Practical Treatise on Hydraulic Mining.

By AUG. J. BOWIE, JR.

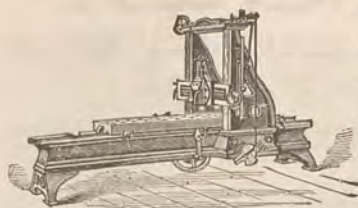
This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by DEWEY & Co., Publishers, 252 Market St., San Francisco.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



Putnam Planer.

# PARKE & LACY.

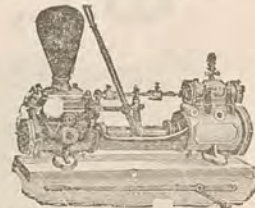
.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.

Knowles Steam Pump  
The Standard.

1850.

1885.

**RANKIN, BRAYTON & CO.,**  
BUILDERS OF...  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

### WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



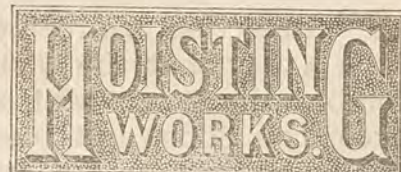
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



### BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700 pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE OF CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

## THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
AIR COMPRESSORS—Rope Power Transmission.  
HYDRAULIC PUMPING and Hoisting Machinery.  
WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.  
SAW-MILL MACHINERY of all kinds.  
STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.  
MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.  
WILSON'S PATENT GAS-PRODUCER.  
STEAM BOILERS of all descriptions.  
SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.  
STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company

Send for Circular and Price Lists.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.  
J. O. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market &amp; Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

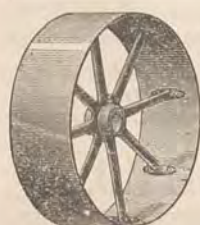
TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT &amp; CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.  
**CLOT & MEISE,**

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 &amp; 131 Fremont Street,

San Francisco, Cal.

## CINCINNATI CORRUGATING COMPANY.

JOHN F. HAZEN, Prest.

JAMES HICKS, Treas.

J. G. BATTELLE, Sec'y.

## Over 1500 Tons Iron in Stock!

FOUR WIDTHS OF CORRUGATIONS MADE!

STANDING SEAM PLAIN ROOFING!

All Paint Re-ground in Pure Linseed Oil!



Chicago Prices Beaten!

ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 &amp; 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).  
Orders Promptly Executed

AUGUST LUTZ,

METAL SPINNER,

10 Stevenson St., 3d floor, S. F.

The only custom work spinner in the city. Personal attention given to all work. Orders respectfully solicited.

San Francisco Cordage Factory.  
Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

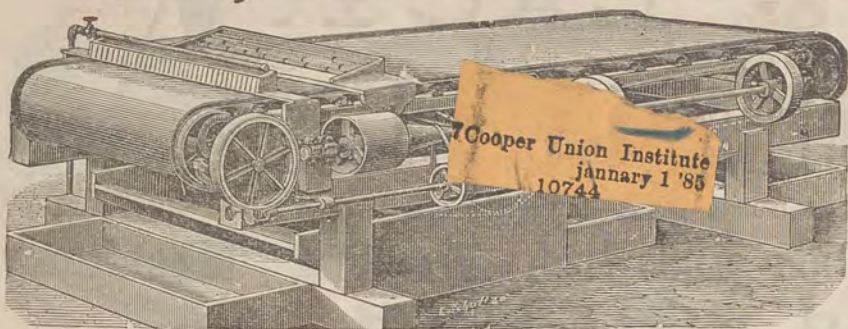
Extra sizes and lengths made to order on short notice

TUBBS &amp; CO.

611 and 613 Front St., San Francisco.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR**  
OR VANNING MACHINE.

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS**  
(\$575.00) F. O. B.

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

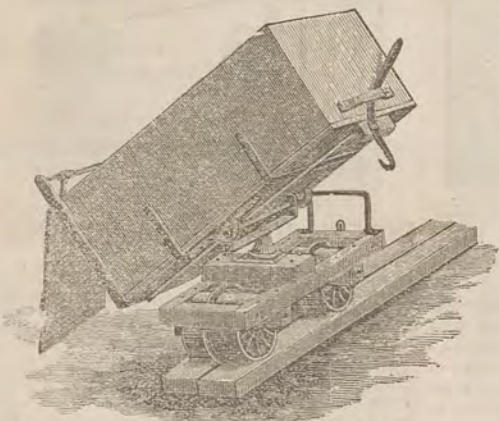
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.

Protected by patents May 4, 1880; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,  
Room 7, No. 109 California Street, SAN FRANCISCO, CAL.



JAMES' PATENT ORE CAR.

## TATUM & BOWEN,

34 & 36 FREMONT ST., Donahue Block, SAN FRANCISCO.

91 & 93 FRONT ST., PORTLAND, OREGON.

Ore Car, . . . .	\$ 40.00
Rock Breaker, . . . .	100.00
Quartz Mill, . . . .	350.00

## THE JAMES QUARTZ MILL

Saves a Higher Percentage than any other machine.

Its action is a reciprocating motion of four separate and distinct Dies attached to a heavy casting in such a way that the **WHOLE WEIGHT** and **FORCE OF BLOW** ACTS **ALTERNATELY ON EACH DIE**. In this respect it resembles the Stamp Mill, and in point of amalgamation is superior to any machine in use. There is no wear, except on Shoes and Dies, and there is no expense for setting. Weight, 3000 pounds. Capacity, 6 Tons in 24 hours through No. 40 Screen. Requires 4 H. P.

## H. P. GREGORY & CO.

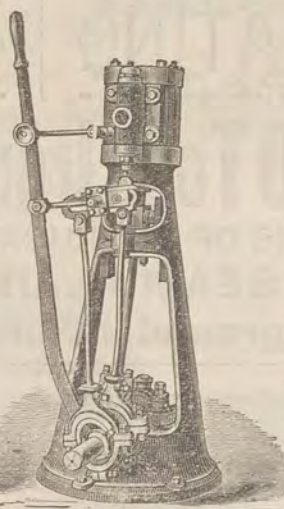
Nos. 2 and 4 California St., - - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

# MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING MACHINERY.  
FRANK & CO.'S WOODWORKING MACHINERY.  
NEW HAVEN MANUF'G CO.'S MACHINISTS' TOOLS.  
BEMENT & SON'S MACHINISTS TOOLS.  
BICKFORD'S POWER DRILLS.  
BLAKE'S IMPROVED STEAM PUMPS.  
WEBBER CENTRIFUGAL PUMPS.  
PERIN BAND SAW BLADES.  
STURTEVANT BLOWERS AND EXHAUSTS.  
SHIMER MATCHER HEADS.  
BRINARD MILLING MACHINES.  
TURBINE WATER WHEELS.  
BRADLEY CUSHIONED HAMMERS.  
MASSEY'S STEAM HAMMERS.  
SCHLENKER'S BOLT CUTTERS.  
HOLLOWAY FIRE EXTINGUISHERS.



YACHT ENGINES.

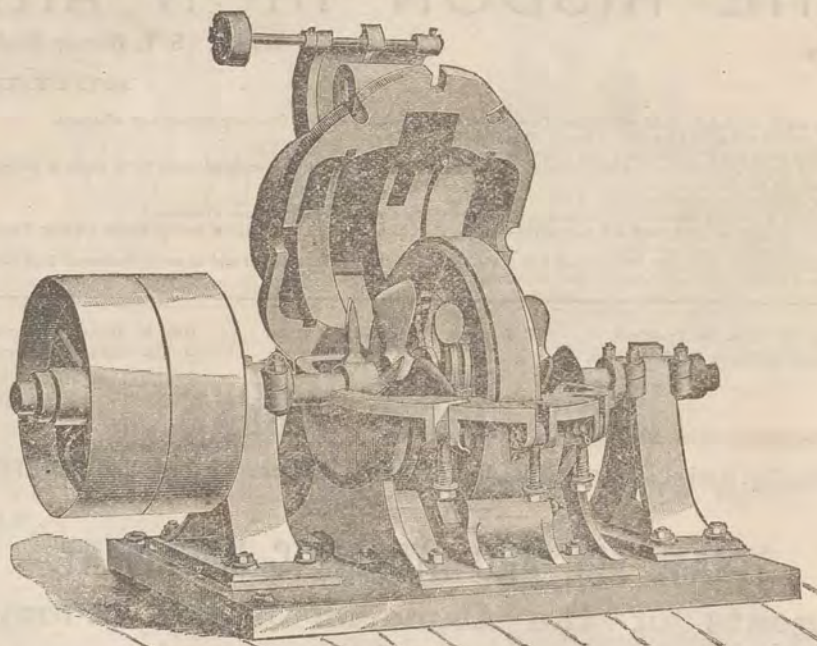
WILLIAMSON BROS' HOISTING ENGINES.  
ATLAS ENGINE WORKS ENGINES AND BOILERS.  
PAYNE'S VERTICAL AND HORIZONTAL ENGINES.  
OTTO SILENT GAS ENGINES.  
EMPIRE LAUNDRY MACHINERY.  
PICKERING ENGINE GOVERNORS.  
JUDSON ENGINE GOVERNORS.  
TANITE CO.'S EMERY WHEELS AND MACHINERY.  
NATHAN AND DREYFUS OILERS.  
KORTING INJECTORS AND EJECTORS.  
DISSTON'S CIRCULAR SAWS.  
NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.  
LANE AND BODLEY SAW MILLS.  
H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied. At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet. All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco. Certificates as to performance of the Mills, and any information required, furnished on application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 & 106 Washington St., NEW YORK.  
OR PACIFIC IRON WORKS, SAN FRANCISCO.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, NOVEMBER 13, 1886.

VOLUME LIII.  
Number 20.

## A New Concentrator.

We saw in operation this week, in this city, a new concentrating appliance devised by W. C. Stiles, who is known also as the inventor of quartz-crushing machinery and similar appliances for mining purposes. The new concentrator is quite simple in construction and operation. It is built on the well-known principle that when a vessel containing gold, sulphurets, quicksilver, etc., is shaken, the heavier valuable material will settle and the sands and gangue will come to the surface. As the heavier material settles the lighter sands are carried off by flowing water. The concentrator is an inclined surface having at stated intervals transverse depressions with long downward incline and short upward incline. This makes a series of inclined planes. Each of these has a pitch of one-half inch in one foot toward the head, where it is met by an incline six inches long, one and one-half inches in height. This incline is the beginning of another of one foot, pitching one-half inch toward the head, as before. Then follows another, and so on, there being from 4 to 10 inclines as best suits the concentration.

The table is given an end shake, and brings up with a jar or shock. The material if constantly jarred would settle very hard. To avoid this there is an automatic rake or series of levers traveling up and down the entire length of the vibrating table. When the levers are going toward the upper end they are plunged into the sands in the different inclines, and when going back or down the table, they are raised out so as not to touch the material. When they are on the inclines that pitch to the upper end they nearly touch the bottom. After reaching the six-inch inclines the rake rises, dragging a portion of the concentrated material up to plane No. 2 and so on to No. 3 and No. 4 up to the topmost riffle, where the concentrates are carried off into a box. The tailings pass off at the lower end. Trials are now being made with the machine to prove its efficiency, and so far the results are satisfactory to the inventor.

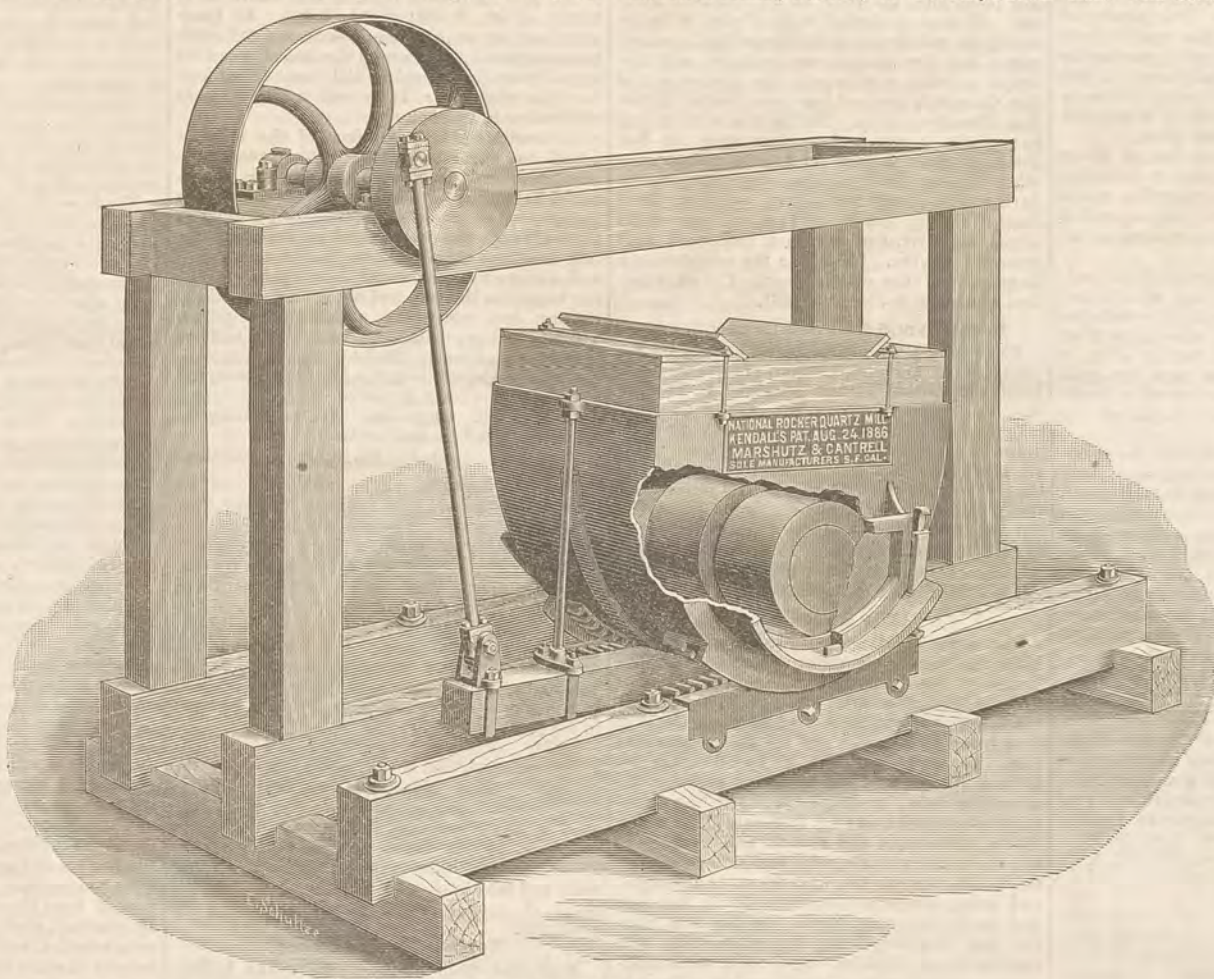
THE Rio Tinto Company reports to its shareholders that its "total delivery of pyrites for the year will be about 350,000 tons, or the same as in 1885. The production of copper at the mines is fully maintained at last year's rate, and, owing to the improvements in the working, the cost price has been further reduced. The continuous fall of copper, the price of which has been considerably below last year's average, has, however, swallowed up more than the results of economy and cheaper production."

## Robinson District, Nevada.

Robinson district, White Pine county, Nevada, is not a new camp, having been originally opened many years since. It has, however, been in idleness a long time, though efforts are now being made to work some of the mines again. The location is said to be a pleasant one, and the claims can be worked the year round. Wood is abundant at \$3 per cord, and charcoal is 15 cents per bushel. The Hamilton and Eureka stages pass through the neighbor-

paying proposition. Efforts are now being made in this city to raise capital for reduction works in the camp and the prosecution of developments in the claim.

A MINING EXPERT'S FEE.—A complaint has been filed in the Superior Court in which Chas. Kaufman alleges that in May, 1880, Frank F. Obiston and Isaac M. Taylor employed him as a mining engineer to examine and make his report on a certain property situated in Gold Mountain Mining District, in Nevada, known



THE NATIONAL ROCKER QUARTZ MILL.

## Another New Quartz Mill.

A representative of the MINING AND SCIENTIFIC PRESS witnessed this week a trial of the new "National Rocker" quartz mill, manufactured by Marshutz & Cantrell, of the National Iron Works in this city. The mill was invented by Stephen Kendall, who got up the one-stamp mill several years ago. We give an engraving of the new machine on this page. It is quite simple in construction, as may be seen. The mortar is semi-circular and rests on rack bars on the timbers, so that it will, when in motion, maintain its relative position with the lever. Secured to its bottom, outside, is a lever, which is connected by a rod to the crank, so that motion may be given, by a steam engine or other suitable power.

Inside the mortar, which is fitted with removable dies, is a large roller, this roller having a circular slot in its center. A central rib fits in this slot so that the roller cannot slide from side to side, but is kept in direct line with the movement of the mortar.

The mortar has a double discharge, there being screens in each side.

The mortar is given a rocking motion and as it rocks the roller moves back and forth over the shoes, going first up one side and then up the other, and in its passage back and forth it crushes the quartz which is beneath it. There is no time when the roller is not in contact with the quartz in the shoes, so that it is doing its work all the time.

The natural swash of the water in the battery serves to keep the screens clear, and the mill is said to save a very large percentage of

the gold in the mortar. One of these machines with all iron work complete, including counter shaft, boxes, pully, crank and connecting rod, weighs 5300 lbs; and the cost of the same capacity is said to be less than one-third of stamps. The wear is only in the shoes and dies. Comparatively little power serves to operate this rocking mill.

At the trials this week in this city before a number of mining men, several lots of hard, clear quartz were crushed. One lot of 500 pounds went through in 25 minutes; another of 500 pounds in 31 minutes; another of 1000 pounds was crushed in a little less than an hour, ordinary gold ore screens being used.

We are informed that a mill of this kind will crush from 10 to 15 tons per day. One has been in operation at Angels' Camp, Calaveras county, for some little time, and has been visited by hundreds of miners, who speak of it with commendation. It is specially adapted for miners who have mines they are working themselves, on account of its comparatively small cost and the small power required to run it. The price complete, without frame, is \$500.

ing valley three times a week. The postoffice, at Ely, is three miles distant. The roads to Eureka are good.

We are informed by a miner who has recently spent some little time in the district that there are several claims which show bodies of mineral assaying from \$10 to \$500 per ton. The ore carries lead, silver and gold, and there is also some copper. The low-grade lead ores carrying silver are the most attractive. Ores assayed from the Ontario mine run from 37 to 66 per cent lead, and from \$8.24 to 40 ounces silver per ton, with some little gold. A proposition is now being made to put up a crusher, mill, concentrator, etc., capable of treating 100 tons of ore per day. The Ontario, Arthur, Great Western, West Altman and Roadside mines are mentioned as promising ones, but a water-jacket smelter is needed for some of the ores.

In 1873, when the camp was better known than now, the Ontario was valued at \$500,000, but under the then existing conditions it did not pay. Now, however, with increased knowledge of working the ore, and better facilities, the mine is represented as being a good

as the Stewart mine, they agreeing to pay him for such examination the sum of \$2500. In accordance with this agreement, Kaufman examined and reported upon the mine, and in September, 1880, the defendants sold the property to George D. Roberts for \$40,000. Since then, Kaufman says, defendants have refused to pay him the commission, wherefore he sues to recover \$3500, with interest thereon at seven per cent per annum from the 30th of September, 1880.

SHIPMENTS of specie from San Francisco by sea from January 1st to November 1st were \$16,135,200 against \$16,670,800 during the same period last year. Of this year's shipments nearly half, or \$7,535,000, went to China. Last year over half, or \$10,450,000, went to China.

THE Amador Canal Company's supply of water at the Blue Lakes fell short of the demand this year, the lakes being drained some time since. Considerable work will be put on the lakes next summer to increase their capacity.



## CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

## Float Gold.

EDITORS PRESS:—The laws that regulate metallic solutions, suspensions and chemical combinations, if examined, point to certain phenomena highly interesting and important.

These laws go to show that when precipitants are used to throw down a metal in solution, there is sufficient force left to form suspension compounds.

Research of modern investigations has proved in actual practice, guided by these theoretical considerations, the importance of these laws that lead to the solution of the float metal question. It is also now considered that solutions, suspensions and chemical combinations are manifestations of the same force and definite chemical compounds; such being the case, it is not difficult to arrive at some definite conclusions highly important to the chemical arts. This has already been done with results which promise to terminate the great wastage of the precious metal now floating away in many mining operations.

To effect this, some agent possessing a stronger attraction for the metals than water was required. This quality was found—possessed in the hydrocarbons and also the saponified oleaginous bodies; the first has strong reducing properties; the latter highly basic. To render the matter clear for practical purposes, an example is cited which will also help to explain the principles involved.

Water carrying gold and silver in suspension is deprived of its silicious and earthy matter as far as possible. A small quantity of any of the saponified oils or fats are allowed to mingle with it, which will coagulate. This decomposition causes a change of base; the metallic fatty matter separates and is taken up by passing the water containing the coagulum through a bath of the hydrocarbons or petroleum, which retains the metal, and is then refined in the ordinary way to obtain the gold and silver.

There are in operation a number of filters placed at the tail-end of jewelry factories, saving gold and silver that otherwise would have been lost; in these cases the saponified matter already exists and the mechanical arrangements are quite simple.

In conclusion it may be stated that this patented process has the following advantages: Gold and silver are withdrawn from water containing one cent in 25 gallons, which pays when in quantities, as the cost of manipulation is quite small; it also suggests that the great waste now going on in our large mining operations may be prevented, and much of our national wealth saved.

The above question has occupied the attention of mining metallurgists a long time; they have demonstrated by actual assay the heavy loss of float gold in our streams, while silver and quicksilver share the same fate. It must be borne in mind, in cases above cited, that quicksilver totally fails to act, while the new agent continues the operation by increase of force. Many of the hydrocarbons act far more energetically by withdrawing gold from its solutions than when precipitants are used.

JOHN TUNBRIDGE.

Newark, N. J.

FINE SILVER MARKET IN OCTOBER.—There was a good demand for fine silver last month at the leading centers, which are San Francisco, New York and London. The market was generally a rising one. The changes at London were called as follows:

October 1.....44 3/16d	October 21.....45 3/16d
October 6.....44 10/16	October 22.....45 4/16
October 7.....44 11/16	October 23.....45 5/16
October 14.....44 15/16	October 25.....45 7/16
October 18.....45 2/16	October 26.....45 8/16
October 14.....45 4/16	October 27.....45 11/16
October 19.....45 1/16	October 28.....45 12/16
October 20.....45 2/16	October 29.....45 14/16

The appreciation for the month amounts to 13d per ounce. In July the price declined from 45gd to 42d. This was the lowest price known for 50 years or more. In August there was an advance of 3d, and in September a further advance of 2d. This has now been followed by a further advance of 13d in October, making a net gain of 34d from the lowest price last July. Of course, some of this gain is due to the increased demand incident to the approaching end of the year, when balances are settled. On the 3d the price was 46d.

DISTRIBUTION OF RAILROADS.—If the average reader were to be asked to name that State of the Union which can show the longest railroad mileage, he would in all probability designate New York or Pennsylvania. But he would be mistaken. Of all the States, Illinois heads the list with 18,904 miles of railway, while far behind come Pennsylvania with 7,767 miles, Iowa with 7,503, New York with 7,385 miles, and Ohio with 7,327 miles. Texas comes next with 6,687 miles. Of all others, Indiana and Michigan alone have over 5,000 miles, while Wisconsin, Missouri, Kansas and Minnesota have over 4,000, and Georgia and California have over 3,000.

THE LEGISLATURE OF THE STATE OF SONORA, Mexico, has exempted from all municipal taxation any ice factories that are or may be established within the State.

## The Minting of Gold and Silver.\*

NUMBER I.

(By ALBERT WILLIAMS, JR.)

A description of the means by which gold and silver are refined and made into coin forms a natural sequence to the description of the mining and metallurgical methods. The following notes are designed to present merely a brief outline of the subject for the benefit of readers who may be unfamiliar with it. An exhaustive treatise on modern practice is much to be desired, but such a dissertation does not come within the scope of the census work. Two mints were selected for examination—that at Carson, Nevada, and that at San Francisco, California. The processes employed at these two establishments are, in the main, identical, though conducted upon an altogether different scale; and to avoid wearisome repetition of details the description of the system at the San Francisco mint is confined, so far as practicable, to the salient divergencies from the methods pursued at the smaller mint. Both mints now part by sulphuric acid, the nitric-acid process (formerly in exclusive use at the San Francisco mint) having been in large part supplanted by the cheaper sulphuric-acid process. In each case the officers extended every facility for inspection, and to them, and to all the employees, the writer is indebted for many courtesies.

United States Mint at Carson, Ormsby County, Nevada.

The Carson mint, though much smaller and having far less working capacity than the similar establishments at San Francisco and Philadelphia, is nevertheless a fully-equipped mint, capable of meeting all ordinary requirements, and performing its work in an excellent manner. It was projected with a view of facilitating the minting of bullion from the Comstock mines, but for reasons unconnected with the simple question of proximity the greater part of the Comstock product has been treated at the San Francisco mint. The Carson mint having but slight, if any, advantages over its San Francisco rival in point of transportation from other mining districts, has, therefore, except during exceptional periods of activity, been limited in its operations to even less than its actual capacity, and at times has been shut down for months. This was the case during a large part of the census year. The examination was made in January, 1881.

## Location and Railroad Connections.

The site of the mint comprises a block on the west side of C street, Carson, one block south from the station of the Virginia & Truckee railroad. The mines of the Comstock and neighboring groups are distant from 20 to 25 miles, while the mills along the Carson river are at nearer intervals. From Virginia City to Carson by rail the distance is 21.1 miles. At Reno, 31.1 miles distant by rail from Carson, the Virginia & Truckee railroad connects with the Central Pacific railroad, thus bringing the mint into communication with the mining districts within reach of the latter road.

## The Building.

The main building, designed by Mr. A. B. Mullett, then supervising architect of the Treasury Department, was completed in January, 1870, at a total cost of \$160,000. It consists of two stories and a basement, the first floor being 15 feet high and the second story 14 feet. The area covered is 90 feet 6 inches by 59 feet 10 inches. The basement contains the annealing-room, cutting-room, grinding-room, hydraulic presses, drying furnaces, Chili mills, vaults, storerooms and closets, and through it run the counter-shafts, with the pulleys driving the machinery on the first floor. The engine and boiler rooms are immediately in the rear and on the basement level. On the first floor are the weighing-room, deposit-melting and ingot-melting furnaces, ingot-rolls, whitening-room, coining presses, machine-shop, offices of the cashier, coiner, and melter and refiner, and vaults. The second story is occupied by the superintendent's, assayer's and chief clerk's offices, the laboratory, assay-room, humid assay-room, refinery and adjusting rooms.

The walls are a rough-dressed freestone from the quarry of the Nevada State Penitentiary, 1½ miles distant—a handsome building-stone, which is said to become indurated by exposure. Granite quarried ¾ miles from the site is used for the stairs. The shutters are of iron.

An extension in the rear of the main building, of the same general construction and appearance as the latter, and designed to contain the refinery (which was hampered for want of room in its original position), was unfinished at the date of examination. The first appropriation of \$8500 having been exhausted, a further sum of \$5000 would be required to complete this extension. There are five vaults in the main building provided with combination locks.

## Machinery, Etc.

The machinery, appliances and fittings, which will be described somewhat in detail, are of recent type throughout, and are well adapted to their several purposes. Their total cost, including alterations and repairs, is stated to have been, in round numbers, \$100,000.

\*From the census report on the "Statistics and Technology of the Precious Metals," by S. F. Emmons and G. F. Becker, special agents. The description of the mints and the processes applies to the year 1881, at which time the mints were examined.

## Cost.

The total cost of construction and equipment of the mint, inclusive of the additional appropriation required, was:

Main building.....	\$160,000
Extension.....	8,500
To complete extension.....	5,000
Machinery, fittings, etc.....	100,000
Total.....	\$273,500

This may be assumed as representing the cost of a first-class mint of moderate capacity.

## Organization.

The work of the mint is, for convenience and as a precaution against loss or error, divided among four distinct departments, which are designated as: *a*, the general department, under the immediate and special charge of the superintendent; *b*, the assayer's department; *c*, the melter and refiner; and, *d*, the coiner. These form separate corps, working independently, but accounting to each other. Over the whole the superintendent has, of course, supervision.

## Mint Terms.

Gold bullion and dust are deposited, and returns made to the depositors in coin after minting, the gold coinage being free. Silver bullion is purchased at the market price, governed by the daily London quotations, with allowance for variation in exchange. The bullion purchased is 0.500 fine and over, at the discretion of the superintendent. Although the Carson mint has been described as a complete one, there are still a few slight improvements which might be advantageously added. Among these are: *a*, A reverberatory cupel furnace, for treating bullion containing a large proportion of lead. At present (1881) the mint is carrying over from year to year bars which cannot be termed base, but which cannot be profitably refined by the sulphuric-acid process. As an average example of this class of bullion, the assay determination of bar No. 92, cast in 1879, is appended: Gold, 0.021; silver, 0.535; lead, 0.444. *b*, Dust-chambers, or condensing-flues connected with the main stack. Although the loss of precious metal is small, it could be still further reduced by these means. *c*, Improved sulphuric acid condensers in the refinery.

In describing the operations of the mint in detail, the natural sequence of the several manipulations will be observed, so far as is practicable, beginning with the receipt of the precious metals in their crude state, and then following them through the processes of melting, refining into mint-fine metal, alloying to the coin standard, casting the coin metal into ingots, rolling the ingots to the required thickness, annealing, cutting into planchets, adjusting to proper weight, milling, whitening, and finally minting into standard coin. Besides these processes, the checks against loss, the driving power, the amount of work done, value of supplies consumed and labor expended, with subsidiary details, will also be considered.

## Weighing-Room.

The gold deposits, silver purchases and re-torted amalgam are here received and weighed in the crude state. The weights, in connection with the assay of samples from the deposit-melting room, form a basis for action by the superintendent. This room is on the first floor, at the left of the main entrance, and is in charge of the weigh clerk and assistant weigh clerk, who form the total force. It is included in the general department, which is responsible for all bullion until the latter is formally transmitted to the melter and refiner and accepted by him in the ingot-melting room.

Scales.—The weighing is done on a large pair of Troemner bullion scales, made expressly for the mint. Their capacity is from 0.01 ounce to 6000 ounces. The center knife-edge is chilled steel or agate bearings, and the knife-edges at each end of the beam are agate on agate. There are no beam riders. Adjustment for wear and tear is secured by filing or removing rings of copper wire, which are hung on pendants.

## Deposit-Melting Room.

From the weighing-room the crude bullion goes to the deposit-melting room, where it is melted and samples are taken for the assayer. This room is on the first floor at the middle of the south side of the main building, is 18 feet 3 inches by 14 feet 10 inches in size, and is in charge of the deposit melter and his assistant. It is included in the superintendent's special department.

Furnaces.—There are three melting furnaces in the room of the same general type. Two of these have heavy cast-iron shells, frames and doors, and are lined with fire-brick; they are 18 inches square, inside measurement, 16 inches deep in front, and 30 inches deep at the back, with level grates. The iron sliding doors at the top are sharply inclined, sloping downward from the back. The flue from each is 7 by 9 inches, and leads to the main stack. The smaller furnace is similar in construction, but has a sheet-iron shell. It is 13 inches square, 16 inches deep in front, and 27 inches deep in the rear, and its flue, 5 by 6 inches, leads to a separate small chimney. The grate-bars of each furnace are 1 inch wide, with spaces of five-eighths of an inch intervening.

Fuel.—If several melts are to be made in succession, Lehigh anthracite and nut-pine charcoal mixed are used. For a single melt the fire is made of charcoal only.

Crucibles.—Graphite, French clay and sand crucibles are used. The series of sizes of graphite crucibles employed includes Nos. 8, 12, 20, 35, 90, 100 and 150. With bullion of the average fineness received, the working ca-

capacity of each size is as follows, the weight of the crude charge, exclusive of flux, being given:

	Ounces.
No. 8 crucible.....	200
No. 12 crucible.....	250 to 300
No. 20 crucible.....	400
No. 35 crucible.....	1,300
No. 90 crucible.....	2,000 to 2,500
No. 100 crucible.....	3,500
No. 150 crucible.....	6,000

These figures are for charges conveniently melted in crucibles of the respective sizes, and do not represent the extreme holding capacity. It should also be observed that the several working capacities are not in direct ratio with the series of designating numbers. The life of graphite crucibles varies from 15 to 20 melts, according to the character of the bullion treated. If there is much lead in the bullion, the crucibles are more rapidly corroded than if an equivalent percentage of other base metal were present. The stirrers are of the same material as the crucibles—graphite and clay mixed. Sand crucibles of small size are employed for melting assay grains belonging to each deposit or purchase, and are broken after having been once used. The French crucibles are second-hand ones from the assay department, and are used, merely as a matter of economy, for the same purpose as the sand crucibles. Like the latter, they are destroyed after one firing.

Loss of weight in melting.—With fairly clean bars the loss of weight ranges from five to fourteen one-hundredths of one per cent, and with well-retorted amalgam the loss is from one-half of one per cent to one per cent.

Fluxes.—The fluxes added to the charge of crude bullion in the melting pots are: *a*, Borax, invariably. *b*, Sodium bicarbonate, if retorted amalgam is being melted. *c*, Potassium nitrate, if iron or carbonaceous matter is present in the bullion. *d*, Bone-ash, to thicken the slag so that it may be easily skimmed off. *e*, Phosphorus, in quantities not exceeding one-half ounce to a melt of 1800 ounces, in case the bullion contains much copper. *f*, Corrosive sublimate, with bullion containing much lead or antimony.

With fine bars the surface of the melt is protected from the air and volatilization of silver prevented, should the melt become overheated, by sprinkling upon it powdered charcoal sifted through a No. 60 screen.

Molds.—The crude metal sent from the deposit-melting room to the refinery is cast into bars of a peculiar shape termed "shoe-bars." The shoe-bar mold is a parallelogram slightly contracted at each end and having two transverse ribs or semi-partitions, which rise to a little more than one-half the thickness of the metal cast, thus producing a bar which is deeply indented transversely in two places and can readily be broken into three nearly equal portions, for convenience and greater rapidity in dissolving. The molds are 15 inches long, 3½ inches wide at the center, and 1¾ inches deep (interior dimensions). With bullion obtaining 40 per cent in value of gold, the shoe-bars average 200 ounces in weight. The range is from 170 to 220 ounces. Smaller rectangular molds are used for casting assay bars and small quantities of bullion.

Sampling.—The deposit melter takes two samples of each gold deposit or silver purchase. With gold deposits diagonal corner chips are taken from the bar, the chips together weighing forty one-hundredths of an ounce. If the gold melt is large, making several shoe-bars, a pair of diagonal corner chips are taken from the first and from the last bar of the melt.

With small melts of silver or dore metal two dips are taken directly from the melting pot and granulated, the two granulation samples weighing from twenty to sixty one-hundredths of an ounce. In case of large melts of silver or dore metal granulations are taken from the top and the bottom of the charge by dipping 200 ounces from the melting pot, pouring off all but a few ounces from the dipping cup, and granulating 1½ ounces in cold water. The pair of granulation samples sent to the assayer weigh from twenty to sixty one-hundredths of an ounce.

In each instance a careful system of designating the samples and stamping the corresponding bars is observed, so that the assay determinations in connection with the weights give exact data for the guidance of the superintendent and the melter and refiner.

SODA WORKS AT OWEN LAKE.—A force of 35 men and 5 teams are employed in excavating vats for the evaporation of the waters of Owen lake for the production of soda. These vats now cover an area of over 10 acres. About 75 tons of crude soda have crystallized this season, although it is not considered that even a commencement has yet been made. These cakes or crystals, taken from the bottom of the vats, are said to go 90 per cent soda. This material has yet to be "furnaced" before it is in a marketable condition. By another season a furnace for this purpose will be built on the ground. This evaporation process cannot be advantageously carried on during the winter months. The work of preparing vats is to be pushed right along until the entire shore of the lake is lined with them. While the enterprise is yet in its infancy, it has, in all its departments, advanced beyond the experimental stage and may be set down as an established enterprise, and one certain to prove of material importance to the business interests of Inyo county.—*Virginia Chronicle*.

MORTAR and paint may be removed from window glass with hot, sharp vinegar.



## California Savings Banks.

The Bank Commissioners on Silver in this State.

The report of the Bank Commissioners of the State of California, W. F. White, W. W. Moreland and A. W. Potts, is an exhaustive and complete statement of the condition of every bank in the State, a report of 420 pages, neatly printed and handsomely bound.

Their report shows that 22 savings banks in the State under their charge hold in their keeping \$63,000,000, almost wholly the hard earnings of the working people, while the deposits in the 74 commercial banks reach only about \$40,500,000. The present law requires that each bank shall be examined twice a year. This the commission finds to be utterly impossible, for in some cases where the banks do a large business it takes a whole week to critically examine all the details of the business. They give a detailed description of how they conduct an examination.

They say: We discourage the loaning of money to flouring mills, lumber mills, and all sorts of enterprises, such as fruit-canning corporations and the like, without demanding ample security for the money loaned. And it is a curious fact that so far our advice in this respect, when disregarded, has always resulted in a loss to the bank, sometimes sweeping away its whole reserve, and in some instances even impairing its capital as well. We do all we can to discourage and prevent the officers and directors of banks from loaning the bank's money to each other. The practice is bad in itself and liable to abuse that is almost criminal. We sometimes find officers and directors of a bank partners in some extensive enterprise of great apparent usefulness to the locality in which the bank is doing business, influencing the board of directors of the bank to make large loans to this favorite enterprise without requiring security that is absolutely and beyond all doubt good. This is all wrong, and generally ends in disaster to the bank. Nine out of every ten banks that fail do so from abuse in this direction, and the stockholders of a bank cannot be too watchful of the action of their officers and directors in this respect.

It may be of interest to state that in our examinations, as a rule, we now find much more currency than formerly in the banks. This is particularly so in the southern counties of the State. The marked change in this respect is undoubtedly owing to a large Eastern emigration that for the last four years has been flowing into those counties.

The prejudice in California against the use of paper money is still very strong, but undoubtedly modified.

The silver standard dollar seems every day to increase in popularity in our State. The country banks find the unabated demand for it hard to meet. Most of them receive from \$1000 to \$3000 a week from the sub-treasury in San Francisco, the expense of the transfer being paid by the General Government. This rapidly goes into circulation and disappears no one knows where, as it never returns to the banks. It seems to remain among the people as a necessary medium of trade. We find, by our investigation on this point, that it does not return to the city through the agencies of the country merchant, for they do not pay their bills in San Francisco in silver. They seldom send a dollar of silver to the city, either to liquidate their debts or purchase new goods. All this is done by drafts on the city banks, or with gold and currency sent through the postoffice or express. The only two avenues by which the silver dollar seems to find its way back to the city are through the settlements made by the country postoffices with the main postoffice in San Francisco, and the settlements made with various railroad stations throughout the State and the head office in San Francisco. But through these avenues cannot be traced one-fifth of the amount constantly streaming into the interior of the State through the local country banks.

There never was a proposition so unanimously unpopular with the people of California as that proposing to stop the coinage of the silver dollar.

The fight so bitterly waged by Eastern money-dealers against silver has had the effect in our State of keeping our large city banks in a constant state of alarm, lest they might be caught with a depreciated currency in their vaults. The consequence is that, though disapproving of this anti-silver crusade, they are yet forced, as it were, to take part in it in a quiet way, by avoiding silver as much as it is possible. It seems plain that if the anti-silver war in the Eastern States was decidedly discouraged by our Government, it would soon cease, and there would be but little further trouble in the continued coinage of silver.

MECHANICS' INSTITUTE.—The Board of Trustees of the Mechanics' Institute met last week, P. B. Cornwall presiding. The time of the meeting was occupied in hearing the reports of the different committees in connection with the recent industrial exhibition. The report of the Committee on Finance showed that the receipts from all sources amounted to \$45,064.62, and the expenditures to \$23,539.85, leaving a balance of \$21,524.77. The reports will be embodied in the published report of the fair.

## Honduras Mines.

A reporter of the Eureka Sentinel has had an interesting conversation with Frank Robbins, formerly superintendent of the Eureka Con. and other mining properties in that district, concerning Honduras, Central America. Mr. Robbins is superintendent of some valuable mines in that country belonging to a New York syndicate of capitalists, and having come to San Francisco to purchase machinery, he decided on a visit of a couple of days to his old stamping-grounds on the Range. The following information gleaned from Mr. Robbins' remarks will undoubtedly prove of interest: The population of Honduras is about 400,000; the two principal towns are Tegucigalpa (meaning Silver mountain), the capital, populated by some 12,000 people, and Camagua, with probably 10,000. The latter was until recent years the capital of the Republic, and both contain many handsome churches, universities, residences and other structures. The ports on the Caribbean sea, or north coast, are Puerto Cortez and Truxillo, both of which have fine harbors. Two lines of steamers run to these ports from New Orleans. On the south coast there is but one port, which is on the Bay of Fonseca. It is at the island Isla del Tigre, and is named Amapala. Supplies from San Francisco, Panama and Germany are transferred from vessels at Amapala to barges that run up the Bay of Fonseca to the two principal landing places, San Lorenzo and La Brea. From there they are transported by teams or pack animals, according to the season and condition of the roads, to Tegucigalpa, a distance of 75 miles, and other interior towns. From the north coast inland for about 60 miles, and from the Bay of Fonseca, on the south, a probable distance of 10 miles, the country is rather flat, hot, and full of mosquitoes. Beautiful orchards of tropical fruits of all kinds are to be found there, also tropical grains, such as coffee. The mountains ascend gradually from the plains and are covered with pines and vegetation. In many respects they remind the traveler of portions of the Sierras on the California side. The valleys and plateaus at an altitude are very productive, and will grow anything, from potatoes to pineapples. The climate there is healthful and equable, the thermometer ranging the year around from 75 to 85° in the shade. There are two seasons only, the wet and the dry. The former commences about the 1st of May and continues until the latter part of October. The rains fall in heavy showers, and generally during afternoons.

The syndicate Mr. Robbins represents holds valuable concessions from the Government, in order to encourage their large operations. Quite a number of foreigners are operating there extensively with improved machinery, but the majority of the mines are owned and worked by natives, whose processes are not so crude as they are small. Many of the companies are paying good dividends, but no definite results of the amounts produced annually can be learned. The archives of the country show that before it became a Republic in 1821, the royalty of one-fifth of the production paid to the King of Spain aggregated up into billions of dollars. An immense and grand cathedral in Tegucigalpa was built entirely at the expense of a priest from the proceeds of a mine that he, individually, owned.

While the soil of the country is very productive and in many places excellent for grazing, the chief interest thus far is mining. The principal sections where this industry is carried on are Yora, Santa Barbara and Orlandio, where gold quartz ledges and placers predominate, and at Comayagua, Tegucigalpa and Pariso are found gold, silver, copper and lead. The country is generally of a volcanic character, and ledges and veins of all sizes and richness are found.

The accommodations for traveling through the Republic are poor, but Mr. Robbins says before long a railroad will be constructed from Puerto Cortez on the north coast to the Bay of Fonseca on the south that will connect as closely as possible with the richest interior sections of the country through which it passes. He does not advise impecunious miners or other classes to go there at present, unless it be to enter a guaranteed position. All such, he says, are fortunate, for he believes the country has a great future. There is every indication of it.

THE RAILROAD TO OREGON.—The railroad workers are gradually pushing the work along from Strawberry valley, where the track will be completed, to the new town of Sisson, to-day or to-morrow. If three weeks more of good weather prevails, the track will be completed to Butteville, and by New Year's it will be finished to the vicinity of Yreka, as work can be carried on rapidly after reaching Butteville. The road will run across the Edson ranch, and may yet come through Yreka, if our citizens will make an effort to secure the main line. Our farmers, stock-raisers and producers generally in this county will no doubt be able to sell a large amount of grain, hay and all kinds of home products to the railroad this winter and next summer, while the railroad work progresses. A great quantity of produce has already been hauled to railroad camps during the past summer, and even during last winter, but from now on to completion at Oregon boundary, there is no reason why all the farm supplies cannot be furnished by Siskiyou county.—Yreka Journal.

## Sacramento's Railroad Shops.

The railroad shops now present a busy scene. Work necessary for the extension of the California & Oregon railroad and other lines by the Southern Pacific Company has given to the shops a lively appearance. In every department all the machinery is in full running order. More men are working now than have been since the great lay-off two years ago, when hundreds of employees were let out. It is estimated that over 2000 persons are employed by the Southern Pacific Company in Sacramento.

The most interesting part of the railroad works is the shops in which iron is manufactured into various forms. Old scrap iron, which has accumulated over the different lines of the company, is shipped to the works and stacked into a large pile. The old iron is assorted and cut up to make one length, after which it is packed on boards and then taken into the different smelters, where it is made into bars.

In the rolling mills every furnace is in full blast, and these are kept going all day and night. In this department over 35 tons of iron are worked over daily. Fish and angle plates are being turned out in large quantities. Nuts and spikes are in great demand, and they are also being turned out as fast as the machines can do it. Over 14,000 pounds of spikes and nuts are made daily, which are packed into boxes of 100 pounds each, all ready for shipping. The demand for spikes and nuts is so great that it is estimated that there is enough work ahead to last for a year. "Unless new machines are put up," said a roller, "we will never catch up."

The foundry is crowded with work, a great deal of which is the molding of bridge frames. The blacksmith shops present a very different scene to what they did a few months ago. The shops, besides being crowded with work, are also crowded with blacksmiths. Every anvil and steam hammer is being used in making iron bridge frames and other work.

The noise in the boiler-shops makes old-time music. New boilers, tanks and smokestacks are being turned out. The employees of this department have been "doing extra time" to keep up with the press of work.

The large machine-shop, like the rest of the shops, is kept going in full operation. There is plenty of work in this department—so much so that "night times" are often used. The shop has the reputation of turning out the finest and largest locomotives in the world. For some weeks Master Mechanic Stevens has had his attention attracted to the building of two large powerful passenger locomotives. These engines will probably be given a trial trip in a few days, and it is said that when they get in running order they will be the fastest locomotives in the United States. The success of building locomotives by the Southern Pacific Company has encouraged them to keep on. This, of course, will require the services of many more mechanics.

A new cylinder will be put in the ferry-boat Oakland as soon as the vast piece of mechanism, which is now in the machine-shop, is made ready.

A Stockton fire engine sent to this shop for overhauling has been made nearly new.

Every stall is occupied by locomotives receiving repairs.

The making and repairing of passenger and freight cars is keeping hundreds of men busy.—Sacramento Bee.

## The Kimberley Gold Fields.

A correspondent of the Sydney Herald, writing from McPhee creek, on July 21, gives a gloomy view of the Kimberley gold fields. He was sent out by the Herald to make a careful estimate of the diggings, and from his observations and the testimony of experienced miners, he pronounces the diggings a failure. The following are the most interesting points in the letter:

This is the main camp in the center of what are named the "Kimberley Gold Fields." There were about 70 men and 100 horses camped there; Samuel Johnson, one of the men recently speared by the blacks, was also there. I had a personal interview with him, and the information I obtained from him has since been verified by personal observation, and also from conversation with at least 100 miners, many of whom have been on the field for months, others for weeks, and others again for only a few days; but all are unanimous in pronouncing the diggings a gigantic failure. Mr. Johnson has been on the field, which embraces an area of some hundreds of miles, between seven and eight months. He states that he, with four others, came overland from Port Darwin with a thoroughly complete outfit and 30 horses. His party commenced prospecting as soon as they struck the Ord river, and have been hard at it ever since. As they have experienced both the wet and the dry seasons, Mr. Johnson ought to be able to speak with some authority. He stated that he had no hesitation in pronouncing the diggings a failure.

All the gold hitherto got has been obtained by gully raking, which is very "patchy." Sinking is useless, as it is impossible to get down more than a couple of feet. No quartz reefs have been found as yet, and the gold ap-

pears to come from "mullocky" leaders. I do not assert that there is no gold in the district, for something like 2000 ounces must have been unearthed. But it must be remembered that the parties who have got the bulk of this came here well equipped with horses and provisions, and prepared to prospect the country in all directions. They have completely worked out all the good gullies, and although many of those who arrived in the various steamers at the Gulf are still working, very little gold is being got—not sufficient to give men rations.

Several men have been killed by blacks, and fully 20 men have been missing, for weeks past. They went out prospecting in different directions, in parties of two and three, with provisions sufficient to last them only a few days. They have never been heard of since, and it is feared that they have either lost themselves and perished in the bush, or have been murdered by the blacks.

## The Coinage.

Report of the Director of the Mint.

James P. Kimball, Director of the Mint, has submitted to the Secretary of the Treasury his annual report for the fiscal year ended June 30, 1886. While the volume of work executed at the mints during the year was greater, he says, than that of the previous year, the total expenditures were less by \$197,089. The coinage of gold during the year amounted to \$34,077,380, against \$24,861,123 in the previous year. The silver coinage amounted to \$30,022,347, against \$28,848,505 in the preceding year. Of the coinage of the year, \$29,838,905 consisted of silver dollars, and the remainder of subsidiary coin. In addition to the gold and silver coinage, minor coins were struck off of the value of \$17,377.65.

The total coinage was 38,844,662 pieces, of the value of \$64,117,105. In addition to the coinage, the value of gold and silver bars manufactured during the year amounted to \$27,268,032.

At the date of the act authorizing the coinage of the standard dollar, February 28, 1878, the London price of the silver dollar was 55 pence, equal to \$1.20 per ounce, at which price the intrinsic value of the silver dollar was .935. At no time since has the price of silver reached 55 pence, the tendency having been steadily downward, with occasional temporary advances. During the past year the decline has been very marked. On July 1, 1885, the price of silver in London was 49½ pence British standard, equal to \$1.07 9-10 per ounce fine, while on June 30, 1886, the price was 44 1-16 pence, equal to 97 9-10 cents per ounce fine. Since the close of the fiscal year there has been a further decline until July 31, 1886, the price of silver reached 42 pence, equivalent to 92 cents per ounce fine, which was the lowest price ever reached. At the latter price the bullion value of the silver dollar is 71 2-10 cents. The price has since advanced until on October 20th it was 45 1-16 pence, equivalent to 93½ cents per ounce.

The value of the gold and silver wasted in the operative department of the mints during the year was \$19,206. The value of gold bullion imported into the United States during the year was \$40,730,458; exported, \$27,565,090. The import of gold coin to the United States was \$16,669,891; exported, \$15,440,991. The imported silver bullion during the year amounted to \$4,151,438; exported, \$10,780,656, of which \$354,848 consisted of trade dollars.

The director estimates the amount of United States coin in the United States on July 1, 1886, to have been: Gold, \$548,320,031; silver, \$308,784,223; total, \$857,104,254. In addition to the coin there was gold and silver bullion in the mints and assay offices belonging to the Government as follows: Gold bullion, \$42,454,430; silver bullion, \$3,468,620, making the estimated stock of coin and bullion available for coinage in the United States \$903,027,304.

MINING COMPANIES.—The following statement shows the condition of various mining companies on the 1st inst.: Alpha Con., cash on hand, \$11,467; Alta, \$6081.04; Benton Con., \$279.19; Belle Isle, \$4095.61; Bodie, \$21,321.84; Best & Belcher, \$8973.65; Bulwer, \$1566.05; Chollar, \$12,092.50; Exchequer, \$1539.35; Gould & Curry, \$37,878.16; Hale & Norcross has an indebtedness to the amount of \$15,531.45, with \$43,092 to be collected from the assessment. Lady Washington, \$529.99; Martin White, \$9247.46; Mexican, \$10,171.76; Mono, \$15,763.36; Navajo, \$23,879.33; North Belle Isle, \$2611.85; Ophir, \$3686.07; Occidental, \$9493.86; Potosi, \$7270.55; Peer, \$1976.28; Standard, \$17,918.13. The following companies have indebtedness: Crocker, \$774; Hale & Norcross, \$15,531, and \$43,092 to be collected from assessments; Peer, \$1976; Peerless, \$16,665; Savage, \$2652.

A CALIFORNIA MANSION.—Mrs. F. E. Waite has contributed under this title an excellent article to *Good Housekeeping*, descriptive of the new house of J. C. Flood, in this city. Several fine illustrations of the interior of the mansion are given. This new building is one of the finest in the United States, and its decorations and furnishing, according to Mrs. Waite's pleasant description, place it second only to the Vanderbilt mansion in New York.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 253 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square).....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month. Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Nov. 13, 1886.

## TABLE OF CONTENTS.

**EDITORIALS.**—A New Concentrator; Robinson District, Arizona; Another New Quartz Mill, 309. Passing Events; Vanadate of Lead; Let the Mineral Lands be Preserved for the Miners; A Century of Progress, 312. Assaying Amalgam; An Automatic Dining Table; Mohave Mines, Arizona; Personals, 313. State Mining Bureau, 320.

**ILLUSTRATIONS.**—The National Rocker Quartz Mill, 309. The Automatic Dining Table; Apparatus for Assaying Amalgam, 313.

**CORRESPONDENCE.**—Float Gold; The Mining of Gold and Silver, 310.

**MECHANICAL PROGRESS.**—What Steam Has Done; A New Use for the Draw-shave; Production of Electricity; Thin Fires the Best; The Advantages of Cypress for Lumber; A Dry Compound for Extinguishing Fires; The Era of Fuel Gases; Look for the Cause; Ancient Alloys, 314.

**SCIENTIFIC PROGRESS.**—How Electricity is Generated in the Atmosphere; The Induction System of Telegraphing; Time of the Future; Carnivorous Plants; Cheap Substitute for a Single Microscope; The Charleston Earthquake Felt at Lowell, Mass., 314.

**ENGINEERING NOTES.**—Electrical Navigation; The Canadian Pacific, 315.

**USEFUL INFORMATION.**—Accidents from Machinery; Preservation of Exposed Ropes; The Tenacity, etc., of Silver; Acid-proof Cement; How to Keep Lemon Juice; Paper Bottles; To Melt Old Rubber; Polishing and Finishing Metals; Shaping Heavy Iron Slabs, 315.

**GOOD HEALTH.**—Mileage of the Blood Circulation; Plain Truth About Smoking; The State Board of Health; Trouble in the Head; What is Hunger; The Voice, 315.

**MISCELLANEOUS.**—California Savings Banks; Honduras Mines; Sacramento's Railroad Shops; The Kimberley Gold Fields; The Coinage, 311.

**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 316-17.

**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 320.

## Business Announcements.

Machinists' Outfit for Sale—B. A. W.

See Advertising Columns

## Passing Events.

Silver has at last got up to be quoted \$1 per ounce, and indications are that it will go still higher. In fact, in this city this price has been refused on account of advancing English quotations.

Crosscutting in the drift run from the tunnel in the Quijota, Arizona, mines was commenced this week. Those interested in that region from which so much was promised will be glad to learn this.

In Alameda county, regarded generally as a cow county, they are now mining not only for chrome, but for magnesia, borax and oil. It is a good illustration of the diversity of products of this State, when, in a county renowned for its fruits, etc., so many mineral substances are found.

It is stated that quicksilver has recently been found in New Mexico. So far California has been the only place in the United States where this metal has been mined. We shall look with interest at the progress of development in New Mexico.

The Comstock mines are producing more bullion just now than for some time past, and we are even promised a dividend from one company, formerly famous for them, but which has for several years not paid.

EIGHT HUNDRED coal miners, employed at the Erie, Marshall, Fox and Louisville mines, Colorado, quit work because of a reduction of their wages from \$1.12½ to \$1 per ton.

## Vanadate of Lead.

In the early part of the year the PRESS mentioned the occurrence of vanadate of lead in Montana and of Roscoelite in this State, and intimated that vanadium minerals were found in Arizona. It now appears that the Arizona supply is developed, and to-day supplies the United States demands, which are very small.

Mr. Chas. R. Fletcher, of Boston, bought the Mammoth and other gold claims in Pinal county, Arizona, 50 miles north from Tucson, in November, 1884, and at once his talented eye discovered that the mineral of his gold quartz was vanadate of lead and zinc, etc., and he at once arranged to get the mineral into the market as soon as his 30-stamp gold mill should be finished. This took place in September, 1885.

Since that time he has shipped several tons of concentrated mineral, carrying about 16 per cent vanadic acid, the concentrates being made up of chloro-vanadate of lead, vanadate of lead and vanadate of lead and zinc. The price realized is 12½ cents per pound f. o. b. Tucson, whence it is taken by a Philadelphia chemical company, and manufactured into vanadate of ammonia.

Since this has come into the American market the price has dropped to one-third its former price, and will no doubt drop to a low figure, in which case the uses may extend. At present vanadic acid is what is valuable, solely as an oxidizing agent in the production of the aniline black dye. Vanadium minerals have long been known in this country. In New Mexico Dr. F. A. Genth found many forms. In Arizona are all varieties of both the red and brown vanadates, in many localities in Pinal, Mohave, Yuma and Maricopa counties; and in the Mammoth gold mine all forms are found, also molybdate of lead, of no value, but beautiful as crystals. In Mexico vanadium minerals are common, and in Montana is a very large and rich supply.

A gold mine like the Mammoth is obliged to concentrate its mineral for the gold. The concentrates of the mine carry about \$140 gold per ton and \$5 silver, consequently the vanadium receipts are profit, which would not be the case were the mineral sulphurets instead of vanadates. The analysis of the red crystals of Mammoth by Genth is: Chlorine, 2.43 per cent; lead, 7.08 per cent; lead oxide, 69.98 per cent; ferric oxide, 0.48 per cent; vanadic acid, 17.15 per cent; arsenic acid, 3.06 per cent; phosphoric acid, 0.29 per cent; total, 100.47 per cent. The minerals found here are chiefly vanadate and deschlorite.

Prof. Silliman, of Yale College, found vanadium minerals in several parts of Arizona in 1880. Prof. Wm. P. Blake found them there in the same, and other parts, in 1881. Mr. Fletcher's discoveries at Mammoth, Arizona, resulted in an examination of the subject by the Colorado Scientific Society, by the Royal Academy of Vienna, and numerous mineralogists in America and Europe, and through his attention they were able to observe the mineralogical occurrence and crystalline form of these beautiful and somewhat valuable minerals.

The metal vanadium was discovered about 20 years ago, (1867), and resembles antimony somewhat. It has no value, although it has somehow got into print as worth the prodigious figure of \$10,000 per pound. The Mammoth Mining Co., Arizona, makes over a ton daily of vanadium-concentrates on their 30-stamp mill, but can with difficulty sell one ton monthly to chemical works. The rest goes to the Pueblo Smelting Works, for the gold and silver; the vanadium being as worthless as the rare metal titanium, or tellurium, to the smelter.

Vanadinite is found in Scotland and in Russia, though to date the Mexico and Montana supplies are the richest. At the Mammoth gold mine, Arizona, the vanadium minerals make up perhaps 2 per cent of the ore, and of this, about 15 per cent is vanadic acid. The development of this supply in Arizona, where it has been looked upon as red lead, and entirely worthless, for years by the first owners, is due to the former owner, Mr. Charles R. Fletcher, the talented chemist, and metallurgist of Boston, Mass., who has kindly furnished us the information. He has examined the subject for two years, and a statement of everything known on this subject will soon appear as a U. S. Government pamphlet.

## Let the Mineral Lands be Preserved for the Miners.

It is evident now that California is, for some years to come, going to receive from outside sources large accessions to her population. The new immigration from the East has for some time past averaged over 700 per week, indicating an influx from that quarter of at least 30,000 for the current year, the probabilities being that the immigration next year will be even larger. As most of these newcomers will be apt to seek homes on the public domain, the foothills of the Sierra Nevada, because of the excellence of the climate and their adaptability to fruit and grape-growing, will no doubt attract many of them into that section of the State. As this region comprises also the principal gold field of California, there is a danger that much land more valuable for mineral than for agricultural purposes will, through the remissness of the miners residing in the neighborhood, be suffered to pass into the possession of these new settlers, instances of this kind, as we are advised, having already occurred. Even more imminent is the danger that such mineral lands will in large tracts be claimed by the several railroad companies to whom land subsidies have been granted by Congress, and that these claims, through lack of protest, will finally be confirmed to such companies. The law has not made it the special duty of any one to look after and resist claims so improperly made, presuming that the miners would be sufficiently interested to oppose them and compel their being judicially passed upon. This the miners have generally, but not always, done; and now that there is likely to arise a greatly increased demand for land for the purpose of tillage in the mineral districts of the State, the miners should be aroused to greater vigilance and see to it that their rights in this portion of the public domain be not encroached upon. Opposition must be made before the claimant perfects his title, since after that it can be of no avail.

What baleful effects may attend a too lax policy in matters of this kind is shown by the immeasurable and irreparable injury inflicted upon the mining interest of both California and New Mexico through the decisions of the courts confirming to the claimants under Mexican grants all the minerals contained therein, notwithstanding these were in terms excepted from such grants, in accordance with the laws, policy and perpetual usages of all Spanish-American countries. This decision, so at variance with law, justice and common sense, was rendered first in the proceedings had to confirm the Fremont Mariposa estate, and, having been established as a precedent, was afterward adhered to in all similar cases coming up for adjudication. As in California so in New Mexico, where these grants are numerous and cover millions of acres, this rule has prevailed, to the great detriment of mining as well as of many other industrial interests.

But it is a strange and suggestive fact that the parties who it might be expected would have benefited largely by this decision of the courts, have, as a general thing, reaped from it only vexation and disaster. The Mariposa grant, confirmed to John C. Fremont, now more than 30 years ago, profited him nothing, nor have any of his successors ever been able to realize anything out of it. On this estate, which covers nearly 70 square miles of mineral territory, millions of dollars have been expended in improvements and other millions in litigation, and yet it is doubtful if it has ever returned a single dollar of legitimate profits. Loaded down with debt, harassed with lawsuits and plunged into bankruptcy, this property has for 20 years or more been the prey of contending factions, the production having meantime been inconsiderable and never more than enough to pay current expenses, both the mills and mines for some years past having been wholly idle.

Over these Spanish grants in New Mexico a similar blight seems to have rested. Though rich in minerals, few of them have made any large or profitable production. The owners, when they have attempted to work the mines themselves, have generally lost money; when they leased them to others they have been in constant turmoil with the occupants. Nothing seems to have gone right with either party. New Mexico, though possessed of mineral resources equal to those of Colorado, adjoining her on the north, yields less than one-sixth the amount of bullion produced by her neighbor.

Seeing how badly most of the mines have turned out, over which this judicial ruling has cast its Upas shade, it may well be inquired if there is not something that savors of retribution in results so generally disappointing.

## A Century of Progress.

An occasion of great interest in the scientific world has been the recent celebration of the hundredth birthday of Chevreul, the great French chemist.

Chevreul was born at Angers, France, on August 31, 1786, his father being a physician and chemist. It is noticeable that the father reached the age of 91, and the mother died aged 93. At the age of 17, Chevreul left his native town and turned toward Paris, which was at that time peculiarly fortunate in possessing as teachers and professors eminent men in every branch of science.

Chevreul entered under Fourcroy and Vauquelin, two eminent teachers of chemistry at the College of France, and soon so distinguished himself as to be allowed to take charge of the laboratory when 20 years of age. At 30, he was appointed special professor of chemistry in charge of the dyeing department at the Gobelins, where the world-famous tapestry is manufactured. One of his earliest discoveries was that of margarine, oleine, and stearine in oils and fats. The last of these furnishes stearic acid, and thus an important interest like that in stearic candles, which have now completely replaced the old tallow dips, was founded.

In 1830 Chevreul was appointed Director of the Museum of Natural History, and his life is now passed between this institution, the Gobelins, and the Institute of France. He never fails to attend the Monday meetings of the Academy of Sciences.

The number of his papers, memoirs, etc., is very great, among them being one written in 1832, on the divining-rod, and another in 1853, in which he dissipated the mystery surrounding table-turning and similar manifestations. Chevreul is exceedingly temperate, drinking nothing but water or beer, and never using tobacco in any form. His longevity is not ascribed to this, however, but is due to a robust constitution and a life wisely ordered, regular and laborious.

It is instructive to review the wonderful events which have occurred during the lifetime of this great centenarian. Until he became of age flint and steel, with tinder-box and sulphur-tipped splints of wood, were the common means of obtaining fire for domestic and other purposes.

Friction matches are now found everywhere, and coal-gas is our common illuminant. During the lifetime of Chevreul, Faraday, the great chemist, electrician and philosopher, has lived, worked and died. Darwin has given his famous theory of evolution to the world. Railroads traverse every continent and steamers connect remote parts of the world. The electric telegraph puts us into immediate communication with the most distant countries, and the telephone is daily attaining greater importance.

During his lifetime the great discoveries of gold in California and Australia have been made, and silver mines have been found in all parts of the world. The electric light blazes forth in all the cities of the world, and the discovery of nitro-glycerine has revolutionized the exploitation of mines. In brief, the present century has witnessed a series of revolutions in every branch of science and has been the occasion of greater progress in the arts and manufactures than during any equal period in the world's history.

**THE SCHEARER AND RADLER MINE.**—About one year ago a great deal was being said concerning the Shearer and Radler mine in Shasta county, which had at that time attained wide notoriety by reason of the rich deposits of the telluride of gold found in it. Latterly, we fail to hear much about that property, though it is hoped it will come out all right, notwithstanding its location on the old Redding ranch, one of those misfortunate Mexican grants of which we speak in the article in another column on the subject of preservation of mineral lands to the miners. There is encouragement in this hope because the big wages made along the gulches here in the early days argues that this district may have been spared those malign influences so born of perverted justice and everywhere so ominous of evil.



## Assaying Amalgam.

In George Attwood's "Practical Blowpipe Assaying" is a chapter on assay of mercury, in which the author gives some directions for testing amalgams of gold, silver, copper, lead, zinc, tin, etc. Native and artificial amalgams, as well as dentists' products, are often so hard and compact, as well as mixed with lead, bismuth, zinc, copper, etc., that a correct determination cannot be arrived at by direct distillation owing to the swelling, spitting and spurring that take place soon after the application of heat. An approximate test should be made in charcoal, or in a small crucible or glass tube, and if the spurring is found to be so violent that the amalgam cannot be distilled without loss, it should be crushed up in the agate mortar and then placed in the retort for distillation. In many cases the latter plan is most difficult, and in some impossible, without losing a large portion of the sample. In such a case the operator should weigh out one equal part of pure mercury, mix it with the assay sample, and then crush it in the agate mortar. The amalgam will then be found to be in a semi-fluid condition, in which state it must be removed to the iron retort, and the mercury can be evaporated and collected without danger of loss in spitting, and the weight of the mercury added, deducted from the total found.

In assaying amalgams make two assays; 1st, distill the amalgam, then condense and collect the mercury, and weigh; 2d, subject the amalgam to the blowpipe flame, either in an open cup or dish, and take the loss of weight to be mercury. The heat should never be sufficient to fuse the retorted metal, else a loss will arise from the volatilization of lead, zinc, silver, etc., all of which are frequently found to be combined with mercury.

The last method will be found to be very accurate when the amalgams consist of nearly pure silver or gold combined with the mercury, but if other metals exist with them the results are very uncertain. It serves, however, not only as an approximate assay, but as a check on the distillation assay. The retorts used for the determination of the amount of mercury contained in amalgams are best made of cast steel, which is afterward turned on the lathe to the required form. The retort is made one inch in length, which includes the cup and cap; the neck about two inches in length, having a gentle taper toward the end, which is made to fit into a good cork which has been previously placed in the glass endwise.

Ten to 30 grains of the amalgam to be examined is weighed, wrapped up in a small piece of tissue paper and (the weight of ash contained in a similar piece of the same paper must always be determined in a quantitative assay) placed in the receiving cup. The cap is now placed firmly on. The joint being perfectly airtight, no luting is necessary.

The condenser is attached and the retort placed in the charcoal furnace, which has now to be held firmly by the holder. The furnace is now brought near the blowpipe lamp and the end of the condenser kept immersed in water contained in a small porcelain crucible.

The heat is applied very quietly at first, but shortly a strong reducing flame may be applied through the hole in the lower part of the furnace. Flames will soon be seen coming out of the top hole of the furnace, and the retort will be found to be red hot. Keep it so for about two minutes, then cease blowing and allow the retort to cool.

The accompanying engraving (which is about two-fifths of the size) is a sectional view of the blowpipe stand and lamp, with flame playing on the amalgam retort, which has been placed in the little charcoal furnace; it also shows the position of the condenser and receiver of the mercurial vapor. The whole operation does not take ten minutes, and although the retort may appear large, the operator will find no difficulty even in obtaining a white heat if necessary, and in a few minutes the assay is completed. The mercury is collected and weighed. To do this, pour off the water, dry the mercury with blotting paper, and remove to a small weighing cup and ascertain its weight on the balance. The mercury so obtained can be considered pure. Most accurate results will be obtained by following the above instructions.

The Idahoan, at Wood River, I. T., has paid \$30,000 in dividends during the current year.

## An "Automatic" Dining Table.

A very novel and useful invention was exhibited in operation at the restaurant in the recent Mechanics' Institute Fair in this city, in the form of a dining table so constructed that the services of waiters may be dispensed with. As may be seen by the accompanying engraving, the "table" is a long one with a central passage running its extreme length and communicating with the kitchen. Side openings also communicate with the small side tables for the different guests. The central passage has a tray-bearing carriage, mounted on tracks and adapted to move back and forth within the passage. The carriage is given movement by



THE AUTOMATIC DINING TABLE.

means of a wheel in the kitchen, and suitable connecting mechanism of simple character. The trays upon which the dishes containing food are placed hang by arms to the carriage, so that when turned outwardly they lie wholly over the guest spaces (through the side openings of the passage), and when turned inwardly they lie within the central passage.

The operation of the table is as follows: The guest, having been seated, determines, from the bill of fare placed before him, his order, and

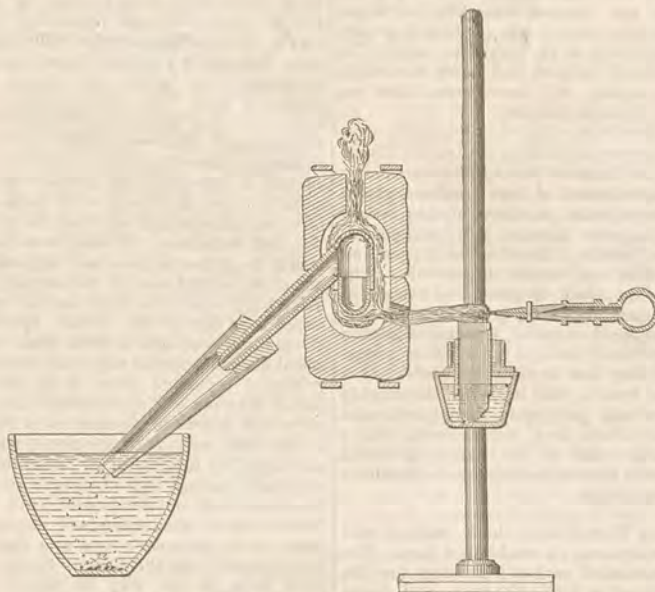
time lost in running back and forth to the kitchen in large rooms, often renders the hungry guest very impatient and does not put him in the sort of temper desirable for comfort and good digestion.

The table is not only adapted for large restaurants, but is also suited to railroad hotels, where, owing to the uncertain number of guests, they are obliged to maintain the maximum force of waiters. The operation of the device is noiseless, and the nervous man is relieved from the disagreeable shouting of waiters giving orders. A gold medal was awarded this invention by the Mechanics' Institute Industrial Exhibition. A company called the Automatic Dining Table Company has been organized,

with offices at 162 Ninth street, to manufacture and introduce this table. The appliance can be made to suit requirements of a cheap restaurant, or a Palace hotel, being made either plain or ornamental.

## Mohave Mines, Arizona.

About three years ago, Walter Scott, a well-known prospector and miner, satisfied himself that the Chimbueve range of mountains in Mo-



APPARATUS FOR ASSAYING AMALGAM.

indicates it upon the bill by writing or suitable mark. He then places the bill of fare upon the tray which lies immediately in front of him, and, by means of a push button in an electric system, calls the attention of the people in the kitchen. The attendant there knows by the signal the location of the guest, and, by operating the wheel in the kitchen, draws the tray, with the bill of fare, on to the carriage in the central passage, and thence to the kitchen.

Here the order is filled and, replaced on the tray, the mechanism is operated, and, on the tray reaching the position indicated, is automatically passed out of the side passage on to the small table in front of the guest. The whole thing is done rapidly and without confusion. The mechanism is such that no mistake can be made, and the order is sure to come to the one who sent it.

By this invention those who dine at restaurants will have their meals served well and promptly, and the services of waiters may be dispensed with. Too often it is the case that the people who wish to eat are the "waiters" instead of the attendants, each one of the latter having too many persons to look after. The

have county, Arizona, was a first-class place to hunt for rich ore. By long and patient work in that region he succeeded in finding ledges of both gold and silver ore, the ledges being about 28 inches wide and the ore rich. A well-known California-street merchant of this city furnished Mr. Scott the means for prospecting the ground. We have been shown specimens, which are very rich. The gold ore is exceptionally rich, not only showing plenty of free gold, but gold in heavy pieces. A shipment of silver ore recently made to this city assayed \$190 per ton. A prominent mining man who represents Scotch capital has offered to bond the mine for a large amount.

This discovery is supposed to be the richest ever made in Mohave county. It is the intention of the owners to erect a mill shortly and commence working the ore. The ledges are near the Needles, and some 14 miles from the railroad. The settlement of the Indian question in Arizona is a good thing for the mining interests of that region, since, heretofore, capitalists have been reluctant to invest there. Now, however, there is no excuse, and this is but one of the examples to show that people

will develop mines in Arizona and be willing to invest there when they can be sure of safety to life and property.

## Personals.

D. Ernest Melliss, civil and mechanical engineer, left San Francisco for the East last week.

F. H. Jennsen, chemist and manufacturer of high explosives, is at the powder works at Point Penole.

Mr. Hans C. Behr, mechanical engineer, has lately removed his offices from 414 California street to 609 Sacramento street.

Prof. Thomas Price, the chemist and metallurgist, has been elected Vice-President of the California Academy of Sciences.

J. C. Henkenius, for some years past in the U. S. Surveyor-General's office in this city, has taken up his residence in Oakland.

Sanford Robinson, C. E., formerly of this city, is now General Manager of the Champerico & Northern R. R. in Guatemala.

A. Van Blarcom, mining engineer, formerly of Eureka, Nev., and more recently engaged in mining in Mexico, is now in Montana.

Irving M. Scott, of the Union Iron Works, who has been East some months, will not return to this State before the close of the year.

David McKay has retired from the superintendency of the Empire mine, Grass Valley, and V. M. Clement has been appointed in his place.

Prof. Wm. P. Blake, of New Haven, who is well known on this coast, is at present in Arizona, where he is planning and carrying out an extensive water enterprise.

Augustus J. Bowie, Jr., author of "Hydraulic Mining in California," and well known as a mining expert, is at present in Mexico, examining some mines. He will return in about a month.

The recent appointment of Capt. A. H. Payson as U. S. Engineer in charge of the Lighthouse Department of this coast, is simply some official routine, as he has held the position for several years.

Mr. Gardner F. Williams, the well-known mining engineer of this State, who visited the South African gold and diamond fields last year in the interests of English capitalists, left this city this week for England, on mining business, and will be absent several months.

Geo. J. Specht, C. E., the Vice-President of the Technical Society of the Pacific Coast, who has been engaged in engineering work for the Spring Valley Company in San Mateo and Santa Cruz counties for some months, has returned to the city to finish up the office work.

Mr. P. J. Flynn, C. E., author of "Hydraulic Tables based on Kutter's Formula," and "Flow of Water in Open Channels" in Van Nostrand's Science Series, who for several years has been employed on Oakland harbor work, until last summer, when he went East, has returned to California.

An Associated Press dispatch to the effect that Col. George F. Mendell, of the U. S. Engineers, in charge of the Government works around San Francisco harbor, has been relieved, is misleading. It was stated that he would be succeeded by Major Wm. H. H. Benyard, who has been on duty at Chicago. Major Benyard will not be stationed in San Francisco, but will go to Southern California, probably to San Diego or Los Angeles, and will look out for Government works there. As Col. C. S. Stewart, for many years stationed here with Col. Mendell, has been placed on the retired list, at his own request, Col. Mendell is the only engineer officer in this city engaged on river, harbor and fortification work. He will probably remain for some time yet, and, it is hoped, will be here permanently.

VERY few people have any idea of the importance of American Flat as an ore producer. There are several good working mines in that district, the principal one being the old Santiago Mill and Mining Company's mine, now owned by Mr. Quinn, Ed. Hamilton and others, they refusing \$45,000 cash a short time ago. There are four men on each shift working on the mine. Yesterday six large ore wagons, loaded with the precious rock, left the mine bound for the mills in Silver City. The ore averaged about \$40 per ton. The district is pretty well staked off and claimed, but there is yet a chance for other prospectors to secure a foothold in the neighborhood and try their luck as these men have done.—*Territorial Ent.*



## MECHANICAL PROGRESS.

## What Steam Has Done.

## Mechanical Progress is Moral Progress.

The books and papers of the day are full of reports of the great revelations in mechanics and industry which have been brought about, during the last century, by the introduction of steam. But steam has achieved victories in the moral as well as in the physical world. In proof of this we note a few facts, which we compile from a cotemporary:

In ancient times the invading conqueror generally carried away to his own country a large portion of the population of the land which he had overcome and made slaves. Why? Because he wanted to remove from his own people a part of the burden of toil. History is full of accounts of such performances. In fact, the process endured to our time, for the capture of negroes in Africa, and their deportation to this country to be sold as slaves, was simply another form of the old business. The slave trade merely supplied a demand for labor from people who wished to reduce their own labors. Now observe. The invention and general introduction of the steam engine ended this kind of thing forever, for it gave to man a servant far more tractable, more economical, more energetic, more tireless, than any number of human servants could possibly be. The effect upon the laborer, of this change, was to uplift him and give him dignity. Labor is no longer joined with slavery.

This is the century of the steam engine. The same century has witnessed the emancipation of the slaves in this country and of the serfs in Russia. It will not close before the slaves will be freed in Cuba and Brazil. Then there will not be an involuntary bondsman in any civilized land on earth. That majestic fact, of vast importance to the toiling man everywhere, is due solely to the introduction of steam and the general advancement of mechanical invention due to the introduction of steam as a motive power. In the meantime, the general status of the laborer has been so much advanced that he is now for the first time in the history of the world counted as a great political and social power. The laboring man to-day is on top. That is a practical, even if it be a startling, fact.

Note this, also, as another result of the introduction of steam machinery: The laborer in civilized countries now earns more money than he ever before earned, and the things which he requires for his comfort and his pleasure cost less than at any former period since the creation. If workmen would only read history they would find much to induce them to greater contentment. There was not in the British islands, 300 years ago, a dwelling-house that would compare in comfort with any one of the tens of thousands of excellent homes owned in this country to-day by men who earn \$10 or \$12 a week. The poor man has them because machines have been invented to do the work which men used to do, and because these machines have capacity for production far beyond the unaided capacity of man.

**A NEW USE FOR THE DRAW-SHAVE.**—A correspondent of the *Blacksmith and Wheelwright* recently visited a country blacksmith's shop, where he witnessed an entirely new process for "pointing" a piece of iron. The blacksmith, after his "heat" had reached its proper temperature in the forge, left it for an instant, while Vulcan laid an old saw and a draw-shave on a bench near the anvil; he then dipped a piece of woolen cloth in his water trough and fixed the cloth on the back of the saw with two bits of hoop that nipped it there, so that the water ran down over the blade. He then swung his "heat" out of the fire, placed it in the vise and clamped it securely in position, as he was working without a helper. He next took up the saw and with it cut about two inches off the molten mass with a few rapid strokes, then snatched up the draw-shave and drew off white hot shavings to taper the end of the piece, only once pausing to dip the draw-shave in water, and turn the under side of the iron uppermost, and the draw-shave was flung into the water to cool. Now followed the rasp; this was nailed on to a staff or stake over three feet long, and the power thus gained to make the teeth of the rasp bite into the hot iron was manifest from the incessant showers of iron which flew off at every stroke. He remarked he was working both sides of his anvil, as his mate was away, meaning he had to do his work single-handed. The use of the saw is common, but we have never seen an ordinary draw-shave used for paring down hot iron.

**PRODUCTION OF ELECTRICITY.**—Electricity is making quite as rapid strides toward utilization as a motive power as steam was doing one hundred years ago. The great thing in electricity now being sought for is some means for developing it from burning coal, without the intervention of a steam engine or any other motor. Many experiments have been made and not a few devices have been contrived—one of these, by an English inventor, in which the electro motive force of a cell is given as about 0.7 volt. This is, of course, much less than the theoretical electro motive power of a hydrogen and oxygen couple, and the remaining energy evolved by the combination appears to be developed in the form of heat at the surface of the oxygen plate, and serves to keep up the temperature of

the apparatus. In the action of the battery the hydrogen, in passing through the inner tube, is, so to speak, filtered off from any gases with which it may be mixed, and the residual combustible gases, if any, when drawn off by the escape jet, can be utilized as fuel for the furnace. This is considered a very valuable feature, as it enables the battery to be worked with strong producer gas, consisting mainly of hydrogen and carbonic oxide, and to be arranged in a compact way, the spare heat left from heating the cells being available for working the producer. It is claimed that a ton of coke used in heating the battery, including the hydrogen producer, gives at least three times the electric energy produced by the same quantity of coke used in working a steam engine and dynamo.

**THIN FIRES THE BEST.**—Mr. John A. Coleman, of Providence, R. I., in an address before the American Railway Master Mechanics' Association, spoke about combustion fire boxes and steam boilers, and among other excellent "points" made were the following: "Thin fires accomplish this. A given amount of coal generates a given amount of gas, and this gas requires a given amount of air or oxygen. This air must be supplied through the grate bars and then pass through the interstices of the mass of heated coal. It requires about 10 cubic feet of air to consume one cubic foot of gas. In stationary boilers, we find that if we use 'pea' and 'dust' coal, an extremely thin layer must be used, or the 10 feet of air per foot of gas cannot pass through it; if 'chestnut' coal be used, the thickness may be increased somewhat; 'stove size' allows a thickness of six inches, and 'lump' much thicker, if any wise man could be found who would use that coarse, uneconomical size. Of course, I am speaking of anthracite coal. Opinions differ about 'soft coal,' but the same general principle applies as regards an unobstructed passage of air through the hot bed of coal."

**THE ADVANTAGES OF CYPRESS FOR LUMBER.**—The cypress is soft, more closely resembling the better qualities of the white pine. It is easily worked and commands a high price in the market, merely because of its value and superiority. It grows in clusters on low, swampy grounds subject to overflows. On account of its aquatic life it seems to endure exposure to the weather. Cypress roofs and sidewalks in New Orleans are a century old. Cypress is usually cut in low water, and floated out in high water. The Northern lumber companies are rapidly erecting mills and putting them in order in certain sections of Louisiana and Mississippi. From present appearances the lumber interests in these States will soon exceed the cotton interest. Suffice to say there is an enormous supply of these varieties of lumber, and their manufacture and marketing will have some effect on the price of Western lumber.

**A DRY COMPOUND FOR EXTINGUISHING FIRES.**—An eminent German physicist recommends for the extinguishment of fires in closed places where the use of water or other liquids would be likely to do great damage, a dry compound, which, by its burning, absorbs the oxygen and quickly renders combustion impossible. The compound is composed of powdered nitrate of potash (saltpeter), 59 parts; powdered sulphur, 36 parts; powdered charcoal, 4 parts; colcothar (brown-red oxide of iron), 1 part. This preparation is one that can be cheaply made. It is recommended that it shall be, when thoroughly dried and mixed, put up in tight pasteboard boxes, holding about five pounds each, with a quick fuse in the side of the box—protruding six inches, with four inches inside—to facilitate and insure lighting it.

**THE ERA OF FUEL GASES,** both natural and artificial, has become an established fact. The total displacement of coal at Pittsburgh for the year is calculated at 2,550,000 tons, and there are 491 miles of iron-pipe gas mains entering Pittsburgh, as built by the four companies which control that supply. The new forms of labor created by these works, and the increase of active work at the iron mills and gas works, give employment to more men than the 3500 assumed to have been displaced in coal mining and coal handling in transportation, as also in the firing and cleaning of coal furnaces.

**LOOK FOR THE CAUSE.**—If a belt is disposed to run off, says a cotemporary, we should never try to keep it on with a stick, but remember there is always a cause, and look at once for a remedy. Four causes alone operate to throw off a belt—the belt being crooked, poor lacing, the belt being too tight for the work, or the shafts not parallel, throwing the pulley out of line. Usually the latter is the cause. Shafts are liable to get out of line, and machines are liable to get moved from their settings.

**IMPROVEMENTS at the Lick Paper Mills,** Santa Clara Co., have been made from time to time, until now there is an extensive manufactory surrounded by numerous cottages and dwellings which accommodate a large number of workmen and their families.

**ANCIENT ALLOYS.**—M. Richie, in his researches on alloys, finds that tom-toms and cymbals are made of bronze that can be worked cold the same as iron or aluminium bronze. The best tone is composed of 78 parts of copper and 22 parts of tin.

## SCIENTIFIC PROGRESS.

## How Electricity is Generated in the Atmosphere.

The observations of meteorologists show that the vapor which ascends in an invisible state from the ground carries with it, in calm and fine weather, into the higher regions of the air a very considerable supply of positive electricity. Each minute vapor-particle that goes up bears its own portion of the load. When, however, the invisible vapor has thus mounted into very high regions of the air, it loses its invisibility, and is condensed into visible mist. Numerous particles of the aqueous substance are drawn close together, and grouped into the form of little vesicles or globules. Each one of these is then a reservoir or receptacle of electric forces, and as more and more vesicles are condensed more and more electricity is collected in the gathering mist; but each of the water globules is still enveloped by a space of clear air. In a drifting cloud the specks can be discerned floating along with transparent intervals between. The clear air which lies around the globules of vapor then acts as an insulating investment; it imprisons its own part of the required electrical force in each separate globule. The cloud is thus not charged as a whole, like a continuous mass of metal, with its electricity spread upon its outer surface only; but it is interpenetrated everywhere with the force. It is composed of a myriad of electrified specks, each having its own particular share of the electric force, and each acting as a center of electrical energy on its own account. The electricity which at any one instant resides in the outer surface of a cloud, is, therefore, but a comparatively small portion of that which is present in the entire vaporous mass.

That such is the way in which electricity is stored in the clouds has been proved by direct observation. When a gold-leaf electrometer is placed in the mist of a cloud driven along by the wind, it is seen that the strips of gold leaf continually diverge and collapse as the mass of the cloud passes along. There is an electrical charge acting in all parts, but the charge varies in intensity from place to place accordingly as there is a greater or less condensation of the particles of vapor in each particular spot. But the influence externally exerted by the cloud is nevertheless capable of being raised to a very intense degree, because it is, so to speak, the sum total or outcome of the force contained in the innumerable internal centers of energy.

It is no uncommon thing for the electrical force emanating from a cloud to make itself felt in attractions and repulsions many miles away. Clouds resting upon the remote horizon thus frequently produce perceptible effects at distances from which the clouds themselves cannot be seen. An electrical cloud hanging a mile above the ground acts inductively upon that ground with considerable power. When in summer-time the temperature of the earth's surface is very high, the ground moist, the air calm and the sky clear, very copious supplies of vapor are steamed up from the ground under the hot sunshine. Clouds, however, begin at length to gather in elevated regions of the air out of the abundance of the supply. The free electricity which has been carried up with the vapor is at first pretty evenly spread through the clouds; but after a little time, as the electrical charge becomes more and more intense, a powerful repulsive force is in the end established between the spherules of the mist, and a very high degree of tension is at last produced at the outer surface of the cloud, where it is enveloped by insulating air, until in the end the expansive energy there becomes strong enough to occasion an outward burst from the cloud. The escape of the redundant charge then appears to an observer's eye as a flash of lightning issuing from the cloud. Such, in its simplest form, is the way in which lightning is kindled in the storm-cloud.—*Science for All.*

**THE INDUCTION SYSTEM OF TELEGRAPHING.**—A paragraph in an electrical journal states that "a contract has recently been signed between the Lehigh Valley Railroad and the Phelps Induction Telegraph Company for the application of the Phelps system of railway telegraph to the entire system of road operated by them. The work of equipment has already begun, and the first section of about 100 miles from Perth Junction to Manch Chunk will be in operation in a few weeks. The wires will be worked duplex, being used as ordinary Morse wires for local telegraph business and for train service simultaneously." The announcement, says the *Railroad Gazette*, is in some of its details somewhat premature, probably, but the experiments are going on, and indicate the increasing interest in this question. So far the reports of the practical working of the induction system of telegraphing have been uniformly favorable to it.

**TIME OF THE FUTURE.**—The change in the mode of noting time from the old method under which the clocks varied for every 10 miles of longitude, to that of the present "standard time," recently introduced and which has already proved a great convenience, has set many to thinking of the possibility, in the near future, of having but one time for the whole world. That will be the Greenwich civil day, commencing 12 hours earlier than the astronomical day, whose beginning is at the Green-

wich noon, and the hours will be numbered up to 24 instead of in two series of 12 each. Midnight and noon will then cease to be inseparably associated with 12 o'clock, and will occur at hours varying with the distance in longitude from the Greenwich meridian. The advantage urged for making the universal day coincide with the Greenwich civil day is that the change of date at the commencement of a new day falls in the hours of the night throughout Europe, Africa and Asia, and that it does not occur in the ordinary office hours (10 A. M. to 4 P. M.) in any important country except New Zealand. In the United States and Canada the change of date would occur after 4 in the evening, and in Australia before 10 in the morning. Only in the parts of the world that are almost entirely water would it occur about the middle of the day, and this arrangement would thus reduce the inconvenience to a minimum.

## Carnivorous Plants.

It has long been known that certain plants catch and kill insects, but only very recently has it been suspected that they devour and digest their prey. The matter has attracted a great deal of attention of late, both in this country and in Europe, and many careful observers are fully satisfied that these plants are really carnivorous. Others, among whom are some eminent foreign botanists, hold that the captured insects are devoured by bacteria, which may be detected by the microscope in the putrefying animal matter. A piece of meat placed on a leaf of *Drosera* disappears in the same way; but, according to these authorities, it is consumed by the bacteria as it decomposes, and is not absorbed by the plant.

The weight of evidence, however, appears to be on the other side. The more closely these plants are studied the more clearly is their carnivorous character indicated. Some few years ago a series of very careful experiments were made by Dr. Balfour, of the Edinburgh Botanical Society, on *Dionaea Muscipula* and allied plants. These experiments fully confirmed the suspicions entertained by Ellis, Curtis, Hooker and Darwin, that the *Dionaea* is a carnivorous, and, it may be added, a most brutal plant.

Dr. Balfour classified the facts he had observed in regard to it under the heads of irritability, contraction, secretion, digestion and absorption. The irritability, it seems, is resident in six delicate hairs, so placed on the surface of the leaf that no insect can avoid touching them in crawling over. Dr. Balfour touched with a needle every other part of the leaf, and no response followed; but no sooner was the point applied to one of those hairs than a contraction of the leaf ensued. Chloroform dropped on a hair caused the leaf to close like a winking eye, but water had no such effect. It was only when the object seized was capable of affording nutrition that the contraction continued for any considerable length of time. A piece of wood was soon released, and so was a dried fly; but when a live fly or caterpillar or spider was inclosed the contraction lasted on an average for about three weeks. The leaf at the same time gave out a viscous acid secretion. This appeared to be only the case when an insect was captured, and it was always present on such occasions; but whereas with a fat spider it was abundant, with a shriveled fly there was very little. In proof that nourishment is obtained from insects so inclosed, Dr. Balfour pointed significantly to the facts that young plants of *Dionaea* under bell-glasses had been found not to thrive so well as those left free, and that while a piece of beef wrapped in another leaf became putrid, a piece inclosed by the *Dionaea* remained perfectly inodorous, but soon lost its red color, and was gradually disintegrated more and more till it was reduced to pulp. This statement showed the greediness and ferocity of the plant.

**CHEAP SUBSTITUTE FOR A SINGLE MICROSCOPE.**—The object of a lens in a microscope is to enable us to see a minute object distinctly at a less distance than the natural standard of vision, as by so doing we view it under a larger angle; but, in point of fact, we can, to a certain extent, accomplish the same object without any lens at all. Take a card and blacken one side of it, then pierce it with a fine sewing needle and look through the hole at any small object, strongly illuminated, and held about an inch from it; the object will appear considerably magnified. In this case the use of the perforated card enables the object to be brought about 10 times nearer the eye than the ordinary distance of distinct vision, and hence it appears about 10 times larger. In this experiment the effect is equivalent to reducing the pupil to the size of the needle hole, so that the amount of light entering the eye is correspondingly reduced; hence the object must be strongly illuminated to render it visible.

**THE CHARLESTON EARTHQUAKE FELT AT LOWELL, MASS.**—There is a self-recording instrument kept at the offices of one of the Lowell factories which records any rise or fall of water on the surface of the millpond connected with the factory. On the night of August 31st, a few moments after the occurrence of the Charleston earthquake, there was a perceptible agitation of the water of the pond, which was distinctly seen upon the chart the next morning. That agitation must have been caused by the earth vibrations set up by the great earthquake at Charleston.



## ENGINEERING NOTES.

## Electrical Navigation.

The practical advances of electrical science are indicated from time to time by some new and important departure, which serves to mark the progress made up to a certain point. At one time it is the means of producing electricity; at another, some new method of converting it to useful work. It is in this respect that we would now briefly refer to the progress which has been made in electric navigation.

The electric boat, *Volta*, which recently made a very successful trip across the British channel, seems to have awakened a new enterprise in electric navigation. The *Volta* is by no means the first successful effort that has been made in that direction; but the interest attached to it arises from certain improvements in previous practice which promise an important step in advance in electric engineering. This new departure, from a scientific point of view, is the duplex electrical motor of Mr. A. Reckenzaun, with which the *Volta* is fitted. The vessels which have been heretofore propelled by electricity may be enumerated as follows: The *Electricity* was the first boat ever propelled by the agent whose name she bears. She made her trial trip in 1833. Her screw was driven by 40 cells and a Siemens dynamo. She was 25 feet long by 5 beam—built of iron. In the following year a wood-built screw launch, the *Australia*, of about the same dimensions, was constructed and fitted with the improved electric motor of Mr. A. Reckenzaun. Later on a screw launch, 22 feet long by 4 feet 6 inches beam, belonging to the *Vernon* torpedo ship, was fitted with electrical machinery by Mr. Reckenzaun. The example set by the Government in the case of the *Vernon* was followed by the Duke of Bedford, who had a launch 24 feet by 5 feet beam, which was attached to his yacht, *Northumbria*, fitted with a Reckenzaun motor. The latest example of an electric boat prior to the *Volta* is afforded by a steel launch built by Messrs. Yarrow & Co. during the present year for the torpedo service of the Italian navy. This boat is 36 feet long by 6 feet 4 inches beam, and is propelled by a screw driven by a duplex Reckenzaun motor. She made on the measured mile 8.43 miles per hour, and is now in regular service at Spezzia. In each case the electric current is stored in a battery composed of the Electric Power and Storage Company's cells. We here have the various stages through which electric propulsion in vessels has passed as regards the Reckenzaun motor and accessories, and which stages have thus led up to the *Volta*.

She is a six-ton boat, built without a deck. She measures 37 feet long by 6 feet 10 inches beam, and is fitted with a battery of 61 cells made by the Electric Power and Storage Company, and a duplex Reckenzaun electric motor; that is, two motors carried on one driving shaft. By means of this motor the speed can be varied without affecting the accumulators, three speeds being obtained from it, namely, slow, medium and fast. Another important feature is that all these speeds are produced, and the vessel started and stopped, by means of one switch only, having one handle, thus reducing the control of the speed of the boat to the simplest terms. There is a separate switch for reversing the motion of the motors from ahead to stern, and *vice versa*. The motors weigh 730 pounds, and develop a maximum of 16-horse power on the brake. The propelling machinery makes about 600 revolutions per minute at slow speed, and about 1000 revolutions per minute at full speed. The storage cells weigh about two tons, and are arranged along the keel of the vessel beneath a wood decking.

As the *Volta* approached Calais harbor, she became an object of interest and curiosity to those who happened to be on the pier at the time. And well she might, seeing that she was moving steadily along, an open boat, without funnel, mast, or oars, or, in fact, any apparent means of propulsion. On the return journey, the current remained constant at 28 amperes up to 5 p. m., but at 6 p. m. it was found to have dropped to 25, another ampere being lost before Dover was reached. A fine margin of power, however, still remained, and the last half-mile was run at high speed, the motors and screw making 1000 revolutions per minute, the boat entering the harbor in style. Thus was successfully accomplished without a solitary hitch the first voyage across the English channel and back by an electrically propelled boat. No more successful demonstration of the applicability of electricity to the present purpose could have been made, and the event will doubtless give an impetus to practical electricity in this direction. For night work in torpedo operations, it appears admirably fitted, while those owning steam launches will find an excellent substitute for the noisy, sickly-smelling steam engine, and the begriming, carbon-showering coal furnaces.

THE CANADIAN PACIFIC.—One of the promises made by Mr. Gladstone was that the Canadian Pacific Railway was soon to pay the Government \$20,000,000. It is to do this by a loan from Baring Brothers, the proposals for which have just been published. This mortgaging of the future may help the ministry out of one of its most serious difficulties. It is one of those moves in finance for which Mr. Gladstone has always been famous.

## USEFUL INFORMATION.

## Accidents From Machinery.

There is one point, at least, in which the French are in advance of both England and the United States in shop management—that is, in the measures taken for the prevention of accidents from machinery in motion. In France, for years past, young and inexperienced persons have, by legislative enactment, been forbidden to assist in repairing or in adjusting the bands and straps of running machinery. In addition to this, the French have devised and put into practice numerous scientific and some simple, but very efficacious, means of guarding against danger even to those of riper years, who are intrusted with the management of such machinery. Why have we not copied or even excelled the French in these particular directions? The fact is that neither in factory regulations nor legislative enactments has there been any steps taken for preventing the employment of young apprentices or young persons in general from attending to belting, gearing or the cleaning of machinery in motion. Great indifference also exists in regard to the means employed for guarding employes and others against danger while moving about in the presence of machinery. The consequence is that year after year much maiming and loss of life is reported from such causes, in the case of very young persons who have been employed in such dangerous work, which should never be trusted to any but careful and experienced adults.

Apropos to the above we quote from a mechanical cotemporary as follows: A mill filled with machinery driven at its highest rate of speed is not the safest place in the world. Certain belts and portions of the machinery have to be left exposed, but the most dangerous parts are generally boxed up. In spite of this, hardly a week passes that some operative does not lose a portion of his hand or arm. It is said that in a majority of instances these casualties result directly from carelessness. At times defective machinery injures somebody, but more frequently machinery which is in the best condition, though always dangerous, does the damage. One great trouble, manufacturers assert, is that the help, in spite of the warnings posted, persist in cleaning machinery while it is in motion. The work can be more easily accomplished in this way, and commands and threats have no effect. The help complain that they are not allowed sufficient time for cleaning, but it is thought that that makes little difference.

PRESERVATION OF EXPOSED ROPES.—The preservation of exposed ropes is a matter of great importance when scaffolding remains erected for any considerable time, especially in localities where the atmosphere is destructive of hemp fiber. It has been suggested that in such cases the ropes be dipped, when dry, into a bath containing 20 grains of sulphate of copper per litre of water, and kept in soak in this solution for four days, afterward being dried. The ropes will thus have absorbed a certain quantity of sulphate of copper, which will preserve them alike from rot and from the attacks of animal parasites. The copper salt may be fixed in the fiber by a coating of tar or by soapy water. In tarring the rope, it is said to be better to pass it through a bath of boiled tar, hot, drawing it through a thimble to press back the excess of tar, and suspending it afterward on a staging to dry and harden. According to another process, the rope is soaked in a solution of 100 grains of soap per litre of water. The copper soap thus formed in the fiber of the rope preserves it from rot even better than the tar, which acts mechanically to imprison the sulphate of copper, which is the real preservative.

THE TENACITY, ETC., OF SILVER.—The tenacity of silver has been studied by Matthiessen, and can be stated for comparison as follows: Alloy of tin and copper, 1; gold, 3.6 to 4.3; copper, 4.3; silver, 7.2; platinum, 7.2; iron, 13; steel, 30. It is so ductile that a grain of it can be drawn out 400 feet, and it can be hammered into leaves so thin that it would require 100,000 of them to make a pile an inch in height. Its conductivity for heat is to copper in the ratio of 100 to 73.9, and for electricity as 1000 to 954. Cast silver expands, according to Calvert, between 0 deg. and 100 deg. per Cent., 0.001991, and its specific heat is 0.05701. Although silver is a remarkably good conductor of heat, its power of radiation is very small, so that a silver vessel retains the heat of a liquid contained in it longer than any other metal.

ACID-PROOF CEMENT.—A cement for resisting sulphuric acid even at boiling heat may be made by melting caoutchouc at a gentle heat and adding, with constant stirring, from six to eight per cent of tallow. Then mix therewith enough dry slacked lime to make the whole the consistency of soft paste, finally add thereto about 20 per cent of red lead, whereby the mass immediately sets hard and dry. A solution of caoutchouc in twice its weight in linseed oil, aided by heating and the addition of an equal weight of pipe clay, yields a plastic mass which will likewise resist most acids.

HOW TO KEEP LEMON JUICE.—a. Keep the filtered juice, before it has passed into fermentation, without adding alcohol, in a bottle hermetically sealed. b. Heat the fresh juice not

compounded with alcohol in a vessel to the boiling point, and close while boiling. c. Compound the unfermented juice with 10 per cent of alcohol and heat as in b. d. Fill the fermented juice in bottles without an addition of alcohol and without heating. e. Heat the fermented juice without an addition of alcohol in a closed vessel to the boiling point, and close while boiling. f. Compound the fermented juice with 10 per cent of alcohol, and heat as in c.

PAPER BOTTLES.—Paper bottles were patented in this country in 1883. Their sale was not extensive at first, but now that European patents have been secured, covering nearly all fields of probable competition, the controllers of the patents, it is said, intend to manufacture the bottles in large quantities. In the item of freight alone they will effect a saving of one-third less weight than glass or stoneware, and are, on the whole, less liable to breakage. Paper being also an excellent non-conductor, fluids stored in airtight paper bottles will withstand a more intense degree of heat or cold than they could endure without injury in bottles of any other material.

TO MELT OLD RUBBER, such as old rubber car springs, scraps, etc., so as to be able to run it into molds for new work: Heat the india rubber with steam; the sulphur then discharges and the india rubber melts, runs into the hot water and collects at the bottom of the pot, while the vapor prevents it burning. The properties of the india rubber are thus sensibly modified; it becomes a blackish mass, liquid at the ordinary temperature, but drying in the air, and becoming then impervious to water. The material loses its elasticity, but is suitable for the preparation of gums or special varnishes for certain articles.

POLISHING AND FINISHING METALS.—To get the beautiful finish we see on the best work, take a piece of flour emery paper, well worn, and a little oil upon it, and when this has been well worked, a piece of wood flat upon the surface, with some fine crocus, will bring it up to a high polish, and if any deep scratches be there, you will at once observe them, and to remove, in all probability, it will have to be filed over again.

SHAPENING HEAVY IRON SLABS.—It is a feature in the manufacture of the enormous slabs of iron for the English turrets that they are bent to the required form direct from the rolls, and when at cherry heat. To bend such plates cold would give them a certain amount of brittleness, and render them liable to "star" when struck by shot.

## GOOD HEALTH.

## Mileage of the Blood Circulation.

In preparing lectures on vital or animal mechanics for a Cantor course at the Society of Arts, several practical points of new or renewed study have come before me, some of which are, I think, deserving of brief notice. One of these is the question of the mileage of the blood current of a healthy adult man, in whom the current shall be traversing the conduits of the circulation under the direction of 69 strokes of the heart per minute, at the assumed propulsion of nine feet at each left ventricular pressure.

The distance traversed would, I estimate, be at the rate of 207 yards per minute, or seven miles per hour, or 168 miles per day, or 61,320 miles per year. Supposing, therefore, that a man who has lived 84 years could have one blood corpuscle floating all that time round his circulating channels—as a planet circulates round a sun—that corpuscle would have performed at the close of the time named the grand tour of 5,150,808 miles. The heat generated by friction in this motion of the blood we may take as included in the normal constant of 98.45° Fah. What the excess would be when, as in fever, the rate of passage may extend to over double the normal, or 14 miles an hour, at full tension, can only at present be estimated on data which have to be formulated, and are, therefore, inexact. But here a most important field is open for inquiry, and includes the questions: 1. Is the excess of febrile heat in pyrexia due to increased pulsation at full tension? 2. Is the increased motion due to the high temperature? 3. Are both dependent on one common cause? We really know nothing about pyrexia until these questions are determined. A pigeon lives always at what in the human subject would be the highest pyrexia. Its temperature is 108° Fah.; its arterial pulsations are 140 beats per minute; and it has a surface of body presenting the fullest resistance to conduction. Does this truly pyrexial animal owe its normal high temperature to its rapid circulation? Does its high temperature give rise to its rapid circulation? Or, are the heat and motion dependent on one common undiscovered cause?—*The Asclepiad*.

PLAIN TRUTH ABOUT SMOKING.—Dr. Wm. A. Hammond, to a reporter of the *Tribune*, made some remarks on smoking by boys that deserve the attention of all young persons—and older ones: "If children smoke cigars they destroy their nervous systems before they are fully formed and render themselves liable to neu-

ralgia and various functional diseases of the brain which are certainly calculated to destroy their mental force. There is also some evidence to show that tobacco in young persons actually interferes with the development of the body in regard to size—that it stunts their physical system. It certainly impairs digestion, for they cannot use tobacco without spitting inordinately. The saliva expelled from their bodies is one of the most important of the digestive fluids, and the proper digestion of the food in the stomach is materially interfered with when there is not enough saliva left to mix with their food before it is swallowed. Again, it certainly impairs hearing and eyesight. I have seen several instances of young children having their eyesight injured seriously, if not irreparably, by the use of tobacco. The excessive use of tobacco is injurious to everybody, adults as well as infants, male as well as female."

THE STATE BOARD OF HEALTH.—We acknowledge the reception of the ninth biennial report of the State Board of Health for the fiscal years from June 30, 1884, to June 30, 1886. It has been printed at the State printing office in Sacramento, and comprises a volume of 282 pages. California was one of the first States in the Union to recognize the need of organizing a State Board of Health, and the work which that Board has done has fully proved its value, although its opportunities for usefulness have been largely curtailed by reason of insufficient appropriations for such work. The table of contents of this report, which occupies 10 full pages of small type, shows that the work of the board has comprised a wide range of subjects, all of which are valuable for the information and instruction of the people at large. It deals sparingly in statistics, and none but those absolutely essential to a publication of this kind have been admitted. The report deals largely in general sanitary information and instruction, and will, no doubt, do much to encourage more general attention in regard to public sanitary needs and to domestic hygiene among the more intelligent portion of our people. It is gratifying to observe that in many ways the public is gradually becoming better informed in regard to these important matters. The publications of the board, through its monthly and annual reports, and the encouragement which it gives to the newspaper press to take a more active interest in health matters, if properly seconded by needed legislation, will soon place California in an advanced position, not only in the conservation of life but in the repelling of disease as well, by means of all the knowledge and appliances which modern sanitary science has devised for the benefit of the human family. We shall take an opportunity from time to time to transfer to our Health Column some of the many valuable hints which a more careful examination of the report will doubtless bring to our notice.

TROUBLE IN THE HEAD.—Roaring sounds and whistling in the ears and deafness. I had been much troubled by roaring and singing in my ears and at times a whistling sound, especially when lying down, writes a correspondent of the *Boston Transcript*. An old and experienced physician whom I consulted told me to gargle my throat night and morning with hot and cold water. Have one tumbler of hot water, taking the water hot enough to scald the mouth, and one tumbler of cold water. Gargle first three times with the hot, then three times with the cold water. Do this three times, making nine times with each. In a short time I was cured by this very simple remedy. Many times I have wished it were better understood how often deafness is caused by the hardening wax in the ear. A great number of people doubtless suffer from what they believe is incurable deafness, old persons in particular supposing it to be caused by old age, when if they would consult any good aurist they would find it was merely hardening of the secretion of wax in the ears. This can generally be removed by a very simple and painless operation and hearing restored.

WHAT IS HUNGER?—The cause of the intense pangs experienced by a starving man is little understood, but it may be safely said that the pain is not produced, as has been popularly explained, by the grinding together of the walls of the empty stomach. Dr. Robert Wilson remarks that the theory of hunger may be thus formulated: Fasting produces a general change in the organism as a whole. This again brings about a specific change in a particular part of the organism—the stomach—of which the pain of hunger is the local symptom. Direct applications, such as a bolus of food, or even of clay, temporarily relieve the local feeling of a pain, by neutralizing the specific local changes to which that feeling owes its origin. Indirect applications, again, such as the injection of milk into the blood, correct the general alteration of the system produced by want of food. By doing so, they correct those local gastric changes produced by the general effect of fasting in the system—changes which render the local manifestations of hunger possible.

THE VOICE.—It is now generally maintained that the voice is formed exclusively in the larynx. All such terms as "head voice" and "chest voice" are incorrect and misleading. By aid of an instrument called the laryngoscope the organ of voice may be thoroughly examined, abnormalities detected, and note made of the affections which beset it.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Alameda.

**MAGNESIA MINE.**—Livermore *Herald*, Nov. 9: One of the tunnels of the Cedar mountain magnesia mine is now in 20 feet, or nearly 50 from the surface of the slide. The character of the formation continues about the same, the best deposit being found beneath the large rocks. Cross tunnels are being run in on the larger veins, as they are cut by the main drift.

**CHROME.**—Chrome is still coming in, with unfailing regularity. Four teams are engaged in hauling. N. Q. Patterson's and Patterson & Bagley's making daily trips. Pete Classen makes four trips a week and Ab. Meddenhall one or two. Bagley & Patterson vary the monotony of chrome by bringing in two loads of magnesite per week, or about seven tons. The chrome output is about six tons per day.

**BORAX.**—We were shown this week a sample of the borax from John Worth's recently-discovered deposit in the Livermore mountains. His claim is on the Big Salida creek, southeast of San Antonio valley and nearly 50 miles from Livermore. It is on a county road and but ten miles from Grayson. The borax is found in a bank on the creek and lies in thick veins of clay. A portion of it is white and a portion yellow. It is separated from the clay before being washed, and allowed to stand in mud-pools under the heat of the sun. The borax collects on the surface of the mud and is easily scraped up. It has been tried by our blacksmiths and pronounced better than that usually sold. Mr. Worth intends working his mine himself.

## Amador.

**SUTTER CREEK.**—Amador *Ledger*, Nov. 6: A few men have been added to the force at the Mahoney mine. Charles Smith has taken charge of the mill, and has one or two men at work getting it in readiness to start up. I hope next week to be able to report that everything is running full blast. It is reported on good authority that the Hammack mine, this side of Amador City, has been bonded to a wealthy company, and that operations are expected to be started soon. The building of the additional 10 stamps at the South Spring Hill mill is making slow progress, on account of delay in the delivery of the material. The lumber has only just arrived on the ground. Work will be prosecuted energetically from now on. A large ore bin has been built in the rear of the mill. In another month the additional stamps will probably be in motion.

## Calaveras.

**ARASTRA.**—Mt. *Echo*, Nov. 3: Robert Leeper is constructing an arastra on Crystal creek in this town. Mr. Leeper intends saving the flow of tailings from the Ulica mill, and work them over by arastra process. Having heretofore engaged in this process and meeting with good results, he concluded to erect the arastra now in course of construction, further down the creek. Times are growing better, activity is observable in all branches of business, quartz mills are starting up, a feeling of confidence is springing up and the indications are that next year will be an active and prosperous one.

**TUNNEL.**—Prospect, Nov. 5: The proprietors of the Peasey mine have run a tunnel so as to tap the ore vein in their mine, 400 feet below the point of former development, and find the rock fully as good as they have yet produced. The Union mine expected to have their mill running in two weeks from to-morrow, the 20th.

## Colusa.

**THE AUGER FINDS GOLD.**—Colusa *Sun*, Nov. 6: The railroad company is having a well bored at the town of Sites, in Antelope valley, and it was down Thursday 145 feet, without a sufficient supply of water. It had been all the way pretty much through slate. On Thursday afternoon, a large piece of quartz was brought up, which showed, so the men said, quite rich in free gold. We saw the piece of quartz and what appeared to be gold, but it was after sundown and we could not tell so well as if it had been light. All hands who had seen it by a good light agreed that it was a very rich specimen. As there is but little water in the way, it would pay to sink a shaft 150 feet and drift on a rich quartz ledge. Gold is found almost everywhere in the Coast Range, from Sulphur creek on the south to Elk creek on the north. It will be struck rich there some day.

## Inyo.

**DARWIN MINES.**—Inyo *Independent*, Nov. 6: Mining business at Darwin is fairly active. The Dehance mine is looking better now than at any time for months past. Ore shipments are hindered by scarcity of teams to do hauling, but a good deal of it is being taken out and will be got to the railroad in a week or two. At Lookout, Mr. Frank Fitzgerald has got the Modoc mine in better condition than it ever was before. This was a hard mine to work, as the ore had all to be followed downward and handled several times. Quite recently a tunnel was completed that taps the ore body at a good depth below the former workings; now the mine is much easier to work, and what is of great importance, it is well aired so the miners can work comfortably. Mr. Fitzgerald recently opened a mine called the Minute Gun that also looks well and is yielding ore steadily.

**THE GOLD STAR.**—Mr. W. W. Stowe, of San Francisco, Major Gillis and Mr. John Paterson arrived at Independence recently. They have become interested in the Golden Star mine, near Independence station. During the past few months several lots of ore from the mine have been shipped away and milling tests made. All of these were very satisfactory, and it was the result of these tests that induced Mr. Stowe to come here. The ore is gold bearing, free milling; it is a soft brown quartz, very easily worked. It is expected that a Huntington mill will work about 50 tons of the ore per day, and one of these will be put up. From the mine down to Owens river the distance is not great and the grade very easy; this admits of putting the mill where there is abundance of water. Mr. Stowe and Major Gillis have gone back to San Francisco; Mr. Paterson remains to conduct the work at the mine,

and get ready for putting up the mill. Mr. Stowe has been operating at Calico during the past few years with much success. He does not speculate in mining stocks, but works mines for what is in them. All who know him must conclude that the Gold Star must be rather a good thing or Mr. Stowe would not touch it.

**THE MARBLE QUARRY.**—Mr. Israel Luce is getting along very well with his work at the marble quarry. The mill building is completed, with a dwelling, boarding-house and office attached. Nearly all the framing for the shafting is finished and the track from the quarry to the mill is in readiness for the cars. The engine and boiler are in place and ready for work. Every effort will be made to get the marble ready for market at as early a date as possible.

**PANAMINT.**—Mr. Fairman recently made a trip from Panamint to Carson on business connected with the new mill he is building. He arrived at Independence on Wednesday, on his way back from Carson, and left next morning for Panamint. He reports making satisfactory progress with the mill. Delay was caused by a washout of the road in the canyon east of Darwin; but this is now repaired and teams are hauling machinery, material and supplies as rapidly as possible.

**TWO SAN CARLOS MINES.**—Register, Nov. 4: Tom Shaw and Charley Hoole a short time since leased two silver-lead mines belonging to S. A. Densmore, located near old San Carlos, opposite Independence. On Monday of last week they commenced work, and now have about a carload (10 tons) of \$100-ore about ready for shipment, showing an average output of about 1500 pounds per day for the two men. One of these mines, the Confidence, shows full 24 inches of ore; the other, the Chalfant—named after a San Francisco Chalfant, not this Register man—is smaller but richer. The shaft on this ledge is down 90 feet, and the shipping ore from both mines is nearly solid galena and quite rich in silver.

## Mono.

**THE STANDARD CON.**—Bodie *Miner*, Nov. 8: Men employed in and about the mine: Engineers 2, pumpman 1, shiftboss 1, carpenter 1, blacksmith 1, miners 26, carmen 5, stationmen 3, timbermen 2, laborers 2; total, 44 employed. Ore stops and drifts looking very well. Ore shipped to mill, 296 tons. Mills running steadily on ore and tailings. Bullion shipment was made on Tuesday, 2d, of cleanup for October.

**THE BULWER CON.**—We shipped to the mill 350 tons of ore; average pulp assay, \$31.15. We shipped to San Francisco on the 1st instant \$16,520.88. There were employed 30 miners, 5 carmen, 1 timberman, 1 blacksmith, and 1 blacksmith helper at \$4 per day; 1 night foreman at \$5 per day; 1 foreman at \$6 per day.

**THE MONO.**—We are taking out good ore below the 700 level track. There were employed 2 miners at \$4 per day, and jointly with Bodie Con., 3 engineers and 2 firemen, 1 watchman, 1 blacksmith, 1 blacksmith's helper and 1 carman at \$4 per day, 3 carpenters and 1 foreman.

## Nevada.

**GOOD QUARTZ FROM THE BADGER.**—Grass Valley *Union*, Nov. 4: The ledge in the shaft of the Badger mine is now beginning to show finely in free gold and heavy sulphurets at the depth of 200 feet. The ledge is yet small, but the walls are four feet apart, and a strong vein is expected at a lower depth. Since the mine was started up by the new company the shaft has been sunk 90 feet. No other work is being done at present than to sink the shaft, but drifting will be done as soon as the ledge shows sufficient strength. From the appearance of the quartz now coming out there is every reason to believe that a rich pay chute is being opened upon. The hoisting and pumping at the Badger is done by water power, and all the operations are conducted very economically. When the old shaft was first pumped out a heavy flow of water was encountered, requiring the pumps to be driven at the rate of 15 strokes a minute, but at the present time only five strokes are necessary. The prospects of the Badger are now very flattering.

**THE NORTH STAR MILL.**—The work on the new North Star mill is making rapid progress. A large force is engaged, and the continued favorable weather is a great aid in expediting the work. It is confidently expected that the mill will be completed within the contract time, Dec. 25. The mill will not be surpassed by any in the State, as it will contain all the latest improvements.

**NOTES.**—The Coe mine is prospecting finely. A two-foot vein is showing in the drift being opened by Mansau & Co. In the North Star mine the ledge in the shaft at the depth of 1490 feet is four feet in size and shows well in free gold. This is an important development and very encouraging for the future of the mine, which is already giving large returns. The ledge in the Empire mine at the depth of 1600 feet shows a width of three feet, and the quartz is of fine quality.

**BAR OF PURE GOLD.**—Nevada *Transcript*, Nov. 4: J. J. Ott turned out a beautiful bar of gold at his assay office yesterday weighing over 100 ounces. It was very pure, assaying 940 fine. The reporter tried to find out from what claims the gold was taken, but Mr. Ott was "mum" on the subject, simply remarking, "there's plenty more where that came from."

**BOSS.**—North San Juan *Times*, Nov. 6: The Boss mine is doing well. The rock grows richer the deeper the mine is penetrated. The owners are jubilant over the prospects. The Boss company have recently covered their mine and shaft and are prepared for winter work. Success to the Boss mine, say we.

**MAYBERT ITEMS.**—Foothill *Tidings*, Nov. 6: A correspondent writing from Maybert, Washington township, this county, gives these items: A few days ago, M. Baugh, of Maybert, located a quartz claim on Canyon creek; a few days after the location he sold the claim to B. J. Watson for \$1000; in about 24 hours Mr. Watson disposed of the claim for \$1500. On Wednesday Mr. Baugh and his brother started on a trip to the Eastern States. J. D. Waters has returned to Maybert from San Francisco and will proceed immediately to the development of the Grafton mine.

**THE NORTH BLOOMFIELD.**—Nevada *Transcript*, Nov. 7: The question of how to work certain hy-

draulic mines without transgressing Judge Sawyer's illiberal anti-mining injunction appears to have been finally satisfactorily answered at the North Bloomfield Company's claim in this county. Some time ago it was announced in this paper that an apparatus had been constructed there for the purpose of working by the elevating process, which has already been described at length in these columns and which is generally understood by our readers. The first experiments made in this line were unsatisfactory, but numerous changes have been made until the best of results have been attained. The debris can now be readily raised to a height of 85 feet, which permits of its being deposited in the depressions caused by former workings, where it is securely impounded. Only the muddy water escapes into the river, and this carries so slight a solution of mud that it can do no essential harm. The company will not begin working regularly by the elevator process until the permission of the enjoining court to do so is obtained. It is believed there will be no difficulty in obtaining the privilege.

**HORSE SHOE.**—Grass Valley *Union*, Nov. 9: The Horse Shoe mine is looking well on the 200 level. The ledge is more regular than it was in the shaft, and nearly all the quartz taken out shows well in free gold. The strike of rich quartz in the Badger is drawing general attention to the mine. Some of the stockholders believe that it is the coming big mine of the district.

**THE COUNTY.**—Mining men have been visiting the county in greater numbers this season than for years previously, and all portions of the county have received their attention. It is gratifying to know that practical mining men have a high opinion of the mineral resources of the county, and these visits promise to be productive of good in turning the attention of mining investors to the county.

**THE QUARTZ REGION OF EUREKA TOWNSHIP** is beginning to receive attention. The quartz lodes of that section are numerous, and as a rule, wide. The ores are of low grade, but there is an opportunity of obtaining cheap water power from the canals.

## San Diego.

**GOLD FIND.**—Cor. San Diego *Sun*, Nov. 5: Considerable excitement has been created hereabouts, of late, by the discovery of a fine 12-inch vein of gold-bearing quartz, near the old gold mines about two miles from town, the facts of which have not before been given to the papers. One assay last week showed one dollar in gold to one pound of rock. Scarcely a piece of rock can be taken from the ledge in which free gold is not visible to the naked eye. A shaft has been sunk 20 feet upon the vein and it shows the vein widening. Work is still progressing, and it is reported that arrangements are being made to push it and open up the mine, also to put in a 10-stamp mill soon. This ledge is upon the Escondido ranch.

## San Bernardino.

**PROVIDENCE MINES.**—Calico *Print*, Nov. 2: The Bonanza King mine is still shut down. Kerr & Patton's mines have changed hands and the Messrs. Bahtens, of your place, are in charge. They have already commenced grading for a five-stamp mill, Mr. G. Bahten being in charge. It is expected that this new company will be running their mill by Christmas. A new find on the west side of Providence, with the singular name of Grey Hound, is looking exceedingly well, the owners having already about 50 tons of ore out, and they claim to have 1000 tons in sight. The ore is similar in character to the Bonanza King and is likely to prove another bonanza. The Arrow Gold camp which has been idle during the heated season is likely to soon make itself heard from again.

**MESCAL MINING CAMP.**—Your occasional correspondent has visited the Mescal mining camp twice lately, and was gratified to see the substantial improvements made. Mescal mining camp is about nine miles south of Ivanpah and about 49 miles north of Providence. The place is supplied from Fenner station on the A. & P. R. R., with freight, being about 70 miles.

**THE CAMBRIA MILL AND MINING CO.**—This is a Los Angeles corporation of a few shrewd business men, who bonded the Cambria group of mines owned by Sim A. Barrett and W. A. McFarlane. The owners with much pluck and grit opened up their mine under many difficulties, but were rewarded by the showing up of one of the finest mines in Southern California. The L. A. Company have appointed L. W. Carr their superintendent, and Mr. Barrett was prevailed upon to remain in charge of opening up the mine, which he has done with apparent success. There are now on the dumps some 500 tons of ore, with a very large area of virgin stopping ground, the stopes that they are now working showing over five feet of splendid ore.

**THE NEW FIVE-STAMP MILL.**—This mill is about completed with all its surroundings. The mill was built by the Baker foundry in Los Angeles and is the first mill erected by them. By the time this is in print, the stamps will likely have commenced to pulverize, and in a very short time another white metal mill will be producing bullion. Everything about the mine and mill is put up in a substantial manner, showing it has come to stay. There is at least two years' run of ore in sight in the mine. Mr. W. A. McFarlane is to be in charge of the mill.

**ORO GRANDE.**—San Bernardino *Courier*, Nov. 6: Mr. H. L. Atwood, of Oro Grande, favored us with a call yesterday. Mr. Atwood is the owner of several valuable mines in the Oro Grande country; among others the Vermont, a gold-bearing quartz ledge which gives indications of great richness. He brought quite a quantity of the rock to town, which experts, among others Mr. Brunn, pronounce extremely rich. Mr. Atwood will work the mine "to a finish" from this day onward. We trust he will meet with the reward his intelligent enterprise deserves, for he is a sterling man, an anti-monopoly Democrat of the first water, and as we know from his experience, one of the best of neighbors.

**HOLCOMB VALLEY.**—San Bernardino *Index*, Nov. 5: John Broadwater, who has been polishing a drill and igniting the fuse at the Zaragoza mine in Holcomb Valley for C. L. Metzgar, arrived in the city yesterday. Mr. Broadwater brings the information that the Zaragoza, Dandy, and Maxwell mines, the property of the Metzgar brothers, are developing far beyond the most sanguine expectations of the owners. Leading from a small vein of ordinary ore, the Zaragoza has developed into a veritable bonanza, and its success will go far to encourage legiti-

mate mining in Holcomb valley. The Dandy and Maxwell are good properties and will make a stir in mining circles when further developed. Mr. Broadwater says there will be more men employed in and about Holcomb valley, in the mine, this winter, than for many years past. Prospecting is being done in the whole country round about, and a large number of men are at work. The Sam Baird property will, no doubt, fall into the hands of a moneyed company, and give employment to a large number of miners. Mr. Godfrey, superintendent of the Green lead mine, has commenced operations in earnest, and now has 14 miners under him. The Cox mine is being worked and good results will most undoubtedly follow.

## Plumas.

**THE GLAZIER MINE.**—Greenville *Bulletin*, Nov. 2: From Mr. J. D. Baker, who came over from Big Flat, Sunday, we learn that the lower tunnel in the Glazier mine is in 375 feet. At the end of the tunnel an "upraise" was made to gravel. Only a few carloads of gravel have been removed from the "breast" of the drift. This was washed, and it yielded \$5 to the car. The gold is of the same character as that obtained from the old works further up the channel. The lower tunnel will be continued forward, and made to tap the bed of gravel. This tunnel will ultimately connect with the old works. The company have completed over 2000 feet of flume to supply water for washing gravel and for running a "blower" to furnish air in the mine. It will be about a month before "breasting" will begin. Mr. Baker thinks the mine will be richer in the lower works than it was in the upper. He informs us that considerable money is being taken out in that section of the country. Word comes from the North Fork country that the Sunny Side mine is paying big. We are glad to hear this, and hope the miners will continue to find lots of the "filthy lucre."

## Shasta.

**MILL.**—Shasta *Democrat*, Nov. 3: Paul's new 12-stamp mill, in Old Diggings district, is under way of construction. Jack Conant cleaned up, from the Uncle Sam, 75 ounces of gold bullion last week. Small reduction works are to be erected at Lower Springs, by Messrs. Skinner & Atkins. The machinery for Rely & Matthews' 10-stamp mill, to be erected on their Squaw Creek mine, was shipped from San Francisco last week. A 10-stamp quartz mill will be erected on the Muchmore mine at Lower Springs, as soon as possible. All the machinery has been ordered. Bill O'Neal, an old miner who has lived near Centerville for the past quarter of a century, died last Thursday, of hemorrhage of the lungs. Last week, Tom Greene came down with a big gold brick. Tom says his five stamps will be increased to ten right away, and has ordered the machinery.

## Sierra.

**PROMISING.**—Sierra *Tribune*, Nov. 5: That the mining district in and about Sierra City is the most promising in the State is a fact conceded by all mining men. No district can be found where the mines give better promise of permanency and richness than here. The Calico mine is about to be incorporated. The prospects at this mine are said to be excellent. It is stated that a six-foot ledge has been discovered at the Cleveland, the rock from which will mill \$6 to \$8 per ton. Only 30 stamps have been running at the Young America for the past two weeks, because of the lack of water.

## NEVADA.

## Washoe District.

**CON. CALIFORNIA AND VIRGINIA.**—On the 1300 level the north drift from the station in the Con. Virginia shaft has been advanced about 60 feet; total length, about 186 feet. On the 1435 level the drift running south from the north end of the mine has been advanced 55 feet; total length, 266 feet. On the 1500 level the drift running north from the Con. Virginia shaft was advanced 24 feet; total length, 266 feet. The drift running south from the Con. Virginia shaft is out 280 feet from the shaft station. On the 1300 and 1400 levels in California ground, good milling ore is still being extracted from both levels. During the past week about 2500 tons of ore were shipped to the Morgan and Eureka mills on the Carson river. The average value of the ore milled during the week, according to the assays from the batteries, was about \$39 per ton. During the week bullion to the value of about \$90,000 was shipped below through Wells, Fargo & Co.'s express.

**UNION CON.**—On the 700 level west crosscut No. 1 has been advanced 30 feet; total length, about 232 feet. The joint Mexican and Union west crosscut, at the south line, was extended 29 feet; total length, 269 feet. On the 1300 level the joint Mexican and Union drift, started north from the station in the Ophir shaft, is out about 50 feet.

**BEST AND BELCHER.**—The northwest drift has been advanced, making the total length about 500 feet. On the 800 level a north lateral drift has been started. The 600 level is being repaired and retimbered, and they are working east. The work during the week has been divided between the east and the northeast drifts.

**CHOLLAR.**—The set of boilers taken from the Combination shaft has been set in place at the old Chollar shaft, and the work of timbering the shaft still continues. It is the intention of the management to repair the shaft down to about the 1000 level, and to prospect between that point and the 350 level above.

**ALPHA.**—Operations will be resumed from the 300 to 900 levels through the old shaft as soon as the work of retimbering is completed, which will take some time, as the shaft is very much out of repair. From this shaft the Exchequer will also be prospected instead of through the Imperial shaft as heretofore.

**ALTA.**—No new developments have occurred since last week's report. The upraise from the 700 level is still passing through quartz giving low assays. The north and south lateral drifts are still running along the hanging wall of the Keystone vein.

**SAVAGE.**—The south drifts on the 600 and 825 levels are being pushed rapidly forward to connect with the Savage shaft in order to increase the air supply.

**GOULD AND CURRY.**—The work of retimbering



he main west drift on the 425 level in the Bonner shaft is almost completed. The south drift from the main west drift has been cleaned out and retimbered a distance of about 100 feet.

**HALE AND NORCROSS.**—The old hoisting works on F street are still undergoing repairs preparatory to the resumption of active operations, between the bottom of the shaft, which is down to the 1300 level and to the 500 level.

**OCCIDENTAL.**—Ore to the extent of about 10 tons has been extracted from the upper tunnel. The upraise has been advanced about 54 feet from the lower tunnel, and is still in quartz giving low assays.

**SIERRA NEVADA.**—On the 520 level west crosscut No. 5 from the north lateral drift has been advanced 30 feet; total length, 118 feet. The face is in quartz formation.

**UTAH.**—*Enterprise*, Nov. 6: The main west drift started from the station in the shaft on the 472 level has been advanced 59 feet; total length, 260 feet.

**MEXICAN.**—The operations here are confined to extending the joint Union Con. crosscut and the joint Union north drift on the 1300 level.

**CROWN POINT AND BELCHER.**—The ore shipments from the upper levels will average about 210 tons per week.

**OSBISTON SHAFT.**—The 2400 level is now flooded with water, and all work in the shaft stopped.

**OPHIR.**—On the 1200 level the station has been completed, and drifting will soon commence.

**YELLOW JACKET.**—About 150 tons of ore per day are daily shipped from this mine.

**KENTUCK.**—The ore shipments during the past week average 42 tons per day.

#### Barbee District.

**THE GOLDEN JACKET MINE.**—*Silver State*, Nov. 3: The Golden Jacket Mining Co. have a force of men prospecting their mine in Barbee District in the Humboldt Range, about four miles from Humboldt house. Reports from the mine are to the effect that the prospects are very encouraging, and the indications for a valuable mine are very favorable. The owners are mostly San Francisco men, though L. A. Blakeslee and other residents of the county have large interests in it.

#### Cherry Creek District.

**EXCHEQUE.**—*White Pine News*, Oct. 30: The Exchequer mill has been shut down for a few days for repairs, but it is in full blast again, with plenty of good ore on the dump. The company to-day shipped four nice bars of bullion to San Francisco.

#### Columbus District.

**CANDELARIA WATER-WORKS AND MILLING.**—*True Fissure*, Nov. 6: The mill has been shut down for a couple of weeks to make necessary repairs and improvements. It will resume operations on the morning of the 15th. The building for the hoisting works at the Georgene mine has been completed and the men are now waiting for the machinery, which was shipped from San Francisco yesterday. About 15 men were added to the mining force last evening under Dick Creer as shift-boss. A great deal of ore is being taken from the tunnels. The work of sinking the shaft will begin as soon as the machinery can be put in place.

**OVERLAND AND MIKADO.**—A trial lot of ore will be shipped to Fleming's mill at Columbus, for reduction. These are very promising properties, and with the aid of capital to develop them properly, could soon be put on a paying basis. The ledges are well defined and wherever opened up the ore has given good assays.

**GOLD MOUNTAIN.**—A great deal of work is still being done in this district and considerable bullion is being shipped from the different mines.

**MOUNT DIABLO.**—The company is still figuring on its mill and pipe line at Soda Springs, and work is expected to begin before long.

**HOLMES.**—It is rumored that if silver will keep up its rising tendency this mine will still resume full operations.

#### Eureka District.

**ORE SHIPMENTS.**—*Eureka Sentinel*, Nov. 5: During the past week ore shipments were made from the mines of the district to the two reduction works in town, as follows: To the Richmond works—Silver Lick mine, 19 tons; Members, 7; White Pine, 10; Antonazzi, 15; Dead Broke, 15; Grant, 2½; Phoenix, 21; Geddes and Bertrand, 2½; Williamsburg, 13; Bullwhacker, 8. To the Eureka Con. works—Altoona mine, 46 tons; Pittsburg, 1; Geddes and Bertrand, 15½; Oriental and Belmont, 6½; Woodchopper, 4½.

#### Jackrabbit District.

**ONONDAGA.**—*Pioche Record*, Nov. 1: Six tons of ore were shipped on Monday from the Onondaga mine, making the last of a carload. This mine is getting in condition to work to advantage, and hereafter is expected to yield big returns to the stockholders. When the mine starts paying dividends, they will be of such a character as will prove a blessing to the hungry owners. All who have visited the mine speak highly of it.

#### Philadelphia District.

**ORE BUT NO MONEY.**—*Belmont Courier*, Nov. 1: A revival of mining is what is wanted in Philadelphia District. The ore is there but the money necessary to open the mines properly so that it may be profitably extracted is unobtainable while the silver market remains so depressed. Free and unlimited coinage of silver would put new life into every industry of the United States and make Nevada the wealthiest State in the Union. Nye county is rich in mineral, of almost every known variety, which will for many years pass by make it one of the most prosperous and populous counties in Nevada. The people of Nye have unlimited faith in its future.

#### Sprucemont District.

**SHUT DOWN.**—*Elko Free Press*, Nov. 5: The smelter is shut down for two or three days, for slight repairs. It has been turning out bullion very fast for some three weeks. The present furnace manager, Mr. Gordon, is thoroughly posted in the art of running a smelter, consequently it is working better than ever.

#### Tuscarora District.

**BELLE ISLE.**—*Times-Review*, Nov. 5: Join Belle Isle and Navajo crosscut has been advanced

18 feet. A joint crosscut has been started east on the same level.

**NAVAJO.**—No. 1 winze, east vein, 350-foot level, has reached a depth of 55 feet, and a drift has been started north to determine the length of the ore chute. No. 2 winze on the east lateral vein, same level, has been sunk eight feet and shows some improvement. Drift north from east crosscut 150-foot level has been advanced 12 feet, and shows a good width of vein and a low-grade milling ore. Drift south on west vein, same level, has been extended 12 feet.

**NEVADA QUEEN.**—North gangway, 150-foot level, has been extended during the past week 20 feet; total, 42 feet. Formation has seams of quartz showing mineral, with a light seepage of water. Expect to be in far enough to start crosscut to cut the east or North Belle Isle vein in a week or ten days. Drift from No. 2 shaft has been started and driven four feet. This drift was run partly in the footwall, only the top exposing 12 to 14 inches of the vein. Have turned so that a few feet more will be entirely in the vein. Have two feet of fine ore in top of drift. Cannot tell how much more until the drift is further into the vein. In drifts from No. 1 shaft, with the exception of timbering, no work has been done since stopping on account of water. Will start drifting on ore toward our south line as soon as hoisting works are ready, which will be on the 8th or 9th inst., as the house will be all inclosed to-day. Engine, boiler and reels all in place; connections, etc., will all be finished by Monday. Will start sinking to connect with 150-foot level immediately after we get running.

**NORTH BELLE ISLE.**—Main gangway drift north on the 300-foot level has been driven 40 feet since last report; total length, 193 feet. Small seams were crossed by the drift the past week, from which good assays were obtained. This can be considered as certain evidence of the vein being well mineralized on this level. The formation is of the character most desired. Good progress has been made with all the work on the 150-foot level. The greatest improvement to note the past week has been in No. 2 winze. The ore that is being followed down continues strong and of a high grade. Shots in the footwall side of the winze disclose a mass of ore to the east of unworked richness. Several feet is exposed but not its full width. At the depth of 100 feet a crosscut will be extended to the footwall, to determine the width of the ore in this portion of the vein. No. 1 winze has been sunk to the depth of 65 feet and continues in good ore. The necessary preparation for future workings in and about the mine is being forwarded as rapidly as possible. Certain improvements to be made on the mill for handling this grade of ore will be commenced tomorrow and finished as soon as possible.

#### Tybo District.

**A REVIVAL EXPECTED.**—*Belmont Courier*, Nov. 1: The people of Tybo feel confident that a revival of mining in that section is not far distant, and they look for livelier times than were ever experienced in the palmist days of that famous and once lively camp. We hope that their fondest expectations of Tybo's future greatness will be realized.

#### White Pine District.

**BULLION SHIPMENT.**—*White Pine News*, Oct. 30: The Eberhardt-Monitor Mining Company shipped this week through Wells, Fargo & Co.'s Express, two bars of bullion, valued at \$1500.

#### ARIZONA.

**ORE.**—*Prescott Courier*, Nov. 3: W. A. Rowe is prepared to ship a carload or more of rich ore from the Davis mine, Hassayampa district. It will go to Argo, Colorado. Col. Bigelow, of same district, is waiting, patiently, for a home smelter, or the advent of the railroad, so that he can operate his mines with profit. Frank Kuhne has brought to Bones' ore-rooms several hundred pounds of good-looking ore from his Zalida mine, seven miles east of Prescott. John Hutchins, a well-known prospector and miner, returned, recently, from Silver Mountain district, with rich-looking ore from the claims of Wm. N. Kelly and T. S. Bullock, on the Mammoth mine, which is the biggest mine ever seen by the writer. Now that the election is over, the *Courier* would like to see all people put their shoulders to the wheel and turn her for active mining and reduction works, or even a sampler, so that owners of ores can turn them into money. There are upon the dumps of mines near Prescott nearly, if not quite, a million dollars. We need this amount and all, regardless of everything, should unite in one grand effort to realize upon our ores. Let us have a grand meeting and see if something cannot be done to make the mines respond to the wants of our people.

**OLIVE CAMP.**—*Tombstone Democrat*, Nov. 5: Olive camp, 22 miles south of Tucson, not only keeps up its reputation as one of the best chloriding camps in the Territory, but it is rapidly going to the front as one of the most prosperous permanent camps. The mines are improving with depth and the ore grows richer, and every indication and development is full of encouragement.

**GLOBE.**—*Silver Belt*, Nov. 6: The appearance of silver as coatings and flakes on copper ore continues in the fifth level of the Globe mine, and forms a separate strata between other stratas of ore, indicating the presence of silver ore near by. It is thought probable that an argentiferous vein will soon be discovered, which, in that case, will greatly add to the value of the mine. We are also informed that the owners of the Globe, realizing the importance of cheapening the rate of freights, have signified their intention to materially assist in the construction of the narrow gauge road from Tucson, provided that assurance is given that it will be built to Globe. The owners of the Globe mine have purchased the Interloper, which adjoins the Globe property on its southeast side.

#### COLORADO.

**DETROIT AND WARSAW.**—*Georgetown Courier*, Nov. 5: J. King is industriously pushing a crosscut to develop the property.

**FREELAND.**—A contract to do 1000 feet of drifting has been let.

**BLUE RIDGE.**—Five men are employed in drifting on this vein and the East St. Louis, a cross vein.

**OHIO.**—An engine and hoisting plant are being

put in and other preparations being made to actively work the property.

**COMMONWEALTH.**—Disbrow & Co. are hoisting water from the old shaft preparatory to working it. Stanhope & Campbell are crosscutting for the vein.

**ANTELOPE.**—The mine shows a nice body of ore. A recent mill-run of nine tons from a 10-inch vein of solid ore returned 121 ozs. silver per ton and 55 per cent lead.

**HORSTMAN.**—Work had to be suspended a few weeks ago on account of bad air, since which air pipes and a furnace have been put in and work resumed at drifting on the lode and extending the tunnel.

**SEVENTY DOLLARS A DAY.**—Timmons & Co. had a mill-run from their lease on the Seven-thirty last Saturday, of 9½ tons of ore, worth over \$3000. It was the result of the work of two men for 21 days.

**LUCKY STAR.**—Mr. Evans has opened up eight inches of solid galena in this recent discovery. The property is on one of the precipitous slopes of Irwin's peak. It was surveyed for location by Mr. Frank Maxwell last week, and in doing the work he had to use a rope to guide himself over the precipices. The west end of the claim is 1000 feet higher than the east, and much of the ground is at an angle of over 40 degrees.

#### IDAHO.

**PROSPECTORS.**—*Boise Statesman*, Nov. 2: A good many prospectors have been in the hills north of the city during the past month prospecting for ledges. Several promising locations have been made, but none of them have been developed enough to determine the extent or value of the ledges. The prospectors have all come down to Warrens from the Alton mining district, in Idaho county, snow having become so deep as to preclude a further stay. It is thought that considerable prospecting and development will be made there during next season. It is probable that the Idahoan mine will declare only one more dividend this year, to complete \$100,000 during the season of 1886. The profits of the mine for the next three or four months will be used in development work. Next season, commencing with early spring, more ore than ever will be taken out and bigger dividends declared. A great deal of development work will be done in Sheep Mountain District and adjoining territory next year. The Dailey boys, John Lemp, George Baldwin and others all have good prospects in that district which they propose to develop next year.

**THE SMOKEY MINES.**—*Wood River Times*, Nov. 3: From miners just in from Smoky, the *Times* learns that nearly all the producing mines there have about closed down for the winter. The Carrie Leonard, which formerly employed nearly 100 men, inside and out, now employs but five, besides two leasers. At the Galore-Stormy group everything is shut down, and the tools and provisions locked up. The King of the West is still working, but it is not believed that this mine will attempt to ship ore this winter, as if it did it would be to the expense of keeping the road open without any assistance from the other mines. Smoky district may therefore be considered shut down until next March or April.

**THREE-FOOT BODY OF ORE.**—*Bellevue Herald*, Nov. 3: To report a strike in the Minnie Moore mine would seem like duplicating an item about every week, but the latest discovery in the bonanza is on the 500 west, where a body of ore was encountered the other day that is a continuation of the immense body of rich galena found above. This new strike is of about two feet of first-class galena, and one foot of splendid jiggling ore. Being in a vicinity where no ore had been found before, it is indeed encouraging, although it was looked for, and work has been pushed to uncover it.

#### NEW MEXICO.

**THE GOLD CAMP.**—*Cor. Denver Tribune-Republican*, Nov. 5: The hebra now coming in here from the more northern Territories bids fair to populate this mining region to an extent hitherto unknown, and while the boom may not reach the proportions of a Black Hills excitement there are many who believe there will be more stability and staying qualities connected with it. The gold placers at San Pedro are undoubtedly the richest now known in America, at least they are so pronounced by experts and prospectors recently arrived—while silver abounds, and the richest copper mine in New Mexico is here; still this is emphatically a gold region, and that metal occupies a position of overshadowing importance and occupies first place in the hearts of our resident countrymen. The attention of capitalists at the Eastern financial centers has already been called to the gold fields of New Mexico, and the profits that await the investment of brains and machinery in this favored region. Many of the conditions for permanent and successful mining enterprises are found here, and may be summarized as consisting of a climate that allows continuous operations throughout the entire year, proximity to a transcontinental route, the Atchison, Topeka & Santa Fe Railroad passing within 16 miles of Golden, and connected therewith by a good mountain road, making the transportation of machinery and supplies an ordinary matter. Board and the necessities of life are at cheaper prices than is generally the case in mining regions; these things, together with the inducements offered by the rich mineral wealth locked up in these hills, will induce an investment of capital here that will effect astonishing changes in the development of this region.

**SOCORRO'S BULLION PRODUCT.**—*Socorro Bullion*, Nov. 6: The Billing Works of this city produced during the past month of October 525 tons of high-grade bullion. The Graphic smelter of this city produced during the same period 222 tons of high-grade bullion. Total production of bullion in this city during the month of October amounts to 747 tons as against 617½ tons produced in the preceding month, a gain of 129½ tons.

**SMEILER.**—The Graphic smelter will soon blow in their new stack No. 3. This will very materially augment the bullion product of Socorro. Prospector Kelly was in the city Wednesday. He is having some ore sampled at the Graphic smelter from his Bonanza discovery on the summit of the Magdalenas. The ore consists of argentiferous gray copper, and this claim enjoys the distinction of being situated at the greatest altitude of any ore-pro-

ducing property in southern New Mexico, being close on 10,000 feet.

#### OREGON.

**PROSPECTING.**—*Jacksonville Times*, Nov. 5: Considerable prospecting is still going on in southern Oregon. Most of the miners of southern Oregon are now ready for the winter's run. It is not likely that work will be resumed at the Blue Gravel mines on Galice creek this season. A great deal of placer mining will be carried on during the coming season, if it is at all favorable. It seems as if the cold snap will this time precede the rains that the miners are so anxiously looking for. Illinois river has raised enough to enable Wimer & Sons to resume pining at their hydraulic mines near Waldo. Brown Bros. have again rented Wm. Bybee's placer mines on Rogue river and are engaged in rigging them up. Work is still progressing on the tunnels which will tap Green Bros.' ledge on Galice creek, and it will be two months before it is completed. There is every probability that good results will ensue. Brown & Co.'s mill in Rock Point precinct, on the site of the Swinden ledge, which has lately been enlarged and improved, was started this week and is said to work well. The crushing of a large amount of excellent quartz is next in order. E. S. Smith & Co. have commenced running a tunnel to tap their quartz mine on Grave creek, which will probably be 500 feet in length. The ledge is already defined and the ore of a promising character. It is believed that it will prove both extensive and remunerative.

**ROGUE RIVER.**—*Cor. Roseburg Plaindealer*, Nov. 5: As yet this country is comparatively new to the outside world with regard to its mineral wealth, as but very little prospecting has been done outside of the bars that have been formed along the banks of the streams and rivers that contain more or less gold. All of the streams have cut their way down through the mountain sides so that in many places it is impossible to get through the deep canyons with any convenience, being filled with rock and large boulders that have rushed down from above and settled themselves in their rocky bed, here to remain as a barrier between the poor prospector and that which men call gold. Judging from the amount of gold found in all streams and bars along Rogue river, there must undoubtedly be some very rich gold veins found, for there is no disputing this fact in all mining countries where even rich placer diggings are found, there has been found also rich gold veins sooner or later, and I think there is no better country for prospecting to-day than there is from the mouth of Rogue river up for 100 miles or more, and this whole country is interlaced with a perfect network of veins, not only gold, but silver, copper, lead, iron, antimony, nickel, tin, bar and coal, and where nature has bestowed such an abundance of her wealth of this sort for the benefit of mankind, with one of the finest climates there is on this continent. When this portion of southern Oregon which includes the Umpqua valley becomes known to the outside world it must become one of the richest and most prosperous portions of the United States.

#### UTAH.

**REVIEW.**—*Salt Lake Tribune*, Nov. 5: For the 10 months of the current year the receipts of bullion in this city (excluding all ore receipts) have been as follows: January, \$328,852.66; February, \$456,024.03; March, \$469,722.63; April, \$519,666.08; May, \$387,891.49; June, \$527,036.97; July, \$585,644.38; August, \$480,141.49; September, \$491,129.32; October, \$377,104.59; total, \$4,623,262.64. The product of the Ontario for the month of October was 63,935.92 ounces of fine bullion, and \$46,356.34 from sales of ore; an approximate value for the month of \$110,292.26. Added to the previous nine months' output of \$1,273,964.11, the output to October 31st inclusive, for 1886, is \$1,384,256.37. Out of this 10 regular monthly dividends of \$75,000 each have been paid, a total in dividends of \$750,000 for the 10 months of this year. The daily output for October was 50,851.17 fine ounces, and ore sales to the value of \$8309.78; an approximate valuation for the month of \$59,160.95; which added to the nine months' product of \$556,897.65, gives a valuation for the 10 months of 1886 of \$616,058.60. For the week ending November 3d, inclusive, the receipts of this city were valued at \$119,409.05, of which \$65,973.41 was bullion and \$53,435.65 was ore, being especially light in bullion. The previous week the receipts were \$130,041.90, of which \$83,621.21 was bullion and \$46,420.69 was ore. The output of the Ontario for the week was 18,800 fine ounces and four lots of ore sold, amounting in the aggregate to \$30,322.45; an approximate product for the week of \$49,122.45. The product of the Daly for the same week was 7220.77 fine ounces; no ore sales. Base bullion receipts for the week amounted to \$11,600; fine bars, \$38,007.41. The Hanauer smelter produced during the week \$16,276 in bullion. Ore receipts in this city during the week were \$15,027 by Wells, Fargo & Co.; \$26,215 by McCormick & Co., including \$3212 from the Queen of the Hills; and \$11,296.64 by T. R. Jones & Co.

**PARK NOTES.**—*Record*, Nov. 6: Early this week an 18-inch body of fine-looking lead and silver bearing ore was encountered in the face of the north drift of the Apex lower tunnel. This news caused quite a boom in the stock at Salt Lake. The stock jumped from 7 cents a share to 20 and is still on the advance. The strike has been expected for some time, and now that the ore body has been uncovered, it will be developed with all activity. No assays have been made on the new find yet, but the opinion of several experts who have seen the samples pronounce it good, rich stuff that will pay to ship. Supt. Chas. Read returned to Salt Lake yesterday with a lot of the ore, and from him it was learned that the usual force of miners would likely be kept at work all winter.

**THE ANCHOR STARTS UP.**—After about three months' inactivity, work on the Anchor was resumed Thursday morning. The new boilers have been put in position and steamed up, and timbers and other necessities got in readiness. The water in the shaft is up to within 100 feet of the surface, and with active work it will not be later than the new year before the 400 or 500 feet of water is pumped out and got under control. Thirty men constitute the force at the mine. Before the lapse of another year we would not be surprised to hear that the Anchor company had a mine—a good big one.





SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

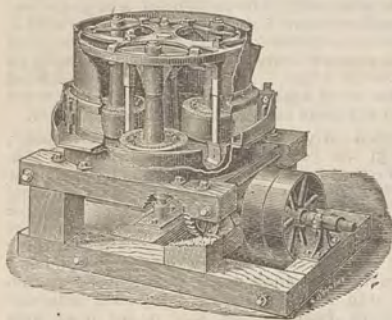
BEST SOFT LAKE SUPERIOR COPPER USED.

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 &amp; 655 Mission St., San Francisco.

E. G. DENNISTON, Proprietor.

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.  
 NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



Centrifugal Roller Quartz Mill.

### F. A. HUNTINGTON,

MANUFACTURER OF

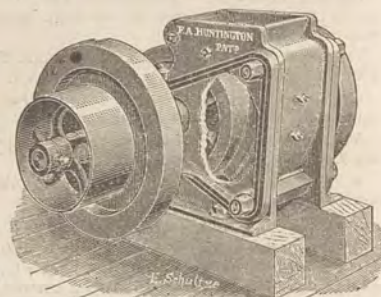
## Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,

Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

## THE RISDON IRON AND LOCOMOTIVE WORKS.

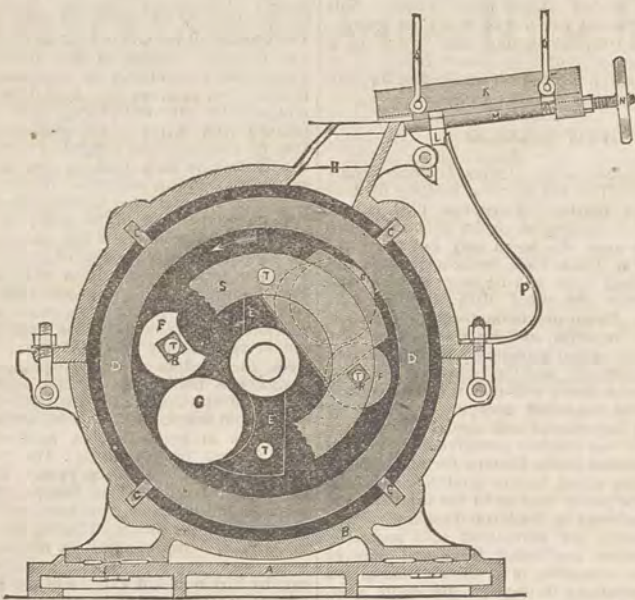
Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

### BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
 AIR COMPRESSORS—Rope Power Transmission.  
 HYDRAULIC PUMPING and Hoisting Machinery.  
 WROUGHT-IRON WATER PIPE a Specialty. *NOTE*—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.  
 SAW-MILL MACHINERY of all kinds.  
 STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
 SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.  
 MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.  
 WILSON'S PATENT GAS-PRODUCER.  
 STEAM BOILERS of all descriptions.  
 SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.  
 STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.  
 Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.  
 Send for Circular and Price Lists.

## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied.  
 At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.  
 All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.  
 Certificates as to performance of the Mills, and any information required, furnished on application.

### THE FRISBEE-LUCOP MILL CO.,

Office, 104 & 106 Washington St., NEW YORK.  
 OR PACIFIC IRON WORKS, SAN FRANCISCO.

## H. P. GREGORY & CO.

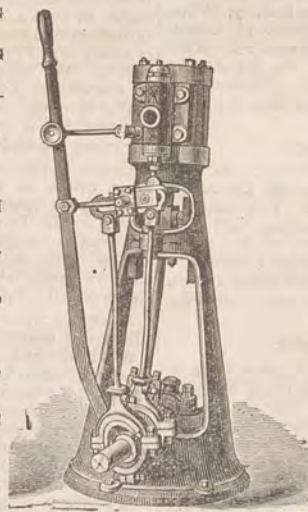
Nos. 2 and 4 California St., - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

## MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING MACHINERY.  
 FRANK & CO.'S WOODWORKING MACHINERY.  
 NEW HAVEN MANUF'G CO.'S MACHINISTS' TOOLS.  
 BEMENT & SON'S MACHINISTS' TOOLS.  
 BICKFORD'S POWER DRILLS.  
 BLAKE'S IMPROVED STEAM PUMPS.  
 WEBBER CENTRIFUGAL PUMPS.  
 PERIN BAND SAW BLADES.  
 STURTEVANT BLOWERS AND EXHAUSTS.  
 SHIMER MATCHER HEADS.  
 BRAINARD MILLING MACHINES.  
 TURBINE WATER WHEELS.  
 BRADLEY CUSHIONED HAMMERS.  
 MASSEY'S STEAM HAMMERS.  
 SCHLENKER'S BOLT CUTTERS.  
 HOLLOWAY FIRE EXTINGUISHERS.



WILLIAMSON BROS' HOISTING ENGINES.  
 ATLAS ENGINE WORKS ENGINES AND BOILERS.  
 PAYNE'S VERTICAL AND HORIZONTAL ENGINES.  
 OTTO SILENT GAS ENGINES.  
 EMPIRE LAUNDRY MACHINERY.  
 PICKERING ENGINE GOVERNORS.  
 JUDSON ENGINE GOVERNORS.  
 TANITE CO.'S EMERY WHEELS AND MACHINERY.  
 NATHAN AND DREYFUS OILERS.  
 KORTING INJECTORS AND EJECTORS.  
 DISSTON'S CIRCULAR SAWS.  
 NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.  
 LANE AND BODLEY SAW MILLS.  
 H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

YACHT ENGINES.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival. Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

Huntington Centrifugal

QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,

JIGS and TROMMELS.

**MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.**

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

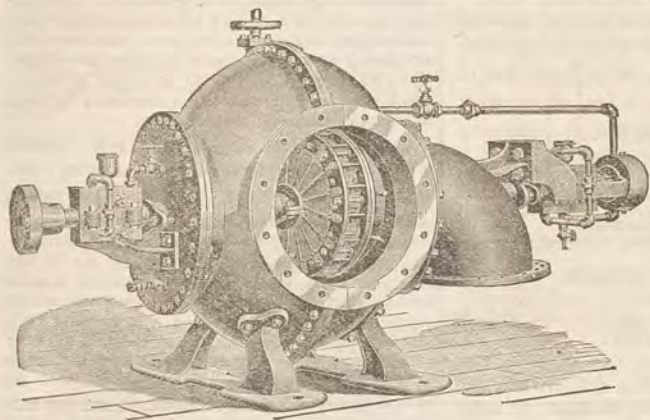
NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

UTAH OFFICE—SALT LAKE CITY, UTAH.

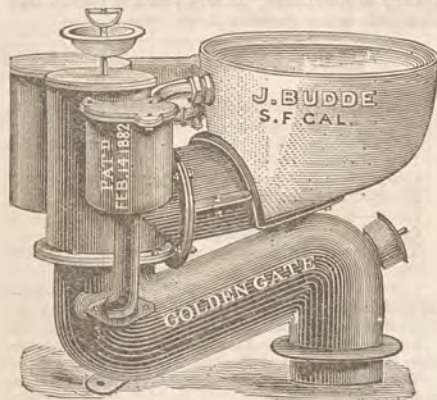
## JAMES LEFFEL'S Mining Turbine Water Wheel.



These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing. Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case. Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

**JAMES LEFFEL & CO.,**  
Springfield, Ohio, or 110 Liberty St., New York.  
FRASER & CHALMERS, General Agents,  
Chicago, Ill., and Denver, Col.  
PARKE & LACY, General Agents, San Francisco, Cal.

### THE GOLDEN GATE PLUG CLOSET.



The only secure-locking device to keep sewer gas entirely away from dwelling houses.

JOSEPH BUDDE, Manufacturer, 43 Fremont Street,  
All kinds of Water Closets, Slop and Waste Hoppers  
Always on hand. Write for information

### American Exchange Hotel,

SANSOME STREET,  
Opposite Wells, Fargo & Co.'s Express, one door from  
Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50  
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

### COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published relating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

### AUGUST LUTZ, METAL SPINNER,

10 Stevenson St., 3d floor, S. F.

The only custom work spinner in the city. Personal attention given to all work. Orders respectfully solicited.

### THE CONSUMERS' COMPANY.

## VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**

218 California Street, San Francisco, Cal.



## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

**GIANT POWDER or DYNAMITE,**

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

**JUDSON POWDER IMPROVED.**

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

**BANDMANN, NIELSEN & CO.,**

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

## THOMAS PRICE'S ASSAY OFFICE,

CHEMICAL LABORATORY,

**BULLION ROOMS and ORE FLOORS,**

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

## Metallurgy and Ores.

### SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY  
And Assay Office.**

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

**Standard Shot-Gun Cartridges,**  
Under Chamberlin Patent.

### Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED 1869.

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of

Mines; Plans and Reports furnished.

**C. A. LUCKHARDT & CO.,**

(Formerly Huhn & Luckhardt, )

Mining Engineers and Metallurgists.

J. KUSTEL.

H. KUSTEL.

### METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my

Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical Instruction given Treating Ores by improved processes.

**G. KUSTEL & CO.,**

Mining Engineers and Metallurgists.

### C. H. AARON,

**ASSAYER AND METALLURGIST,**

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

### WM. D. JOHNSTON,

**ASSAYER AND ANALYTICAL CHEMIST.**

514 Kearny Street,

SAN FRANCISCO, - - CALIFORNIA

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

### W. A. GOODYEAR,

**Civil and Mining Engineer**

**MINING EXPERT and GEOLOGIST.**

Address care of DEWEY & Co., 252 Market Street, San Francisco, Cal.

### JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

**ASSAYERS' MATERIALS, MINE**

**AND MILL SUPPLIES,**

CHEMICAL APPARATUS AND CHEMICALS, DRUG GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. C. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.



## State Mining Bureau.

They have recently received at the Museum of the Bureau some peculiar and interesting ores from Australia and New Zealand. The Australian silver ores are very rich in bromide and chloride of silver in a gangue of kaolin, which also contains numerous small garnets. These peculiar ores are well worthy of examination by mineralogists. The collection is quite a complete one. The silver bromide is rather rare, though some is found in Chili and some in Inyo county, this State. This ore was assayed by Mr. Luckhardt, and runs 1500 ounces in silver to the ton.

There are also some pretty specimens of gold quartz; one is a set of 20 pieces from the district of Marmora, Canada.

Two quartz specimens from mines in Amador county were presented by Mr. Nevills. Besides, there are some specimens of gold quartz from New Zealand, yielding \$170 to the ton.

All the mineral specimens in the museum are being rearranged on a different system from that previously carried out. The State Mineralogist is working on his report, which will shortly be published. It is to be of a more practical character than those recently issued, inasmuch as it deals with practical matters of every-day use to the mining community.

Silver ores from Mexico, silver ores from Peru, and anthracite coal, Peru, from F. E. Monteverde.

Four specimens calcite and aragonite crystallized on basalt, Australia; fine rose quartz, Lake Superior; 13 crystallized specimens of sphalerite, galena and pyrite from Joplin, Missouri. Donated by J. Z. Davis.

Twenty-five specimens of gold and iron ores from Marmora district, Canada.

## Mining Accidents.

On Friday of last week an accident occurred in the Idaho mine, Grass Valley, by which three miners were injured. John M. Williams, James Cornish and Richard Steele were at work on the fifteenth level, when a cave occurred, injuring them all. James Cornish was at first thought to be killed. He suffered greatly from his injuries, his head having been badly cut, the bones of his right leg being crushed and his spine hurt so badly that his lower limbs are paralyzed. It is expected that he will not recover. Williams escaped with the fracture of some ribs and Steele's injuries were confined to the mashing of his fingers on his right hand, two of them requiring to be amputated.

On the 9th inst. Dennis Harrington was caved upon and severely injured while at work in the Consolidated California and Virginia mine.

One day recently James McGonigal was caved on in the Lone Star mine, Idaho, and it took the miners of the Tiptop, Donovan and other adjoining properties 14 hours to dig him out. Fortunately, the timbers in the tunnel saved his life, and only one foot was caught by the falling rock. The Lone Star is about one mile east from the Donovan group of mines, and was being worked by a lease at the hands of McGonigal and Cass.

## Mining Share Market.

Stocks have had a little setback this week, or rather they have been checked in their upward movement. Political questions have absorbed more or less attention and kept people away from the stock market. Interest seems to be centered in the Comstock mines, particularly Consolidated California and Virginia and Ophir. The daily output of ore from the Consolidated California and Virginia, as well as the battery assays, are about the same as last week—being 400 tons per day for the output or shipment, and \$39 per ton for the battery assays. Reports from the mine say: On the 1435 level the drift which runs in a southerly direction from the north end of the mine on this level has been extended 49 feet; total length, 265 feet. This drift has cut into good milling ore, which is, without doubt, the extension downward of the ore development on the 1400 level. On the 1650 level good milling ore has been struck in a drift which runs in an easterly direction from the old stopes at a point which is directly under the ore development on the 1400 level. Shipped to the Morgan mill 938 tons of ore which assayed \$28.85 per ton, and 1703 tons to the Eureka mill which averaged \$37.09 to the ton. Bullion to the value of \$76,544 was shipped to this city during the week. The Alta mine will be open for inspection in about a week or ten days.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
G. W. INGALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
R. G. HUSTON—Montana.  
GEO. McDOWELL—Fresno and Tulare Cos.  
O. F. BERGMAN—Tehama and Colusa Cos.  
J. H. SMITH—Plumas and Sierra Cos.  
J. C. SWENNEY—Sonoma and Mendocino Cos.

THE Queen of the Hills, at Wood River, I. T., has paid \$160,000 in dividends, and is producing bullion valued at \$25,000 monthly.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.									
COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Acme M & M Co.	California.	9.	21.	Oct 25.	Nov 29.	Dec 20.	J. M. Buffington.	309 California St.	84
Aultman M & M Co.	California.	3.	24.	Oct 26.	Nov 29.	Dec 20.	J. M. Buffington.	309 California St.	84
Alta S M Co.	Nevada.	34.	25.	Oct 16.	Nov 29.	Dec 10.	W. H. Watson.	302 Montgomery St.	84
Andes S M Co.	Nevada.	30.	25.	Sept 15.	Oct 21.	Nov 17.	B. Burris.	302 Montgomery St.	84
Baker Divide M Co.	California.	12.	25.	Sept 24.	Oct 21.	Nov 17.	D. M. Kent.	330 Pine St.	84
Best & Belcher M Co.	Nevada.	35.	50.	Sept 29.	Nov 4.	Nov 24.	W. Willis.	309 Montgomery St.	84
Benton Con M Co.	California.	16.	10.	Oct 27.	Dec 1.	Dec 21.	W. H. Watson.	302 Montgomery St.	84
Centennial Gravel M Co.	Nevada.	27.	02.	Oct 27.	Dec 6.	Jan 6.	J. P. Flannagan.	Virginia Nev.	84
Columbus Con M Co.	Nevada.	4.	50.	Oct 27.	Nov 29.	Dec 29.	J. M. Buffington.	309 California St.	84
Diana M Co.	California.	6.	25.	Oct 12.	Nov 22.	Dec 13.	P. J. Flannagan.	318 Pine St.	84
Exchequer M Co.	Nevada.	23.	20.	Oct 13.	Nov 24.	Dec 15.	C. B. Elmer.	306 Montgomery St.	84
East Mt. Diablo M Co.	Nevada.	4.	10.	Oct 30.	Nov 10.	Dec 30.	G. W. Fisher.	318 Pine St.	84
Gould & Curry M Co.	Nevada.	34.	50.	Sept 23.	Nov 3.	Nov 24.	A. K. Durbrow.	309 Montgomery St.	84
Golden Fleece M Co.	California.	6.	15.	Oct 15.	Nov 23.	Nov 13.	W. J. Gleason.	312 Phelan Block	84
Independence M Co.	Nevada.	16.	21.	Oct 12.	Nov 16.	Dec 8.	J. W. Pew.	310 Pine St.	84
Mayflower Gravel M Co.	California.	32.	25.	Sept 6.	Oct 15.	Nov 12.	J. Morizio.	328 Montgomery St.	84
Mountain Tunnel M Co.	California.	2.	10.	Oct 27.	Nov 29.	Dec 20.	A. B. Paul.	328 Montgomery St.	84
North Banner Con M Co.	California.	15.	10.	Oct 2.	Nov 6.	Nov 27.	T. J. Mitchell.	Grass Valley	84
Pneumatic M Co.	California.	1.	13.	Oct 5.	Nov 11.	Dec 9.	G. Pictor.	320 Sansome St.	84
Rocky Bar M Co.	California.	9.	50.	Oct 15.	Nov 20.	Dec 7.	G. W. Hill.	Grass Valley	84
Spring Valley G M Co.	California.	1.	25.	Oct 19.	Dec 3.	Jan 3.	H. Pichoir.	320 Sansome St.	84
Santa Annita M & M Co.	California.	10.	14.	Oct 26.	Nov 29.	Dec 20.	J. M. Buffington.	309 California St.	84
Tyrolene M Co.	Idaho.	1.	15.	Oct 23.	Nov 30.	Dec 28.	F. Frankenthal.	121 Battery St.	84
Tallulah M Co.	California.	21.	30.	Oct 31.	Dec 8.	Dec 28.	G. A. Hill.	634 Market St.	84
Union Con M Co.	Nevada.	34.	25.	Nov 3.	Nov 24.	Dec 7.	J. M. Buffington.	309 California St.	84

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Challenge Con M Co.	California.	C. L. McCoy.	339 Pine St.	Annual.	Nov 19
Esta Buena Con M Co.	California.	J. T. Cross.	806 Market St.	Annual.	Nov 24
Humboldt Hill M & M Co.	Nevada.	J. Stadfeld Jr.	419 California St.	Special.	Nov 12

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Martin White M Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	30.	Oct 11
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	20.	Sept 30
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Aug 16
Young America M Co.	California.			40.	May 20

## PACIFIC COAST WEATHER FOR THE WEEK.

[Furnished for publication in this paper by NELSON GORUM, Sergeant Signal Service Corps, U. S. A.]

DATE.	Portland.				Red Bluff.				Sacramento.				S. Francisco.				Los Angeles.				San Diego.			
	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.
Nov. 3-10.																								
Thursday.....	.00	51	NW	Cl.	.00	59	NW	Fr.	.00	62	N	Cl.	.00	62	NE	Cl.	.00	82	SE	Cl.	.00	70	W	Cl.
Friday.....	.00	54	NE	Cl.	.00	76	N	Cl.	.00	63	N	Cl.	.00	70	SE	Cl.	.00	66	SE	Cy.	.00	64	SW	Cy.
Saturday.....	.00	57	NE	Cl.	.00	69	E	Cl.	.00	62	S	Cl.	.00	61	SE	Cl.	.00	68	SW	Cl.	.15	62	SW	Fr.
Sunday.....	.00	49	S	Cy.	.00	60	NE	Sy.	.00	62	S	Cl.	.00	62	SE	Cl.	.00	65	SW	Cl.	.00	63	NW	Cl.
Monday.....	.04	43	SW	Cy.	.00	56	S	Cy.	.00	59	S	Cy.	.00	58	SE	Cy.	.00	64	S	Cl.	.00	61	NW	Cl.
Tuesday.....	.09	35	NW	Cy.	.00	55	NE	Cl.	.00	53	S	Cl.	.00	60	SW	Cy.	.00	62	SW	Cy.	.00	61	NW	Cy.
Wednesday.....	.00	48	E	Cl.	.00	56	S	Cy.	.00	54	N	Cy.	.00	56	NE	Cy.	.00	63	W	Fr.	.00	—	—	—
Total.....	.13				.00				.00				.00				.00				.15			

EXPLANATION.—Cl. for clear; Cy. cloudy; Fr. fair; Fy. foggy; — indicates too small to measure. Temperature Wind and weather at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING OCT. 21.	WEEK ENDING OCT. 28.	WEEK ENDING NOV. 4.	WEEK ENDING NOV. 11.				
Alpha.....	.60	.65	.70	1.25	.70	.85	.85	1.80
Alta.....	.45	.60	.50	.75	.75	1.85	1.00	1.10
Andes.....	.35	.45	.40	.60	.35	.45	.35	.70
Argenta.....	.10	.15	.15	1.60	1.25	1.35	1.40	.30
Belcher.....	1.10	1.15	1.15	1.60	1.25	1.35	1.40	1.30
Belding.....	.75	1.20	1.10	2.50	1.45	2.35	2.40	4.30
Best & Belcher.....	.40	.50	.45	.75	.55	.65	.65	1.10
Bonanza King.....	.30	.40	.25	.40	.35	.45	.25	.40
Belle Isle.....	2.45	2.80	1.40	2.55	2.40	2.50	2.30	2.45
Bodie Con.....	.08	.10	.10	.15	.10	.15	.20	.30
Bodie Tunnel.....	1.35	1.05	1.30	1.65	1.35	1.85	1.55	1.70
Bulwer.....	3.00	4.25	4.45	9.50	6.00	8.25	8.75	12.00
California.....	.10	.25	.25	.30	.25	.35	.35	.55
Challenge.....	.75	2.50	1.45	1.70	1.45	1.50	1.50	2.00
Chollar.....	1.95	2.00	2.10	2.35	2.30	2.90	2.90	5.40
Confidence.....	.10	.10	.15	.20	.15	.20	.15	.25
Con. Imperial.....	3.00	4.25	4.45	9.50	6.00	8.25	8.75	12.00
Con. Virginia.....	1.00	1.05	1.10	2.35	1.00	1.25	1.30	1.25
Con. Pacific.....	4.20	5.25	4.75	5.00		5.00	4.00	4.25
Crown Point.....	.05	.10	.10	.20	.10	.15	.15	.30
Day.....	.05	.10	.10	.20	.10	.15	.15	.30
Eureka Con.....	.05	.10	.10	.20	.10	.15	.15	.30
Eureka Tunnel.....	.05	.10	.10	.20	.10	.15	.15	.30
Exchequer.....	.05	.10	.10	.20	.10	.15	.15	.30
Grand Prize.....	.50	.85	.75	1.30	.80	1.50	1.50	2.00
Gould & Curry.....	.50	.85	.75	1.30	.80	1.50	1.50	2.00
Goodshaw.....	.05	1.05	1.00	1.40	1.00	1.15	.95	1.80
Hale & Norcross.....	.05	1.05	1.00	1.40	1.00	1.15	.95	1.80
Holmes.....	.25	.25	.25	.25	.25	1.10	2.25	2.50
Independence.....	.10	.10	.10	.20	.25	.25	.25	.30
Julia.....	.10	.10	.10	.20	.10	.15	.15	.30
Justice.....	.10	.10	.10	.20	.10	.15	.15	.30
Martin White.....	.240	2.55	2.40	2.45	2.45	2.50	2.30	3.50
Mono.....	.50	.79	.75	1.65	1.05	1.25	1.40	2.80
Mexican.....	.260	2.75				2.25		2.25
Mt. Diablo.....	.75	.85	.70	.95	.65	1.00	.85	
Northern Belle.....	.35	3.65	3.25	5.37	5.37	8.50	5.87	8.00
North Belle Isle.....	.95	1.25	1.10	1.50	1.20	1.25	1.40	7.37
Ophir.....	.95	1.75	1.95	4.75	2.90	4.00	.45	1.50
Overman.....	.25	.30	.35	.60	.40	.60	.80	1.20
Potosi.....	.45	1.40	.75	1.00	.80	.85		
Final Con.....	.25	2.60	2.45	3.35	2.65	2.90	2.70	3.25
Savage.....	.60	.85	.75	1.40	1.10	1.70	1.30	1.70
Seg. Belcher.....	.05	.15	.10	.15	.10	.15	.15	
Silver Hill.....	.10	.05	.15	.10	.10	.10	.10	
Silver King.....	.10	.05	.15	.10	.10	.10	.10	
Scorpion.....	.10	.05	.15	.10	.10	.10	.10	
Syndicate.....	.10	.05	.15	.10	.10	.10	.10	
Bioga.....	.80	.60	.60	1.15	.70	.80	.80	1.50
Union Con.....	.80	1.20	.85	1.50	1.05	1.15	1.45	1.80
Utah.....	.30	2.10	1.15	2.35	1.50	1.70	1.75	2.15
Yellow Jacket.....	.30	2.10	1.15	2.35	1.50	1.70	1.75	2.15

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., Nov. 11.	950	Hale & Norcross.....	1.70	1.75
470 Alta.....	1.05	1.05	1.05	
900 Andes.....	.75	.80	.70	
250 Alpha.....	1.75	1.80		
400 Argenta.....	2.00	2.00	2.45	2.55
1010 B. & Belcher.....	2.00	2.00	2.45	2.55
200 Bullion.....	1.00	1.00		
200 Belle Isle.....	.35	.35		
100 Bodie Con.....	2.30	2.35		
150 Bulwer.....	1.50	1.50		
50 Benton Con.....	1.50	1.50		
350 Belcher.....	1.50	1.50		
200 Chollar.....	1.00	1.00		
1450 Con Va & Cal.....	1.15	1.20		
150 Confidence.....	5.75	5.75		
100 Crown Point.....	1.50	1.50		
150 Challenge.....	.65	.65		
220 Exchequer.....	.25	.25		
700 Gould & Curry.....	1.90	1.90		
200 Grand Prize.....	.60	.60		
650 Yellow Jacket.....	2.40	2.40		

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Stonewall mine (San Diego), Oct. 30, \$4800; Con. Virginia and California, Nov. 4, \$76,544; Hanauer, 4, \$4800; Stormont, 5, \$3250; Hanauer, 5, \$4740; Crescent, 5, \$6700; Queen of the Hills, 5, \$1070; Overland, 5, \$1180; Hanauer, 6, \$4688; Stormont, 7, \$1960; Hanauer, 7, \$4540; Eberhardt-Monitor, 2, \$1500; Bodie, 10, \$4530; Consolidated Virginia and California, 10, \$37,000; Bulwer Con., 7, \$16,520; Lexington, 6, \$18,208; Alice, 6, \$49,456; Moulton, 6, \$16,504. The last week's mineral shipments from Salt Lake City were 19 cars bullion, 486,472 pounds; 10 cars ore, 293,600 pounds; 7 cars copper ore, 202,950 pounds; total, 36 cars, 983,022 pounds. Last week Wells, Fargo & Co. shipped from Salt Lake \$65,024; McCormick & Co., \$42,488, and Jones & Co. \$11,296.

## San Francisco Metal Market.

[WHOLESALE.]	
THURSDAY, Nov. 11, 1886.	
ANTIMONY—French Star.....	9 1/2 @
BORAX—San Bernardino.....	— @ 8
Armstrong.....	— @ 6 1/2
IRON—Glengarnock ton.....	— @ 22 50
Eglington, ton.....	— @ 21 50



## Assessment Notices.

**Tallulah Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Sierra Mining District, Humboldt county, Nevada.

NOTICE is hereby given, that at a meeting of the Directors, held on the 30th day of October, 1886, an assessment (No. 21) of thirty cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 634 Market street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 8th day of December, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Wednesday, the 29th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

GEORGE A. HILL, Secretary.  
Office—With Estate of Samuel Hill, 634 Market St., San Francisco, Cal.

**Acme Mill and Mining Company.**—Location of principal place of business, San Francisco, Cal. Location of works, Volcano Mining District, Amador County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 25th day of October, 1886, an assessment (No. 9) of two and one-half cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 29th day of November, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 20th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Sec'y.

Office—Room 4, 309 California St., San Francisco, Cal.

**Aultman Mill and Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Georgetown Mining District, El Dorado County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 26th day of October, 1886, an assessment (No. 3) of two and one-half cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 29th day of November, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 20th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Sec'y.

Office—Room 4, 309 California St., San Francisco, Cal.

**Santa Anita Mill and Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Nevada County, Cal.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 26th day of October, 1886, an assessment (No. 10) of one and one-half cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 29th day of November, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 20th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. M. BUFFINGTON, Secretary.  
Office—Room 4, 309 California St., San Francisco, Cal.

## Testing and Working Silver Ores

An illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroehne's process, etc. Under "Pulverizing Machines" are described the anstra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace mounds and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

Price, post free, \$2.00. Sold by Dewey & Co., Publishers, 252 Market St.

## MACHINISTS, ATTENTION!

AN OUTFIT FOR A MACHINIST.

Good Tools, Patterns and an Established Business

FOR SALE AT A BARGAIN,

If applied for immediately.

Address, B. A. W.  
Care of this Paper.



## CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and

## HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

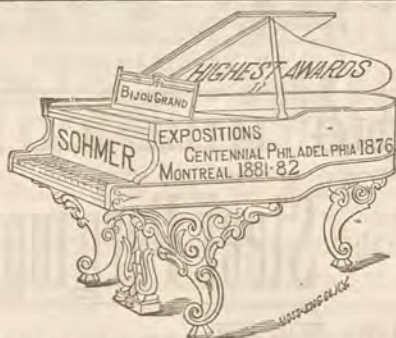
PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street

San Francisco, Cal.



SOHMER & CO. PIANOS.  
PEEK & SON PIANOS.  
BYRON MAUZY,

SOLE AGENT,

922 Market Street, San Francisco, Cal.

SEND FOR CATALOGUE.

H. M. RAYNOR,

No. 25 Bond St.,  
NEW YORK.

ESTABLISHED  
1858.

FOR ALL

PLATINUM  
Laboratory  
—AND—  
Manufacturing Purposes.  
Wholesale and Retail.  
Native Platinum and Scrap purchased.

THE RUSSELL PROCESS COMP'Y.

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

INVENTORS, TAKE NOTICE

L. PETERSON, MODEL MAKER,  
253 Market St., N. E. cor. Front (up stairs), San Francisco,  
Experimental machinery and all kinds of metal, tin,  
copper and brass.

RUPTURE  
RADICALLY CURED BY  
Dr. Pierce's Great Discovery. Thousands of patients  
cured AT THEIR HOMES. No experiment! It does the work  
DRS. PIERCE & SON, 704 Sacramento St., San Francisco, Cal.

## About Obtaining Patents.

Patents are Virtually Contracts.

The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent contract be skillfully and accurately drafted, in order that it may afford him complete protection for his invention during the life of his patent.

Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which the invention relates. If, by this "preliminary examination," the improvement is found to have been previously patented, our client will receive, for the small sum of \$5 for the examination, a verbal or written report showing definitely wherein his invention has been anticipated, thereby saving him further expense and perhaps much time, anxiety, etc.

To avoid all needless delay, however, and secure patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with \$15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately and forwarded to the inventor for his signature. When he receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of \$20 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give up a case so long as there is a chance of obtaining a patent. The Agency charge, including drawings, rarely exceeds \$40, and for this we do all we can without appealing the case.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are more satisfactory to the Patent Office than the old cumbersome system of storing up an immense bulk of countless models.

Drawings or sketches, sufficient to illustrate the invention clearly, with a description that will enable us to make a full set of perfect drawings for the Patent Office, is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings often prejudice capitalists and manufacturers against the invention, while in reality it may be of great value, and would meet with ready sale had it been skillfully, completely and artistically portrayed. In all cases prepared by us, the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken to have the invention fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public when the patent is granted.

Advantages to Inventors on the Pacific Coast.

The firm of DEWEY & Co. has edited and published the MINING AND SCIENTIFIC PRESS continuously since 1860, a period of 26 years. Few agents, who are still engaged in the business, have had so long-extended practice in patent soliciting. The members of the firm give personal attention to the applications entrusted to their care; and their familiarity with inventions and with local affairs in the Pacific States and Territories, enables them to understand the wants of inventors on this coast more readily and thoroughly, as we believe, than any other agents in America. Thus there is saved a great deal of the time which ordinarily—when distant agents are employed—is wasted in preliminary writing back and forth.

This happy combination of long business experience together, and wide connections, has placed our firm in a position unquestionably most fortunate for affording inventors prompt and reliable advice, and the best facilities for securing their full patent rights with safety and dispatch at uniformly reasonable rates.

Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly-stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording just the circulation best calculated to widely inform the class of readers especially interested in the subject of his invention.

Caveats.

A caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is, that it entitles the caveator to receive notice, for a period of one year, of any application for a patent subsequently filed, which is adjudged to be novel and is likely to interfere with the invention described in the caveat, and the caveator is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from \$10 to \$20. The Government fee is \$10 additional. To enable us to prepare caveat papers, we require only a sketch and description of the invention.

Rejected Applications.

Inventors who have rejected cases (prepared either by themselves or for them by other agents) and a desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

Inventors doing business with us will be notified of the state of their application in the Patent Office whenever it is possible for us to furnish such information.

DEWEY & CO.,

Patent Solicitors, Office of SCIENTIFIC PRESS, 252 Market St., Elevator entrance, No. 12 Front St., S. F.

GEO. H. STRONG. W. B. EWER. A. T. DEWEY.



THE Sign of the Arkansas Cough Syrup is looking you all square in the face.

Do you want a sure, safe and reliable Cough Syrup? Are you troubled with a Cough, Cold, Bronchitis or Lung Complaint? Do your Babies keep you awake all night with Hacking Coughs, Colds in the Head, etc. Do you want something reliable in the house to meet these emergencies? We answer to all: "Go to your Druggist and get a Bottle of the Arkansas Cough Syrup, and be troubled no more." Price, 50 cents per Bottle!

For Sale by all Druggists.

## Dr. Pierce's Electric Belt.

This small truthfully Grandest Medical means of this BELT is supplied with a constant current of Electricity. It relieves and cures, without medicine, all diseases and weaknesses of male or female, that can possibly be relieved or cured by Electricity and Magnetism. Dr. Pierce's Belt is the only one which will produce electricity with or without acids; giving when charged a current of high tension, which can be instantly felt by the wearer. Contains all the latest improvements, including an improved Electric Suspensory for Men. In fact it is warranted to be the only complete and durable GALVANIC BODY-BATTERY ever invented. Satisfaction guaranteed. Prices very reasonable. Avoid inferior imitations. Call or write for our FREE descriptive pamphlet, No. 2. MAGNETIC ELASTIC TRUSS CO., 304 N. SIXTH ST., COR. OLIVE ST. LOUIS, MO. and 704 SACRAMENTO STREET SAN FRANCISCO, CAL. AGENTS:—PETER VAN SCHAAK & SONS, 138 & 140 Lake Street Chicago, Ill.; M. W. ALEXANDER, Druggist, Fifth & Olive sts., St. Louis, Mo.; J. H. WIDNER, Druggist, 3d & Market sts., San Francisco. RUPTURE Quickly cured! If ruptured send for our Pamphlet No. 1.

NATIONAL ASSURANCE CO.,  
OF IRELAND.

ATLAS ASSURANCE COMP'Y,  
OF LONDON.

BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.

H. M. NEWHALL & CO.,  
GENERAL AGENTS,

309 & 311 Sansome St., San Francisco, Cal.



**NOTICE TO  
MINING MEN,  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.**

### Engineers' Tables of Progress

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimate address:

**INGERSOLL ROCK DRILL CO.,**

REPRESENTED BY

**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

**N. W. SPAULDING  
SAW COMPANY**

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

**Saws.**

SAW MILLS AND MACHINERY  
Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

**HENDERSON'S PATENT TRUSS.**  
Comfortable and Reliable.



This simple truss can be worn without inconvenience, and gives all the comfort to the wearer that can be obtained from a perfect-fitting, pliable apparatus. The pad is soft and yielding, and on account of its peculiar construction and the connections of its securing bands, cannot get out of place. It will remain in place no matter what position the wearer may assume. The engraving shows the construction of the appliance. It is simplicity itself, and is comfortable and reliable. Address,

JESSE G. HENDERSON,  
Grizzly Flat, El Dorado Co., Cal.



The California  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

**FLOUR AND OTHER MILLS.**  
Quartz Mill Screens a Specialty.  
147 Beale Street, San Francisco.

RICHARD C. REMMEY, Agent,

**Philadelphia Chemical Stoneware Manufactory,**

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturers of

all kinds of

Chemical Stoneware

FOR

Manufacturing

Chemists.

Also Chemical Brick

for Glover Tower.

**San Francisco Cordage Factory.**  
Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice  
**TUBBS & CO.**  
611 and 613 Front St., San Francisco.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**

316 California St., San Francisco.

## FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

MANUFACTURERS OF

San Francisco.



BABCOCK & WILCOX BOILERS.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure or Compound, Stern or Side-wheel Engines.

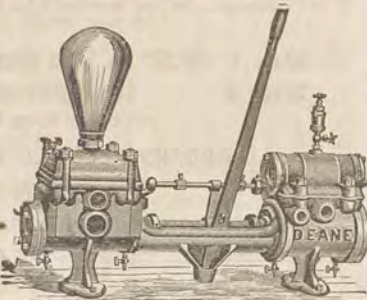
MINING MACHINERY—Hoisting Engines and Works, Cages, Ore Buckets, Ore Cars, Pumping Engines and Pumps, Water Buckets, Pump Columns, Air Compressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for Dry or Wet Crushing, Amalgamating Pans, Settlers, Furnaces, Retorts, Concentrators, Ore Feeders, Rock Breakers, Furnaces for Reducing Ores, Water Jackets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MACHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines and Boilers, Dredging Machinery, Powder Mill Machinery, Water Wheels.



DEANE STEAM PUMP.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries

OF EVERY DESCRIPTION.

Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

—ALSO—

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

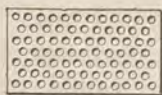
ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T Iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**

## FRASER & CHALMERS.



CHICAGO, ILL.

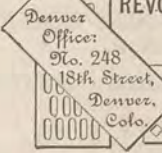
U. S. A.

General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

PERFORATED METALS FOR

REVOLVING and SHAKING-SCREENS,

JIGS & STAMP-BATTERIES.



Denver Office:  
No. 248  
18th Street,  
Denver,  
Colo.



NEW YORK OFFICE,  
ROOM 48,  
NO. 2 WALL ST.  
Mexico Office:  
No. 11  
Calle de Duquesne  
Chihuahua, Mex.

UTAH OFFICE—SALT LAKE CITY, UTAH.

## Iron and Machine Works.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

BUILDERS OF—

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines  
Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. **ESTD ORDERS SOLICITED.**

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON THORNTON THOMPSON

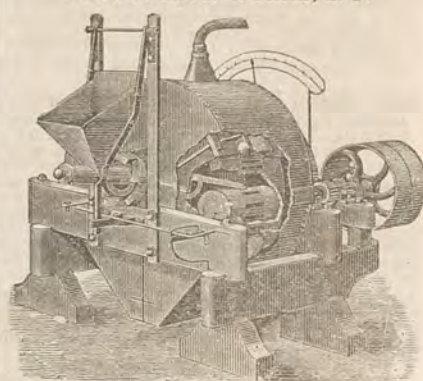
THOMPSON BROTHERS,

**EUREKA FOUNDRY,**

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

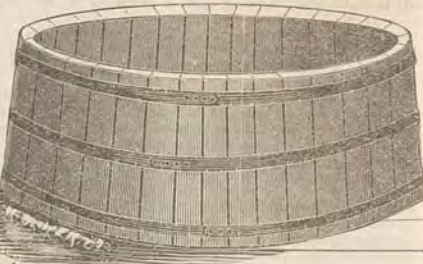
## Tustin's Pulverizer WORKS ORE WET OR DRY FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLY, SPIERS & HAYES,

## Mining Vats and Tanks.



LEACHING VATS with FALSE BOTTOMS.

PRECIPITATING VATS,

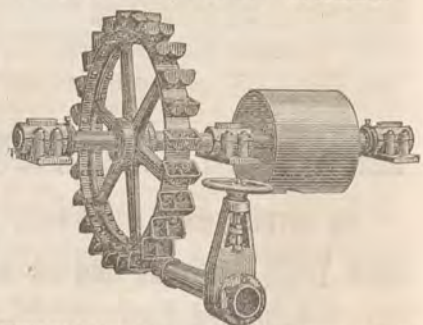
SOLUTION and WATER TANKS

For Mining Purposes.

WELLS, RUSSELL & CO.,

Mechanics' Mills, San Francisco.

## PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED  
by the Idaho Company at Grass Valley, Cal., and  
gave 90 2 per cent., distancing all competitors. Send for  
Circulars and guaranteed estimates.

L. A. PELTON,

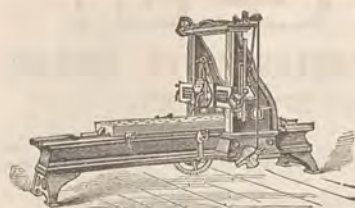
Nevada City, Nevada Co., Cal.  
AGENTS—PARKE & LACY, 21 and 23 Fremont Street  
San Francisco, Cal.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



Putnam Planer.

# PARKE & LACY.

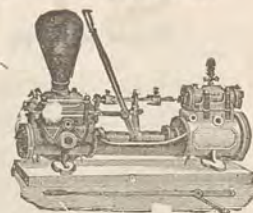
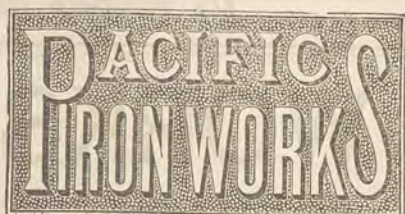
.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.

Knowles Steam Pump  
The Standard.

1850. 1885.  
**RANKIN, BRAYTON & CO.,**  
 BUILDERS OF  
**MINING MACHINERY.**

San Francisco: 127 First Street.  
 Chicago: 100 N. Clinton.  
 New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATING WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

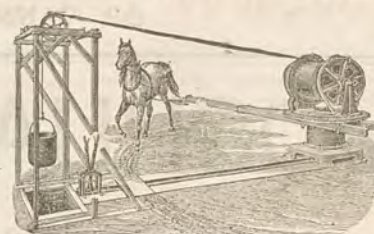
### WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER OF INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



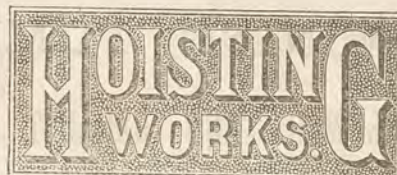
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY OF CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



### BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700-pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE of CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



## NOTICE TO GOLD MINERS! SILVER-PLATED AMALGAMATED PLATES For SAVING GOLD!

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.  
 FULL WEIGHT OF SILVER AND BEST QUALITY OF WORK GUARANTEED.  
 GET OUR PRICES BEFORE ORDERING ELSEWHERE. SAMPLES FURNISHED ON APPLICATION.

**SAN FRANCISCO NOVELTY AND PLATING WORKS,**  
 No. 108 FIRST STREET.

NOTICE.—All our plates are guaranteed to have the full weight of silver agreed upon, and are tested before leaving our works, thereby avoiding the complaints about light weight, made so often before we started in this branch of industry.

**JUSTINIAN CAIRE, Agent,**  
 521 & 523 Market St., San Francisco,

DEALER IN—  
 Assayers' and Mining Material.

MANUFACTURER OF—  
 BATTERY SCREENS AND WIRE CLOTH.

Agent for HOSKINS' HYDRO-CARBON ASSAY FURNACES.

GEO. W. PRESCOTT, President.  
 IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.  
 J. C. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

**STEAM, AIR, AND HYDRAULIC MACHINERY.**

**Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
 HORIZONTAL ENGINES,  
 AUTOMATIC CUT-OFF ENGINES,  
 COMPOUND CONDENSING ENGINES,  
 SHAFTING,

BABY HOISTS,  
 VENTILATING FANS,  
 ROCK BREAKERS,  
 SELF-FEEDERS,  
 PULLEYS,

STAMPS,  
 PANS,  
 SETTLERS,  
 RETORTS,  
 ETC., ETC.

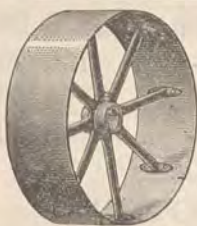
TRY OUR MAKE, CHEAPEST AND BEST IN USE.

## UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

**CLOT & MEESE,**

Sole Licensed Manufacturers of the

**Medart Patent Wrought Rim Pulley**

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

**SHAFTING, HANGERS AND APPURTENANCES.**

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 & 131 Fremont Street,

San Francisco, Cal.

## CINCINNATI CORRUGATING COMPANY.

JOHN F. HAZEN, Prest.

JAMES HICKS, Treas.

J. G. BATTELLE, Sec'y.

## Over 1500 Tons Iron in Stock!

FOUR WIDTHS OF CORRUGATIONS MADE!  
**STANDING SEAM PLAIN ROOFING!**  
**All Paint Re-ground in Pure Linseed Oil!**



Chicago Prices Beaten!

ESTABLISHED 1860.

**S. F. PIONEER SCREEN WORKS,**

221 & 223 First St., cor. Tehama, S. F.

**J. W. QUICK, Prop'r.**

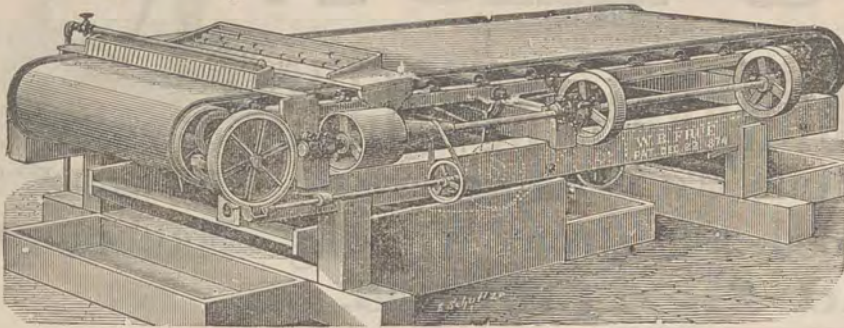
Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS  
(\$575.00) F. O. B.**

**OVER 1400 ARE NOW IN USE.** Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

**ADAMS & CARTER, Agents Frue Vanning Machine Co.,  
Room 7, No. 109 California Street, SAN FRANCISCO, CAL.**

## JOSHUA HENDY MACHINE WORKS.

(INCORPORATED SEPTEMBER 29, 1882.)

Nos. 39 to 51 Fremont Street, - - - - - San Francisco, Cal.

**MANUFACTURERS OF  
NEW and Dealers in SECOND-HAND BOILERS, ENGINES and MACHINERY  
OF EVERY VARIETY.**

Steam Pumps of all Makes,

CENTRIFUGAL PUMPS,

MINING PUMPS.

BLOWERS AND EXHAUST FANS.

LEATHER and RUBBER

**BELTING.**

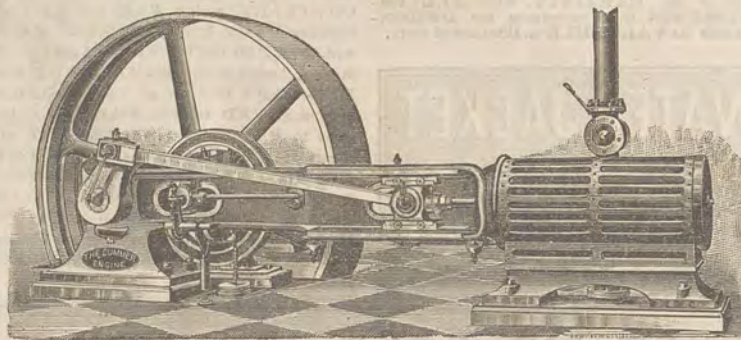
LUBRICATING COMPOUNDS and OILS  
OF THE BEST MAKES.

PIPE and PIPE FITTINGS.

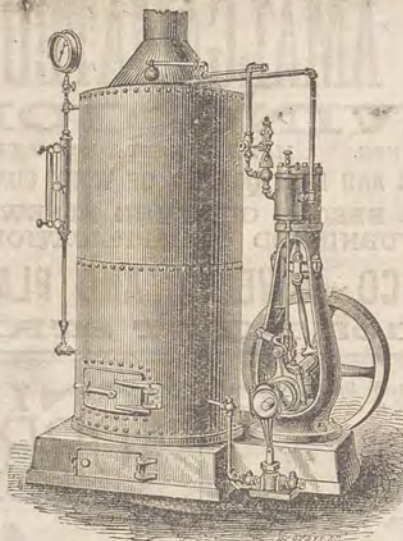
Brass Goods

AND  
FITTINGS.

Hydraulic Mining, Quartz, and Saw-Mill Machinery, Hydraulic Gravel Elevators, Hydraulic Giants, "Triumph" Ore Concentrators, Automatic Ore Feeders.



**SPECIAL AUTOMATIC ENGINES.**  
(Manufactured by the Cummer Engine Co., of Cleveland, Ohio.)



Upright Engines and Boilers Connected.

Stationary, Portable, and Hoisting  
**ENGINES and BOILERS.**

Shafting,

Pulleys,

Boxes,

Hangers.

**WOODWORKING  
MACHINERY,**

—COMPRISING—

BAND SAWS, STICKERS,  
PLANERS, SHAPERS,  
SHINGLE MILLS, Etc.

**IMPROVED  
Single and Double Circular Saw-Mills.**

AGENTS FOR THE SALE OF

"Cummer" Engines, from Cleveland, Ohio,  
Porter Manufacturing Co.'s Engines and Boilers.  
"Baker" Rotary Pressure Blowers.  
"Wilbraham" Rotary Piston Pumps  
"Boggs & Clarke" Centrifugal Pumps.  
The Volker & Felthousen M'fg Co.'s  
Buffalo Duplex Steam Pumps.  
P. Blaisdell & Co.'s Machinists' Tools.

## JAMES' PATENT RECIPROCATING STAMP MILL.

(PATENTED AUG. 16, 1881.)

Weight of Boss and Shoes (1200 pounds) acts on each Shoe separately. It is practically the same as the regular Stamp Mill.

Capacity, 6 Tons in 24 Hours. 4 H. P.

Parties wishing to test the Mill with any ore they may bring, will find one in operation at our works in this city.

**PRICES:**

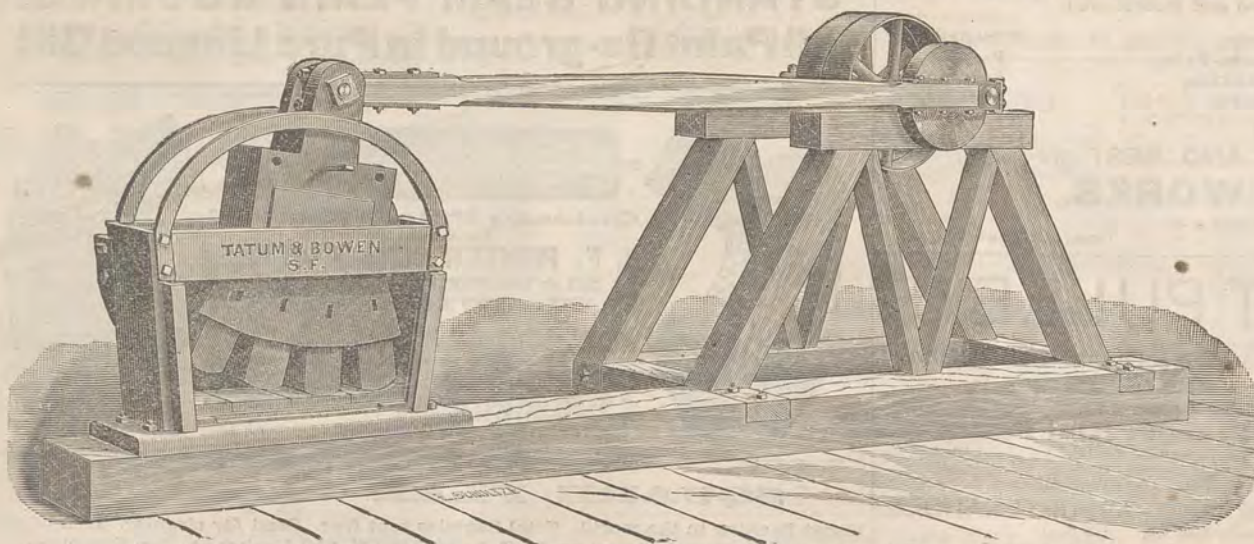
Reciprocating Stamp Mill,	\$350 00
Rock Breaker, - - -	100 00
Automatic Ore Feeder, -	50 00
Single Track Ore Car, -	40 00

SEND FOR CIRCULAR.

**TATUM & BOWEN,**

34 & 36 Fremont St., San Francisco.

91 & 93 Front St., Portland, Oregon.





# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, NOVEMBER 20, 1886.

VOLUME LIII.  
Number 21.

## Evans' Compound Fly-Wheel Pump.

We give an engraving on this page of a large steam pump, made in this city by C. H. Evans for the Chico Water Company, and recently shipped. This compound steam pump has the well-known crank and fly-wheel movement of the Thomson & Evans patent; there are very many of this form in use on the coast. The pump illustrated is quite a large one, designed specially to meet the requirements of the Chico Water Company, where its ordinary work will be to raise 1,000,000 gallons of water per day, and discharge it into the reservoir at an elevation of about 70 feet. It is intended, however, in case of fire to adapt the power of the pump so the water can be turned directly into the city mains and maintain a pressure of 125 pounds per square inch, which is equal to a head of 290 feet. In order to be able to do this variable and exceptionally heavy service, the pump was made, as shown, extra heavy and strong, with the metal distributed in such shapes as are best calculated to resist the immense strain and yet have all the parts convenient of access for adjustment or repairs. Being made on the compound principle, when in ordinary use (pumping to the reservoir) the steam is first taken into the small steam cylinder, and after doing its work there is expanded into the large steam cylinder, thus getting the maximum of work done with the minimum of steam or fuel. When required for fire purposes, it is so arranged that the live steam can be turned direct into the large cylinder, thus increasing the power and maintaining the required pressure in the pipes.

The high-pressure cylinder is 12 inches in diameter and the low pressure 22 inches; the water cylinder being 13 inches; stroke, 18 inches. The suction pipe is 10 inches and the discharge 8 inches. The pump has to work against a pressure equal to 290 feet. This form of pump was selected by the water company's engineer after careful comparison with those of the best makers, as being the most reliable and economical for the purpose. These fly-wheel pumps have won great favor wherever used. The chief engineer of the Quartermaster's Department at Jeffersonville, Ind., who has had 33 years' experience with almost every class of pumps, considers the fly-wheel pump recently shipped to that place by Mr. Evans to be the best and least complicated he has yet seen. Mr. Ed. W. Hewitt, of the same department, also speaks highly of it, saying that it was given a thorough test, and he feels satisfied it will give more service with less wear than any direct-acting or fly-wheel pump he has seen. This gentleman had also experience with one of these pumps at the Presidio of San Francisco, while he was stationed here. At that

time he made crucial tests of its power and capacity, and he considers it the best and most economical pump he has come across in his long experience.

## Mining Accidents.

By the premature explosion of a blast in the Ohio mine, Rebel creek district, Nevada, Peter Swan, an old miner, had one of his hands badly mangled.

At the Stickle mine, Calaveras county, some of the men put off a blast in one of the chutes, and as it did not do the required work, Mr. J.

lowered down the shaft on the cage, and when about 100 feet from the bottom the cage began to rapidly descend, with poor Hambleton on it. He was found shortly afterward at the bottom in an insensible condition. The brakeman who had control of the brake at the time says that the brake, for some unaccountable reason, would not hold. Mr. Hambleton died after being brought out of the shaft. The coroner's jury attached no blame to the brakeman.

An accident occurred on Wednesday morning, at the Idaho mine, Grass Valley. While Joseph Palamountain, one of the shift bosses, was

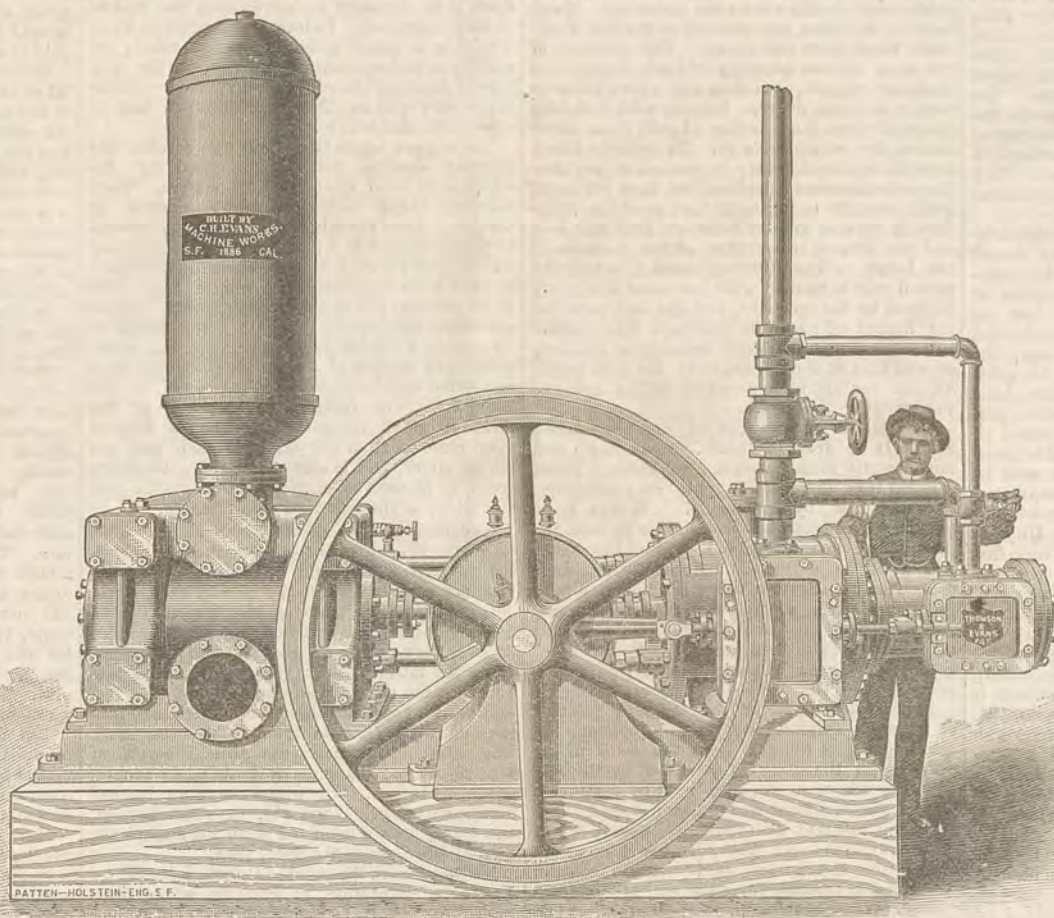
## Closing Down of the Anaconda Mine.

The unpleasant news comes from Butte, Montana, that the works of the Anaconda Copper Mine have been closed down for the winter, a proceeding which will throw 1500 men out of work, and stop the production of 80 tons of copper a day. This mine is the most important copper mine in the United States outside of the Lake Superior region.

It must be understood that the smelter has been closed down for some time, but men were working on the new concentrator, etc. The men at the smelter, when it was running, received \$3 per day. It is stated that Mr. Marcus Daly, the manager, made a proposition to a committee of the Knights of Labor that if the old employees at the smelter would work for \$2.50 per day, the company would start up the works. A meeting of about 1000 of Knights of Labor was held, and refused to accept the proposition, whereupon the mine and the whole works were closed down, and all the men dismissed. Mr. Daly says the works will not be again started up before next May. The Butte Miner, speaking of the matter, says: It appears that many of the workmen who have families there were in favor of accepting Mr. Daly's proposition, as the merchants of the place had carried them along for some time, and they wanted work so they could pay their indebtedness. On the other hand, there were those— young men—better prepared to endure a season of idleness, who opposed the acceptance of any reduction in wages. The matter will probably soon be settled. It is understood that the leading business men of Anaconda are doing all they can to effect a compromise by which the workmen of the place may again obtain employment.

Notwithstanding rumors to the contrary, as far as we have learned, any reduction of wages at Anaconda—if such should be made—will in no wise affect the question of wages in this city. We have yet to learn of a single mine or mill owner in this vicinity who asks for or favors such reduction. The leading business men are opposed to it. They argue that with silver advancing in price and copper two cents above quotations two or three months ago, it would not only be unjust to the miners, but unwise on the part of the mill and mine owners to ask any reduction in wages. It is safe to say that a cut in wages in Anaconda will not be followed by a cut in Butte and vicinity.

A FIRE occurred at the Idaho mine, Grass Valley, which caused some damage, but nothing very serious. A fire at the Ophir hoisting works on the Comstock, the other day, was also extinguished before serious damage was done.



C. H. EVANS' COMPOUND FLY-WHEEL PUMP.

B. Meyers, the foreman of the mine, went with some powder to put in the seams that the blast had made in order to throw the remainder of the rock down. Before he had time to get out of the way of danger, a rock fell, striking Mr. Meyers on the head and knocking him senseless. On examination it was found that no bones were broken, but that he had sustained severe scalp and flesh wounds.

A case occurred in the Perseverance mine, Flint district, Idaho, which came near killing two men, Mr. Will Cates and Joe Vanina. They had examined the place in the forenoon of that day and thought it safe enough, but on going into the drift in the afternoon the ground came down without any warning, catching both before escape was possible. Mr. Cates' right leg was caught between a timber and one wall of the lode, which held him like a vise, and Mr. Vanina was covered with debris. They were dug out as soon as possible.

John Hambleton, a miner, while descending on the cage at the St. Lawrence mine, Butte, Montana, was fatally injured. It appears that after dinner Hambleton gave the signal to be

standing in the shaft at the 100-foot level, he heard a car coming, to avoid which he stepped out of its way on to the track on the opposite side of the shaft, where he was still standing when he heard another car approaching, but thinking it was the same car he did not move, and was struck by the second car, which was descending on the track on which he stood. It is thought impossible that he will live, as several of his ribs were broken, portions of which entered his lungs, and he was otherwise hurt internally.

Wednesday evening a miner named William Hooper had the ends of two of his fingers cut off by a car passing over them as he grasped the track while he was descending the shaft in the North Star mine, Nevada Co.

A cave on Wednesday in the Maybell drift mine, at Bloomfield, injured John Pridgeon so that he will probably die. A broken back, a deep cut in the neck and other hurts were sustained.

SAN DIEGO is now lighted by electricity. The motor power is water.



## The Minting of Gold and Silver.\*

NUMBER 2.

[By ALBERT WILLIAMS, JR.]

Melter and Refiner's Department, Carson Mint.

The crude bullion, after having been cast into shoe-bars and sampled, is transferred to the melter and refiner's department. From this point the melter and refiner is responsible for all bullion received by him until, after refining and casting into ingots of standard coin metal, it has been transmitted to the coiner's department.

The total force employed in the melter and refiner's department is nine men, including the following officers: Melter and refiner, assistant melter and refiner, computing clerk, foreman of the ingot-melting room, and foreman of refinery.

## Refinery.

The refinery occupies two rooms, 47 feet 4 inches by 23 feet 1½ inches, and 26 feet 10 inches by 18 feet 5 inches in size, on the west side and at the northwest corner of the second story. It is intended to transfer the refinery to the extension when the latter shall have been completed. The force employed is three, consisting of the foreman and two helpers. The work done consists in the following operation: *a*, Parting of gold from silver in dore metal by boiling with sulphuric acid; *b*, "sweetening" the parted gold; *c*, precipitation of silver from the acid solution of argentic sulphate by metallic copper; *d*, "sweetening" the precipitated silver; *e*, disposal of the cupric sulphate solution formed during the process of precipitation; *f*, as an adjunct operation, the manufacture of "silver-cake," that is, compressed silver precipitate.

First boiling with sulphuric acid.—This is done over four heating furnaces, arranged in two pairs. These are of common brick, lined with fire-brick. The fuel used is yellow pine, in sticks four feet long. There are four parting kettles, made of cast iron, 3 feet diameter at the top, 30 inches deep, 7-16 inch thick at the upper part, and 1½ inches thick at the bottom. The additional thickness below compensates for the greater exposure there, so that the wastage of iron is uniform. The covers of the parting kettles are also of cast iron, and are conical. They are half an inch thick, and are hung by chains from pulleys and counterpoised.

An essential point in the use of the sulphuric acid process is that the unparted bars should be of the proper tenor, which by long-continued observation is found to be a fineness of from 0.070 to 0.075 in gold to give the best results in parting. The unparted bullion treated at this mint is very irregular in character, the range being from 0.002 to 0.500 fine in gold. Bullion lately received contained only from 0.002 to 0.020 fine in gold. With this low proportion of gold, the latter, on the solution of the dore metal, forms a fine, impalpable powder, which floats on the surface of the acid in the kettle, and cannot be perfectly separated from the silver. This defect is corrected by adding gold in the previous melting. Unparted bullion 0.900 fine (in gold and silver) dissolves readily in the shoe-bar shape with or without breaking the bar into its three sections. These bars weigh, as previously stated, from 170 to 220 ounces each. It was formerly the custom when treating Comstock bullion, which, because of its fineness (usually above 0.990), volatilized perceptibly in melting, to protect it by adding a small quantity of very base bullion. Five pounds of lead bullion, containing also some iron, were added per charge. This practice, introduced by the melter and refiner, is said to have worked well. Latterly, however, it has been unnecessary, as the bullion treated has been of lower grade.

The usual charge of unparted bullion is 2500 ounces to each kettle. The proportion of acid is four pounds of sulphuric acid to one pound of unparted bullion. One-half of the acid, *i. e.*, two pounds to each pound of bullion, is placed in the kettle on charging, and the remainder is added gradually in pitcherfuls as the silver is taken up. The normal strength of the acid is 62° Baume, but if the unparted bullion contains much copper a slightly weaker acid is used. The temperature maintained is 650° F., the boiling point of acid of the normal strength. The time occupied in boiling is five hours. At the expiration of this period the fire is drawn and the charge is allowed to cool and settle for two hours. This interval is requisite for an additional reason, namely, that the operator may not suffer from the sulphurous acid fumes.

The method of discharging the kettles is as follows: As much of the parted gold as possible is first ladled out from the bottom; the acid solution of argentic sulphate is then siphoned off, and finally the remainder of the parted gold is removed.

Second boiling of the parted gold.—A further purification of the parted gold is next attained by reboiling it with sulphuric acid in smaller kettles over special furnaces. There are three of these heating furnaces, of the same type and dimensions. They have heavy cast-iron shells of octagonal shape externally and are lined with fire-brick. The interior is vertically cylindrical, and is 10 inches in diameter and 15 inches deep. The fuel used is nut-pine charcoal. The three reboiling kettles resemble

those employed in the first boiling, but are only 20 inches in diameter at the top and 16 inches deep. The acid is of the same strength, and the time occupied in reboiling is two and a half hours.

"Sweetening" the parted gold after the second boiling.—This consists in repeatedly washing the gold with hot water (not distilled) in a filtering tub. There are six of these filtering vessels. Two are porcelain jars made in Germany, and cost \$60 each. They are 20 inches in diameter and 24 inches deep. Four small wooden tubs, lined with sheet lead, are also used; but the porcelain jars are preferable, even at the increased cost, being free from the inconvenience caused by the incrustation of crystallized sulphates, which forms on the interior surfaces of the lead-lined wooden tubs. Porcelain, however, although undoubtedly the best material, appears to have the property, in a very small degree, of reducing silver from the acid solution of argentic sulphate—a point which is undesirable at this stage of the process. This is probably due to the solubility of the glaze of the jars, though the organic matter of the filter may also have the same effect. The straining material is unbleached muslin sheeting. The old filters are burned, the ashes being preserved and returned with the annual cleanup of the mint.

Third boiling and washing of the parted gold.—On the day following the second boiling with sulphuric acid and washing with hot water, the parted gold is subjected to a third boiling with acid and additional washings. The manipulations are a simple repetition of those just described. The gold is now in a state of almost absolute purity.

Avoidance of brittle gold.—Most refineries in which the method of parting by sulphuric acid is adopted produce brittle gold; that is, gold which cannot be rolled safely, and which requires careful annealing before passing the breaking-down rolls, and perhaps may not be sufficiently ductile even after annealing. Much trouble has been experienced at the San Francisco mint from this cause. The presence of the most minute quantity of lead impairs the ductility of gold, but does not affect silver in nearly the same degree. Lead is with difficulty removed when the parting of gold from silver is done by sulphuric acid. To entirely eliminate the lead which may be present a very simple and efficacious expedient has been hit upon, which consists in taking advantage of the difference in specific gravity between gold and lead and the minute subdivision of the particles of the latter. The filtering vessel in which the parted gold is washed with hot water is slightly inclined by the operator, and the lead particles are floated off with the washings into another tub. This plan of simple decantation succeeds so well that at the Carson mint the gold ingots do not require to be annealed before going to the breaking-down rolls.

Disposition of the parted and sweetened gold.—It is dried (without furnace heat) and sent directly to the ingot-melting room. There it is fed into the melting pots very carefully, to avoid loss by sputtering. Where large quantities are treated it is desirable to have the parted and sweetened gold pressed into cakes and dried in a furnace before melting, as is done with the silver at this mint and with both gold and silver at the San Francisco mint. After melting, the metal is sampled and cast into bars. It is then known as "mint-fine" gold; that is, gold as near absolute purity as is necessary in the subsequent processes.

Precipitation of silver from the acid solution of argentic sulphate by metallic copper.—In the parting of the gold from the silver of the dore metal the silver is attacked by the acid and appears as a sulphate held in a solution which also contains free sulphuric acid. Besides this solution there are also a wash-water of decantation and the filtrates formed in sweetening the parted gold. These contain considerable argentic sulphate, and are concentrated by evaporation before reduction. The next step in the process is the recovery of the silver in a metallic state from the acid solution of argentic sulphate. This is effected by precipitation on metallic copper, in four large wooden vats, rectangular in shape and lined with sheet lead. To prevent the escape of the fumes generated during the heating of the liquor the vats are inclosed in vertically-sliding wooden partitions, hung by chains from the ceiling and counterpoised, so that any portion of the interior is readily accessible for inspection or for any of the necessary manipulations. The vats are each two feet deep (interior measurement), and the other dimensions are from 6x11 to 9x12 feet. Laid around the bottom, on the inside of each vat, are three coils of leaden steam pipes, two inches in diameter, fed by live steam from the engine boilers, by which the solution is kept heated to about 180° F. The maintenance of a precise temperature does not appear to be essential to successful precipitation, and any near approximation to the point mentioned is found in practice to be sufficient.

The copper used is from the Lake Superior mines, and is refined at Baltimore, Maryland. Its fineness is something remarkable, being, by assays at the mint, no less than 0.9997, the 0.0003 of impurity remaining being chiefly iron. The form in which the copper has hitherto been employed has been the ordinary 20-pound ingot of commerce as received from the copper-refining works. The melter and refiner, however, has had molds prepared and forwarded to Baltimore for casting the copper in thin slabs, 6 by 12 by 1 inches, with the object of securing

a larger precipitating surface in proportion to the weight of metal used, and also with a view to increased convenience in removing the precipitated silver. The charge of copper ingots is 1000 pounds to each vat. They are laid across the coils of steam pipes at intervals of 8 inches. The slabs are intended to be placed on the bottom, forming a loose pavement, and also upright along the sides and ends of the vats.

In charging the precipitating vats, after arranging the copper ingots in position, undistilled cold water is poured in through pipes to a depth of from 12 to 14 inches. The acid solution of argentic sulphate is then added, bringing the contents to within about three inches of the top of the vat. With the system pursued at this mint the resulting dilution is about 18° Baume, which is considered the most advantageous strength. After charging, steam is turned on through the leaden coils, and the liquor becomes gradually heated to the desired temperature. The time required for complete precipitation is 24 hours of constant heating; but as the mint is ordinarily working during one shift of eight hours only, three days are consumed in this part of the process.

The method of determining whether complete precipitation has been effected is as follows: A small quantity of the acid solution is drawn off, cooled, and poured into a test-tube. A solution of sodium chloride (strength immaterial) is added. A white precipitate of argentic chloride indicates incomplete reduction; but if all the silver has been reduced, no precipitate occurs. These tests are applied from time to time by the operator, and show the progress of the precipitation.

To remove the precipitated silver from the surfaces of the copper ingots, the latter are scraped twice a day with long-handled wooden spatulas. No especial care is taken to remove by itself all the silver recovered from each separate charge, as ultimately all is saved, and there is no necessity for segregating the results of each operation. Indeed, to attempt to do so would be to entail much additional labor, resulting in insignificant advantages, as the system of dividing the responsibility and accountability serves as an effectual check upon loss or error from this source.

The copper ingots last about two weeks, the gradual wastage being made good by the addition of fresh quantities of copper. Each residual ingot averages eight ounces in weight. Thus the whole of the original charge of copper placed in a vat at any one time may be assumed (disregarding the fresh ingots added) to have been diminished in weight from 1000 to 25 pounds; and the average amount of copper converted into cupric sulphate being taken as 19 pounds 3 ounces for each ingot, the whole amount of copper of the original charge thus converted into sulphate is 975 pounds, or 97½ per cent. The residual copper, now in the form of small irregular nuggets, is washed upon removal from the vat to detach any adhering silver, and is sent to the ingot-melting room, to be used in alloying the mint-fine gold and silver to the standard coin fineness.

Sweetening the precipitated silver.—This operation is analogous to the method of purifying the parted gold, and consists in repeatedly washing with hot water the precipitated silver collected from the faces of the copper ingots. The mountain water from the mint service-pipes is very pure, and contains no chlorides. Were the latter present, they would necessitate a distillation of the water to prevent the formation of argentic chloride. There are four wooden filtering vats lined with sheet lead. The internal measurements are: Diameter at top, 28 inches; diameter at bottom, 24 inches; depth, 24 inches. The filters are of unbleached muslin sheeting. When old, they are burned, and the ashes are returned with the sweepings, etc., at the close of the fiscal year.

Disposition of the cupric sulphate solution.—As the precipitation of metallic silver upon the copper ingots proceeds, sulphate of copper is formed, replacing the sulphate of silver in the solution. After all the silver has been thrown down the solution of cupric sulphate is siphoned out from the precipitating vats and is drawn through leaden pipes into a lead-lined tank outside the building, whence it is removed by the contractors. It is used by the Lyon Mill and Mining Company at their works in Dayton in the amalgamation of tailings. The contract strength is 20° Baume, and the price paid in the census year was at the rate of 17 cents per pound for each pound of copper used in the mint refinery.

Prevention of loss of precious metal in the refinery.—The floor is covered with sheet lead throughout and is mopped several times every day. Whenever a portion of any solution is spilled it is at once wiped up. The mopcloths are finally burned and the ashes are returned with the general cleanup of the mint at the close of the fiscal year. All savings of this kind are credited, according to assay, to the melter and refiner in making up the annual accounts. The savings also include slags, sweepings, furnace ashes, flue dust, burned filters, old cupels, broken crucibles and stirrers, etc.

Manufacture of silver-cake.—The wet and loose silver, after sweetening, is squeezed into consistent shape by powerful hydraulic presses, and is then dried in a special furnace. Two of these presses are used. The pressure exerted is 40 tons to the whole area of the plunger face. The plunger is 12 inches in diameter, and the collar, which fits closely on the plunger, is 12 inches deep. The weight of a single pressed cake before drying is 1100 to 1200 ounces, and

its volume is about one-quarter of that of the unpressed charge.

Drying the pressed silver-cake.—One drying furnace is used. It is 34 inches wide, 13 inches high, and 8 feet long, and has a flat roof. The lining is of fire-brick, and the frames and doors are of cast iron. The grate area is 2 by 8 feet, and the grate-bars are 1 inch wide and five-eighths of an inch apart. The fuel used is yellow pine, in 4-foot sticks. The cakes are charged in pans, supported by six longitudinal bars, 1½ inches wide, with intervening spaces of 3½ inches. When completely dried, but not fused, the cakes are sent to the ingot-melting room and melted. The product is then known as mint-fine silver.

## The Ingot-melting Room.

This room is on the first floor at the rear, adjoining the rolling-room, and is 23 feet 1½ inches by 22 feet 8 inches in size. It belongs to the melter and refiner's department, and is in charge of a foreman, with three helpers. The length of shift is eight hours. The work done here is: *a*, Melting the silver-cake and the sweetened gold separately into mint-fine metal; *b*, preparation of standard coin alloy and remelting of clippings from the cutting-room; *c*, casting the alloy and the remelt into ingots; and *d*, cleaning the ingots and dressing them into shape.

In this room there are five furnaces, all alike. They have heavy cast-iron shells, lined with fire-brick, and are 16 by 16½ inches in area, 17½ inches deep in front, and 20 inches deep in rear, measured from the grate to the bottom of the flue. The flues are 6 by 8 inches, and lead to the main stack. The doors are of cast iron, steeply inclined toward the front. Lignite anthracite is used as fuel. The crucibles and stirrers are of graphite and clay mixed, the sizes of crucibles used being Nos. 45, 60 and 90. No. 12 Dixon crucibles are employed for dipping cups. The flux is borax and sometimes also niter, sal ammoniac, bone-ash and powdered charcoal. A melt of silver usually consists of from 5000 to 6000 ounces, but a melt of gold is smaller and is variable.

System of sampling mint-fine silver.—A cupful of about 200 ounces is taken from the top of the melt. Of this quantity all but five or six ounces is poured back into the crucible, and the remainder is cast into a small assay bar, stamped with the assay number of the melt and also numbered "1," to indicate that it is the top sample. When the large pot is nearly empty this process is repeated, and a second assay bar is obtained, which is stamped as before, but numbered "2," to denote that it is the bottom sample.

System of sampling mint-fine gold.—A similar method is practiced with gold, except that the assay bars cast are 10 ounces in weight.

Molds.—The molds are of clamped cast iron, and for gold, the series consists of one size each for double-eagle, eagle, half-eagle and quarter-eagle ingots. Quarter-eagles are not coined at this mint, though the necessary molds, dies, etc., are on hand. For silver ingots three sizes of molds are used; one for quarters, one for halves, and one for dimes and standard or trade dollars. The dollar mold produces ingots from which strips for punching a double row of dimes are rolled. The total stock embraced 135 ingot molds, as follows: Double-eagle, 6; eagle, 10; half-eagle, 10; quarter-eagle, 10; dollar and dime, 36; half-dollar, 36; quarter-dollar, 27. The duration of the molds is indefinite. They are said to become better as they grow older.

The ingots are cooled and cleaned by being plunged into a bath of cold water, slightly acidulated with sulphuric acid, in the proportion of 5 ounces of the commercial acid to 25 gallons of water.

Manufacture of standard gold ingots.—On the report of the assayer as to the fineness of the samples of mint-fine gold (which average 0.997 gold and 0.003 silver) the melter and refiner bases his computation as to the amount of copper required to reduce a given weight of mint-fine gold to the coin standard. The law prescribes that the proportion of copper shall not be less than 0.090. After placing into the crucible the proper amounts of gold and copper, clippings from the cutting-room may be added to complete the charge. The average weight of gold-ingot melts is 3000 ounces. In sampling the coin ingots a center chip is taken from the heads of the first and last ingots of the melt, and from the assays of these samples the assayer certifies to the alloy being of the proper proportions.

Manufacture of standard silver ingots.—The calculation for copper is similarly based on the assayer's report as to the fineness of the mint-fine silver. The proper amounts of silver and copper having been placed in the crucible, the charge may be filled out with clippings from standard silver strips, as in the case of the gold melts. The average weight of the silver-ingot melt is 1800 ounces. Granulations are taken from the top and bottom of each melt, the two samples together weighing about 0.30 ounce.

Legal tolerance.—The legal tolerance is the slight variation allowed by law from the absolute standard. For gold this margin is 0.0015 each way from the standard; that is, the coin may contain from 0.9985 to 0.9015 gold. For silver the allowance is 0.003 each way from the standard, or, in other words, the coin may legally vary from 0.997 to 0.903 in silver.

Actual working tolerance.—The mint regulations prescribe much greater accuracy than is required by the law. In mint practice the gold ingots are not allowed to vary more than 0.0005

\*From the census report on the "Statistics and Technology of the Precious Metals," by S. F. Emmons and G. F. Becker, special agents. The description of the mints and the processes applies to the year 1881, at which time the mints were examined.



from the standard, and the silver ingots are kept within a range of 0.0015. Thus the gold ingots actually only vary from 0.8995 to 0.9005, and the silver from 0.8985 to 0.9015 in fine metal.

**Liquation of silver in standard ingots.**—In cooling, there is a partial segregation of silver toward the center of the ingot, which results in making the center richer than the edges. It is found that the central portion of a rolled strip of standard silver prepared from such an ingot (the molecules during the rolling process maintaining the same relative positions to each other laterally that they had in the ingot) may sometimes be from 0.0005 to 0.001 finer than the edges of the same strip. This variation differs with the character of the strips; that is, for which sized coin they are intended. The planchettes are therefore slightly finer than the clippings, the greater bulk of the latter being from the edges of the strip, while the planchettes contain proportionally more of the central part. A slight allowance has sometimes been made to offset this irregularity. The alloy of gold and copper does not act in the same way, being more stable, and if there is a similar liquation it is in an imperceptible degree.

**Dressing the ingots.**—The ends of the ingots are squared by a clipping machine, the invention of the late John A. Eckfeld, of the San Francisco mint. This is a very compact and convenient machine, consisting of a vertically-sliding steel jaw in combination with a fixed steellower jaw, the driving machinery being inclosed in an upright frame or post. The ingots are then clamped in a vise and the rough edges dressed down by a 14-inch bastard file. After trimming, the ingots are sent to the rolling-room. The standard silver ingots weigh from 48 to 50 ounces each. The gold ingots for eagles weigh 69 ounces, and those for half-eagles, 44 ounces.

The floor of the ingot-melting room is covered by hexagonal cast-iron gratings, easily removable when the room is swept. Wherever practicable, as for pails, tongs, etc., the utensils here used are of copper. Iron discolors the silver ingots. A settlement of the standard ingots is made weekly. Bullion is received in the melter and refiner's department on the 1st and 15th of each month. All bullion is reweighed on receipt, in addition to the tally made by the melter and refiner or his assistant, when it is weighed out and delivered by the weigh clerk.

#### Coins of 1886.

There were 7,740,000 coins struck from the presses at the three United States mints last month, of which 152,000 were gold, 4,990,000 silver and 2,598,000 nickel. There were 3,000,000 standard dollars made, the largest for any month. The coinage for October and for the first ten months of the calendar year is as follows:

	For October.	Jan. 1 to Oct. 31.
Double eagles.....	\$ 360,000	\$ 1,290
Eagles.....	580,000	9,541,400
Half eagles.....	10,150	16,242,055
Three dollars.....	264	264
Quarter eagles.....	586	10,150
Dollars.....	3,000,000	26,173,625
Standard dollars.....	459	459
Half and quarter dollars.....	199,000	463,731
Dimes.....	33,100	42,423
Minor coins.....		
Totals.....	\$4,172,100	\$52,474,932
In 1885.....	5,252,908	44,936,750
In 1884.....	4,343,197	44,433,348

In 1885 the coinage embraced \$13,874,880 in double eagles, against \$17,511,600 in 1884. Only sample lots of this coin have been made this year. The coinage of standard dollars this year is nearly \$6,000,000 larger than in either of the previous two years.

**PENNIES.**—The Director of the U. S. mints states that the circulation of pennies in this country is confined to localities where odd change is exacted by way of street railway fares, etc., and especially by the extraordinary increase of late of shops whose policy it is to fix prices at odd amounts, that is to say, at prices not corresponding to the denominations of the Sub-treasury coin. The Director referred to the 99-cent store, so called. The Director is now endeavoring to ascertain the total active circulation of pennies and five-cent pieces, and considers that not less than \$7,000,000 of pennies are now in active circulation in the United States. The mint at Philadelphia is now turning out minor coin to the value of \$3000 a day, \$200,000 ahead of the supply. This amount will soon be made up and the public want will be fully met, despite its tendency to get into particular channels and to accumulate at public depositories. Orders for minor coins are filled in the order of application, but the Superintendent of the mint will probably be obliged to resort to the expedient of filling large orders in two instances.

**NEW ARMY HEADQUARTERS.**—Major-General Howard, commanding the Department of the Pacific, has taken up permanent headquarters in the Phelan building, on Market street, occupying the entire floor. He has selected rooms 201, 202 and 203 for himself and his secretary. The other rooms will be assigned to his staff officers and their clerks.

The acid works in Dayton, Lyon county, Nev., were destroyed by fire on the 11th inst. The loss was \$25,000; insured for \$8000. The property was owned by J. M. Douglass.

#### Tulare Lake.

This is by far the largest lake in California, measuring about 35 miles in width by 50 miles in length. Within a few years since its length was over 60 miles. Its western border is said to be a comparatively trackless desert, a few isolated ranches comprising all the settlements. The traveler who passes along that way must provide himself with water and food for himself and animals over long stretches of hot, dry and dusty country. And yet, when water is provided for irrigation, no doubt the land can be made a garden spot. It is not far from the northern border of this immense lake that we find the rich agricultural lands of Mussel slough, embracing Hanford and other enterprising settlements. The name Mussel slough is derived from a stream that empties into Tulare lake containing great quantities of fresh-water mussels.

The north, east and south shores of the lake recede very gradually to the lake, and for miles out a boat can be propelled by pushing with poles touching the bottom. On the west side the shore is more abrupt.

Abundant flowing artesian wells are obtained at a depth of about 400 feet on the eastern and northeastern and southeastern borders.

At the mouth of Tule river, 13 miles west from Tipton (on the S. P. R. R.), is kept a small steamer capable of conveying about a dozen individuals. It is used by hunters who have a camp at that point. Trips are made once a week or so across the lake. At some seasons of the year large quantities of game are secured for the S. F. market—principally ducks, geese and terrapin. A handsome species of large white swan inhabit the lake winters, going north summers. Big pelicans are often seen. Grebe, a smart and quaint-looking diving bird, larger than ordinary ducks, are increasing in numbers. The fine, soft and pure white down of their breasts and bodies, except the upper portions, makes their skins highly prized by many ladies for warm capes and ornamental dress trimmings. Snipe, as well as some other varieties of game, are found in greater or less quantities.

Probably no other one place in the United States affords as many rare and easily-obtained luxuries for four-footed swine as the borders of Tulare lake.

In the spring of the year good-sized fish—locally called mullet—force their way in among the tule reeds in immense quantities. Like catfish, they have large heads. This makes locomotion difficult in the tules, and they fall in legions an easy prey to the swine.

The aboriginal tule hog is pictured in the minds of the oldest inhabitants as being from 6 to 10 feet long and 4 feet or more in height, with legs slim and fleet enough to create a desire on the part of ordinary two-legged animals to give them plenty of distance. By cross-breeding with modern breeds of swine, the wild hogs have become improved and less ferocious. They have also imparted their fishing proclivities to the domestic animal, and he can now swim for fish, and dive and dig for mussels along the shores of Tulare lake, as expertly as his ancient porcine predecessors. Thus, with fishing, fresh clam excavating and digging a very nutritious species of nuts which grow on the roots of a peculiar species of a reedy-like grass, which grows abundantly in places along the shore, the Tulare lake porker easily gathers unto himself a daily feast unequaled by his swinely brethren of any other hunting ground.

It is said to be in contemplation to put on a steam ferry-boat next summer to make regular trips across the lake.

Notwithstanding its alkaline qualities, this is a beautiful and grand body of water. From the fact that a few hunters and cattlemen are the only human beings who have occasion to sail upon its immense bosom, or even look upon its great and usually placid face (except from long distances), but little is said about it in public print or otherwise. At this season of the year, at least, the water is not so unpalatable as the writer had supposed it to be from hearsay.

During the past 20 years the borders of the lake have greatly receded, leaving a large amount of the richest tillage land to be found in our State. Yet there was a time, since 1849, when Tulare lake contained much less water than at present. This is evidenced by old barns and corrals now standing in shallow water a long distance from the water's edge.

The slope on the east side to the lake is not much, if any, greater than one foot per mile, so that its tule border prevents those living near from viewing its surface without rising to an elevation or visiting its very shore. Probably not one citizen in twenty, of Tulare county, has ever visited or enjoyed a near view of this remarkable inland body of American waters.

It seems to us that Tulare lake merits more attention than it receives. It lies quite near Tulare City, which promises to be a metropolis of the upper San Joaquin, and in a county which this year is the banner grain county of the State. It should receive the attention of the scientific explorer, for it must contain a wealth of animal and vegetable life which is new to science, and perchance minerals of great interest and importance. Navigation of the waters of the lake may add much to the information we have about the west shore, and it is not unlikely that there may be found many places worthy of settlement in this compara-

tively unknown land, which includes both the immediate borders of the lake and the foothills of the Coast Range beyond. We predict that an exploration of this region may disclose such resources in soil and mineral that the wonder will be that they could have remained unknown so long.

#### A Shaft Full of Water Tapped.

The Deadwood Mining Company have been engaged for some time in extending their tunnel so as to connect with the incline which is filled with water, the pumps having been stopped some five or six years ago. The tunnel is about 200 feet below the surface of the incline. As J. J. Lyons, the superintendent, recently found it was nearing the incline, he took great precaution to prevent any accident occurring by the water leaking in upon the workmen. On Friday, while Mr. Lyons was at the head of the tunnel breasting out some quartz, he was called by William Harrison, who was working about 40 feet away from him, to come quick and help him put some boards in the side of the tunnel, as the dirt was caving and a stream of water was pouring in. Mr. Lyons hurried to the spot, took in the situation, and said: "Let's get out of here as soon as possible." They had over 1000 feet of tunnel to traverse before getting out, and in their hurry their candles went out and they had to grope their way in darkness. They managed to get out safely, except receiving numberless bumps from the timbers overhead. They met the carman just coming into the tunnel for a load of quartz, and to him they shouted: "Get out as quick as you can." He immediately threw himself on the other side of the car and pushed it out, Lyons and Harrison following. The car was pulled up on the bank and everything made safe in short order, but none too soon. In a minute or two at least 10,000 inches of water came rushing through the tunnel with a pressure of 200 feet. It was discharged into Deer creek. An examination of the tunnel on Saturday showed that no damage, whatever, had been done to the timbers, it having stood the test admirably. The company will now be able to work a chute of ore that runs in proximity to the incline and which paid the company excellent returns in years gone by. The pump, which has been submerged for several years, will also be started up, and an effort will be made to put the mine on a paying basis.—*Nevada City Transcript.*

**A PLACER MINE DISPUTE.**—The Supreme Court has confirmed the judgment of the Superior Court in the case of McLaughlin vs. Del Re et al., by which the defendant was awarded \$470 damages, and an injunction granted restraining the plaintiff from trespassing on a certain placer mining claim in Old Gulch, Calaveras county. It appears from the findings that defendant had a claim on the hillside at Old Gulch and used the hydraulic mining process. He had worked this claim since 1864, and had deposited the "tailings" and debris in a certain place during that time. In 1868, plaintiff took up a claim on the land used by defendant for the debris, and had constructed a flume and ditch to convey the water necessary to mining. The debris, however, continued to come from the defendant's claim above, and destroyed plaintiff's ditch and flume. The court was of an opinion that the evidence, though conflicting, warranted the findings. Hence the judgment.

**BAYHORSE, IDAHO.**—C. P. Mason and B. B. Van Deusen, of Salt Lake, are in Bayhorse, Idaho, arranging for putting in a concentrator at the smelting works there for concentrating the Beardsley and other ores. The machinery is furnished by the Utah & Montana Company, Salt Lake, and will be shipped from that city early next week. The capacity will be from 50 to 75 tons of ore per day, and will be ready for use by December 1st, if the weather is favorable. The same company is also furnishing a Huron wire-rope tramway between the Beardsley mine and the concentrator, the length of which will be some 3500 or 4000 feet. This tramway is also to be erected at once. This looks as if the Bayhorse will be soon put in active operation after the long spell of idleness pending the Beardsley-Excelsior litigation, and better times may be looked for in that old and reliable camp.—*Idaho Statesman.*

**SCHOOL OF MECHANICAL ARTS.**—The California School of Mechanical Arts was endowed by the late James Lick with \$540,000. The object of the fund was to educate males and females in the practical arts of life, such as working in wood, stone, iron or other metals. The trustees are: Horace Davis, A. S. Hallidie, John O. Earl, John H. Boalt and William Ashburner. A conference will soon be held with President Holden, of the State University, Prof. Rising and others in regard to the best means of starting the school. The trustees have been in communication with instructors of technical schools in the East, and have received considerable information.

The San Francisco ironmolders have adopted resolutions opposing working on Sundays and legal holidays unless double pay is received. A copy of the resolutions will be sent to the proprietors of the various foundries.

#### Cinnabar in New Mexico.

The Socorro (N. M.) *Bullion* says: The reported discovery of cinnabar in this county, which was announced in last week's *Bullion*, has had the effect of producing no inconsiderable stir among mining men. This is, however, not the first time that such an agitation has been caused in this vicinity. In 1880, as we stated in a previous issue, cinnabar was found in inconsiderable quantities on the Alamillo grant. The same character of mineral was found by John Smythe the years previous to this if our memory is not treacherous, in the vicinity of Bear mountain. But the earliest mention of that mineral in this county is that in which a sheep-herder who lived in Sabinal, while grazing his flock on the Ladrones, after a hard rain, many years ago, found metallic mercury in the bottom of a spring on the slope of that range, which had been uncovered by a cloudburst which occurred in that vicinity. The bright liquid metal was a new element to the unsophisticated herder, and in wonder he left his flock in charge of Providence and took the trail without loss of time for his home. Upon his arrival, a hasty organization was formed, which, led by the discoverer, departed for the spring in which the quicksilver was discovered. But upon reaching the scene, there having fallen in the meantime unusually heavy rains, the spring had forever been closed from sight by debris, and the topography had been so much altered that the guide, after several days' search, utterly failed to find the spot which concealed the treasure which was to make him and his companions forever rich.

Prof. Sanders informed J. D. Woodyard and the writer last year that in Water canyon he had discovered on several of the claims there gold and silver in amalgam with mercury; and traditions are current that this metal was seen on the east side of the Rio Grande in this county by the earliest Spanish adventurers who settled in this section of New Mexico.

We are not at present in a position to declare ourselves as to the importance of the reported discoveries, but will use an effort to furnish our readers an impartial statement as soon as our examination of the situation has terminated. There are parties already in Socorro prepared to take hold of the property and erect a plant for the treatment of its production, in case the discovery is corroborated and found to be of sufficient extent to warrant the investment of capital.

**HOPES OF A PROSPECTOR.**—The sanguineness of prospectors is simply remarkable. Their hopes are always high, and the possibility of non-success is seldom thought of. This is well illustrated in the case of an old prospector who lives near Sierra City. He is commonly called Martine. Martine came to Sierra City in the early fifties, and has ever since devoted his time to prospecting. His efforts in the way of finding valuable ledges have been attended with more than ordinary success, he having discovered the celebrated Keystone and Phoenix mines. But, like the inventor, who rarely reaps the reward of his invention, so it is with the prospector; his valuable find falls into other hands, and he finds himself in no better financial condition than before. Martine's success in finding good ledges for other people to wax rich and fat on has encouraged him to devote 20 long years of his life in seeking for some rich ledge that is supposed to exist near the Kirby sawmill about three miles from Sierra City. Martine is satisfied that the ledge is there, and his repeated failures to find it in no way discourage him. We hope he will succeed. He being, however 65 years old, the chances are against him, unless he obtains from the Lord an additional 20 years' lease of life.—*Sierra Tribune.*

**WORKING TAILINGS IN IDAHO.**—General Winters has started the work of erecting a concentrator to work the tailings from Camas No. 2 mine, in Wood river. There are probably 4000 tons of tailings at the mine, which carry from \$10 to \$75 per ton. The concentrator will be erected on Camp creek, about a mile from the mine. The works will be the most primitive known, and consist simply of any desired number of flat sluices about 18 inches wide and 100 or more feet long. These sluices will be covered with gunny sacks, which will catch all the heavier particles of stuff, which contain precious metals; and by sweeping these off every half-hour or so the "concentrates" will be swept into a box, whence they can be shoveled and hauled to a market in Hailey. The cost of hauling to Camp creek and concentrating Gen. Winters thinks will not exceed \$1.25 per ton.—*Idaho Statesman.*

**INSTANTANEOUS PHOTOGRAPHS.**—Instantaneous photographs of the hearts and intestines of various animals have enabled Dr. W. G. Thompson to determine the action of the organs more clearly and accurately than is possible by other methods. Such photographs may prove of great value in showing changes effected by drugs, as well as in their physiological teachings.

**SILVER GOES UP STEADILY.** There's no use disguising the fact that prosperity is once more getting its grip on the country, for all of which we are truly thankful.





A. T. DEWEY. W. B. EWER.  
DEWEY & CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER, SENIOR EDITOR.

#### Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrearages must be paid for at the rate of \$3.50 per annum.

#### Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square).....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.  
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Nov. 20, 1886.

#### TABLE OF CONTENTS.

**EDITORIALS.**—Evans' Compound Fly-wheel Pump; Mining Accidents; Closing Down of the Anaconda Mine, 325. Boosting the Mining Share Market; Gold and Silver Mills; California Chemical Products, 328. Fox's Corrugated Boiler Flue; Lead Mining in Nevada; The Iron Mountain Finco and its Effects, 329.

**ILLUSTRATIONS.**—C. H. Evans' Compound Fly-wheel Pump, 325. The Fox Corrugated Boiler Flue, 329.

**MISCELLANEOUS.**—The Mining of Gold and Silver, 326. Coins of 1886; Tulare Lake; A Shaft Full of Water Tapped; Cinnabar in New Mexico, 327.

**MECHANICAL PROGRESS.**—Important Invention in Copper Gas Tubing; Multiple Motors; Combination of Metal and Glass; A Self-feeding Hammer; Rolling Small Wire Rods; High Speed and Increase of Fuel; Piston Area and Heating Surface; Improvement in Setting Tires, 330.

**SCIENTIFIC PROGRESS.**—Gravitation on the Different Planets; Pictures in the Fire; Light as a Speed Indicator; Force of Explosions; Worlds Great and Small; The Electric Submarine Cable; Annual Rings of Trees; The Roll of the Ocean; Jupiter's Great Spot; Torpedo Inventors; The Electric Light; Strength of Ice, 330.

**USEFUL INFORMATION.**—Danger from Tarrad Cast-iron Water Pipes; Artificial Pumice-stone; A Transportable Electric Light Tower; A Lively Appetite; To Soften Bright Work; How to Prevent Crowding; Copper Telegraph Wires; Painting Zinc Work; To Kill Grease-spots before Painting; Lead and Oak Wood, 331.

**GOOD HEALTH.**—Swallowing Edge Tools; Meat Should be Bolted, not Eaten; Breathing Through the Mouth; Sleep as a Tonic; Milk as an Odor Absorbent; Sugar as an Article of Diet; Strength of Blood-vessels; Tarweed for Medicine; Poison Oak Antidote, 331.

**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 332-33.

**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 336.

#### Business Announcements.

Hand Rock Drill—George T. Emery.  
A Chance for Mining Men—G. R. Wilson.  
See Advertising Columns

#### Passing Events.

The closing down of the great Anaconda copper mine, Montana, this week is connected with the wages question, the company desiring the men at the smelter to accept \$2.50 instead of \$3.00 per day. A large number of men are thrown out of employment. The mine will not start up until next May.

There have been a great many mining accidents lately, most of them caused by caves in mines or by carelessness in blasting.

The excitement in mining stocks in this city is on the increase, and is more intense than any that has occurred since bonanza times. The increase in value of shares has been very large within the past month.

The price of silver has gone up above the \$1 mark and silver miners are greatly encouraged thereat. Some mines that expected to close down have taken a new lease of life.

Mining operations in this State are in a flourishing condition generally. We have here the benefit of a mild climate in winter, so that operations in most parts of the State are carried on all the year round.

The reported stopping of mining operations at Cusihiuriacheo, the big mining camp in Chihuahua, turns out, on the part of the American company at least, to be only temporary. It was caused more by the lack of fuel than anything else. This has been remedied now, and operations will be resumed at once.

#### Boosting the Mining-Share Market.

Once more, and for the first time in a number of years, the mining-share market of San Francisco has gotten into one of its old-time tantrums. Though a mere flurry compared with the whirlwind of excitement that in former days swept over the community, the movement in shares has for a week or two past been decidedly breezy. This improvised market has not, to be sure, been attended with very heavy sales or extremely high prices; nevertheless, it has for a month or more past been quite active and still so remains, transactions having been confined mostly to Comstock shares. Having been preceded by no great strike in the mines, this stir in stocks came upon the community unawares. But this is the way these speculative cyclones frequently occur, there being no signal service to foretell their advent. They very often burst upon us from a clear sky, coming suddenly and when they are least expected. Though making their appearance so unannounced, they have not for this reason proved the less mischievously effective.

Having been intermitted so long, those not directly interested had begun to hope that the last of these pernicious stock excitements had been seen. But in this it looks now as if this hope were doomed to disappointment. It looks as if these insane movements were destined to a periodical return, the most that we can hope for being that we shall, as in this last interregnum, have gracious respite from their any more frequent occurrence hereafter. Looking back to the inception of stock gambling on this coast, it is seen that these speculative movements have at irregular intervals made their appearance, coming often, as in this instance, without premonition or reason. Such being the case, we despair of any relief from this evil, the more especially as certain parties seem able to get up one of these stock deals whenever their selfish instincts may prompt them to do so.

As already intimated, this recent appreciation in the price of mining shares has not been due to any new or important ore find. That such is the case must be obvious to all, inasmuch as little or no exploratory work has been prosecuted of late in the upper and only fruitful zone on the Comstock lode. All the ground situated above what was long since demonstrated to be almost wholly barren territory, was extensively and thoroughly exploited years ago, this work having been done so effectually as to preclude the possible existence there of any considerable quantities of ore, other than such as was then developed. All the high-grade ore found at that time was taken out and milled, that of poorer quality having alone been left behind. While there is, beyond any question, some excellent ore now being raised from the Consolidated California and Virginia mine, the quantity will not probably prove to be large; unless to be sure, it was left there through design, since, with the prospecting work done in all the upper levels of that mine, it could hardly have been missed, or accidentally overlooked. The upper sections of the great ore channel have not, we admit, been gone over with a fine-toothed comb; but they have been pretty well hackled by other and equally efficacious methods. The whole lode has, in fact, been chambered from top to bottom with drifts, tunnels, crosscuts and winzes, from which, again, borings with machine drills have been extended for thousands of feet, and in every direction. Pierced so through and through, how any large or even considerable bodies of rich ore could have escaped detection, supposing any such bodies to exist, passes comprehension.

As stated in an article on the subject, published not long since in the columns of this paper, there remains still in the upper portions of these Comstock mines a great deal of low-grade ore, the most of which can be extracted and milled with a fair margin of profit. But that there exists there any more bonanzas is more than problematic, as they who hold to a contrary opinion will, if they proceed to act on the same, be very likely to find to their grief.

During the earlier history of the Comstock mines, when the uncovering of a bonanza was a thing that might almost any day be looked for, the occurrence of a furor like that which is now running its course was an event that might be winked at, if not wholly pardoned. But that a craze of this kind should now be suffered to obtain is so without reason or excuse that its

originators, aiders and abettors may justly be held amenable to public condemnation. That this craze will prove to be short-lived and work less injury than has attended most of its predecessors is a consummation earnestly to be wished and devoutly prayed for.

#### California Chemical Products.

In looking over the statistics of the manufacture of chemical products and salt, we find that California, for a comparatively new region, stands very fairly. There are in California 42 establishments devoted to manufacture of chemical products, a percentage of 3.11 as compared with the total in the United States. The total value of products is \$3,179,700, or 2.71 percentage of total value in the United States.

In the distribution of manufactures of special products, with approximate value of each, compared with the total value, California stands as follows: In nitro-glycerine manufacture, California stands No. 1, with an approximate percentage value of product of 36; in glycerine-making, we stand No. 3, percentage 4; stearic acid candles, No. 2, percentage, 16; oleic acid soap, No. 5, percentage, 6; sulphuric acid, No. 8, percentage, 3; castor oil, 4, percentage, 6; white lead, No. 8, percentage, 4; other salts of lead, No. 4, percentage, 9.

Out of 1349 establishments of the character being considered in the United States, California has 42. Value of buildings, \$388,300; value of machinery, \$409,725; capital invested, \$2,406,350; wages for year, \$282,214; employees, 573; value of materials, \$49,000. Among the chemical products enumerated are the following: Borax, 1,422,443 pounds production; value, \$107,333. Castor oil, 50,000 gallons; value, \$45,000. Stearic acid candles, 2,596,000 pounds; value, \$375,000. Oleic acid soap, 2,135,000 pounds; value, \$44,300. Other hard soaps, 8,927,500 pounds; value, \$429,860. Glycerine, 394,800 pounds; value, \$38,736. Nitro-glycerine, 1,242,424 pounds; value, \$655,680. Manufactured manures, 1000 tons; value, \$200,000. White lead, 4,000,000 pounds; value, \$260,000. Other salts of lead, 100,000 pounds; value, \$60,000. Sulphuric acid, 5,105,995 pounds; value, \$129,195. Value of all other products, \$959,596; total value of all products, \$3,179,700. As might be supposed, San Francisco is the center of manufacture of the State.

#### Personal.

Mr. D. Ernest Mellis has left this city for Mexico, not for New York, as was stated last week.

John Hays Hammond, the mining engineer formerly residing here, but latterly in New York, is on a business trip to San Francisco.

Mr. C. H. Aaron, the assayer, is at Nogales, Arizona. He writes us that so far he sees no special improvement in business since the capture of Geronimo, who had been greatly blamed because it was not so good as it might have been.

Mr. F. G. Corning, a prominent mining engineer of New York, is visiting this State looking at the mines. He was up at Grass Valley last week, but has returned to this city and called at the editorial rooms of the Press on Thursday.

G. de la Breylise, of Paris, the celebrated French mining engineer, is at the Palace hotel. His name is connected with several noted feats of civil engineering on both sides of the Atlantic, but he is specially known in America for some achievements in mining enterprises with which he has been connected.

George Tew, of Sombereite, State of Zacatecas, Mexico, is in town on a visit. He is largely interested in mines there. Mr. Tew is well known in California as a prospector and miner, having visited all parts of the coast in former times. Of late years he has been in the mining districts of the Sierra Madre, Mexico.

Mr. K. Yamada, mining engineer of the Imperial Mining Bureau of Ikuno, Japan, has been visiting the Comstock and other Nevada mining districts. He has now gone to Utah, and from there will visit Colorado, after which he will return to San Francisco, and thence to Japan. He is gathering information about mines and reduction works.

The Giant Powder Company's dividend this month is the first by that corporation since

June, 1884. Up to that time, however, it had paid regularly every month for 13 years.

#### Gold and Silver Mills.

The processes of working gold and silver ores vary more or less with the character of the ore, but where they are "free-milling"—do not require roasting or previous preparation—the process is very much the same all over the coast. To those not familiar with the process of milling gold ore or silver ore the following brief description will be of interest:

In gold mills the ore coming from the mine is dumped upon the grizzly, where it is screened; that portion which is less than a two-inch cube passes directly into the ore bin; that portion which is larger is fed into the crusher and passes into the ore bin, from which it passes by gravity into the hoppers of the ore-feeders and is fed automatically into the mortars, as required.

The size of screen generally used on the mortar is a 40-mesh or a No. 9 to 10 slot punched screen. The ore after passing through the screen falls directly upon the plates; if the ore contains free gold only it is allowed to run to waste as tailings, but if the ore contains sulphurets it is conducted from the plates to concentrators, when the sulphurets are taken out. The style of mortar generally used is of single discharge, with copper plate in the back, which can be removed for cleaning. Each mortar (5 stamps) weighs about 5000 pounds. The stamps weigh about 750 to 800 pounds, and are usually run at about 90 drops per minute.

In silver mills ore from the mine is dumped upon the grizzly, which screens that portion small enough to go into the mortars; the balance is passed through the crusher, which falls into the ore bins, from which it passes by gravity into the hoppers of the feeders, from whence it is fed automatically into the batteries. These mortars are generally single discharge and are provided with a 40-mesh steel wire or brass screen, or a No. 9 or 10 slot-punched Russia iron screen. The ore, after coming from the batteries, is conducted into settling tanks, from which it is shoveled into the pans. Quicksilver is introduced (200 pounds to the pan) and the process of amalgamation goes on. After remaining in the pans for from five to eight hours (according to the character of the ore) it is drawn off into the settlers, when by gentle agitation the amalgam and quicksilver is settled, and drawn off into canvas straining sacks; the amalgam remaining in the sack while the quicksilver passes to a tank, from which it is elevated to the pan floor to be used again in the same manner as before.

The amalgam is taken from the sacks or safes and placed in retorts, where, after being heated for from five to six hours, all the quicksilver it contains has been driven off and condensed for use again. The retort is then allowed to cool, when it is opened and the silver taken out, which is in the form of a porous, spongy mass, usually called by millmen crude bullion. This is broken up and placed in black-lead crucibles and melted, with borax and other fluxes to collect the impurities contained, and cast into ingots or "bricks" weighing about 1200 ounces Troy. It is then ready for market, being usually about 990 to 997 fine.

If the ore contains gold it will be found in the brick with the silver.

This process, if proper care is taken in manipulation, will save 95 per cent of assay value; great care should be taken to keep the quicksilver in proper condition; it should be kept perfectly clean in order to utilize its full amalgamating properties and prevent flouring. Flouring is a term used by millmen, and signifies that the quicksilver has segregated or divided itself into myriads of small particles, so fine that they may be held in suspension in almost still water. When quicksilver is in this condition, great loss occurs, not only in quicksilver itself, but in silver, as each particle contains more or less. In mills where the greatest care and attention is bestowed the loss in quicksilver from various causes is considerable, generally from three-fourths to one pound, per ton of ore worked. This, however, has been reduced of late, by allowing the tailings to run into one or more Duncan concentrators, or a machine equally as effective, when a large percentage of quicksilver and amalgam escaping the settlers is caught, as well as the sulphurets, if any are contained in the ore.



## Fox's Corrugated Furnace Flues.

The application of corrugated surface to the furnaces of marine boilers, within the last few years, has marked a distinct advance in this branch of steam engineering. The advantages in economy and efficiency accruing from the use of these greatly strengthened tubes in marine practice are attracting now the notice of steam users generally, and their application to land boilers is steadily increasing. It is only a few years since the Fox corrugated furnace and flue were first brought to notice. Yet there are now over 10,000 furnaces of the Fox construction applied to boilers in all forms. By these means pressures are used varying from 100 to 180 pounds, with furnaces only 3-8 to 9-16 inch thick, and as large as 4 feet 8 inches in internal diameter. This was heretofore quite impracticable.

The engraving given herewith will show the form of the flue. The advantages of the corrugated furnaces will appear from the following statement: They possess, as compared with the plane flue, greatly increased strength to resist collapse, the ratio being 4½ to 1 in favor of the former. The results of a series of tests of this factor, made in the presence of representatives of the English Admiralty, the Board of Trade and Lloyd's Register, indicated the average strength of the corrugated furnace to resist collapse to be four times greater than the plane flue of the same dimensions.

In one experiment with two flues, each 3 feet 2 inches in diameter and 7 feet 4 inches long, both of ¾-inch plate, having sound welded joints, and perfect in every way as to material and workmanship, the plane flue totally collapsed at 225 pounds per square inch pressure, while the corrugated flue stood 1026 pounds per square inch before collapse set in. This series of trials proved that, even when flattened to the extent of 15 inches on both sides, the corrugated furnace will bear 450 pounds per square inch before moving on further to collapse.

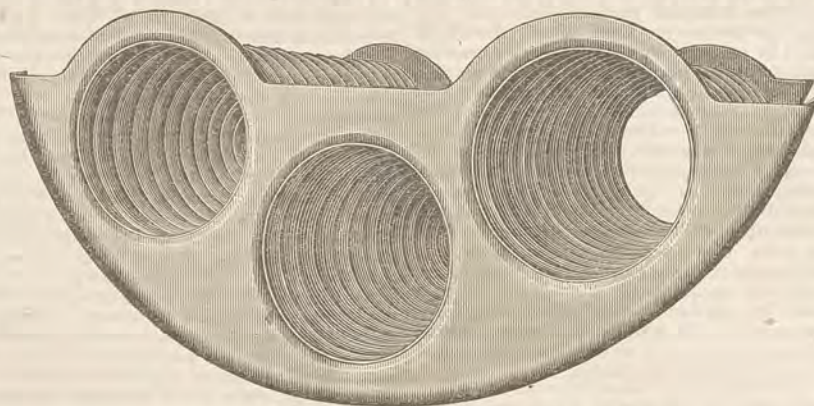
From this important fact there results several notable consequences in respect to the construction of boiler furnaces, as will appear from the following: The great strength of the corrugated surface permits of an increase in the diameter of corrugated furnaces without corresponding increase of thickness of plate. At present they are being made of ¾-inch plate, 4 feet 8 inches outside diameter, to carry 135 pounds pressure per square inch, and constructed of one single plate, the welding being so disposed as to be below the fire-bars. The practicability of employing comparatively thin plates for boiler furnaces by the use of the corrugated surface, the absence of joints in contact with the flame, and the employment of the unusually high pressures which this form of furnace construction permits, are factors which point to a notable economy, and practice has demonstrated the truth of this presumption, both in respect to a considerable diminution in the consumption of fuel to indicate a given horse-power, and, in the case of marine practice, in the ability to develop the required power with fewer boilers, which means a reduction in the number of stokers required and an increase of available space for freight, or longer voyage for the tonnage of fuel consumed.

A series of official trial tests of the evaporative power of various types of boilers, which

were made lately, is said to have developed the fact that those fitted with the Fox corrugated furnace showed first on the list, having evaporated the greatest quantity of water per pound of fuel consumed, and having evaporated the greatest quantity per square foot of heating surface. That such efficiency should be obtained appears quite reasonable when it is considered that, without increasing the size of the furnace and flues, the corrugated surface affords an increase of 50 per cent in the heating surface which it exposes to the furnace gases, over plane flues of the same dimensions; while the corrugated form, likewise, insures a more prolonged contact and a more perfect absorption of the heat of the furnace gases than it is possible to obtain with plane flues.

Another advantage claimed for the corrugated form of furnace is, that while affording a powerful longitudinal tie to the boiler, it possesses great elasticity, and is free to expand and contract in obedience to variations of temperature, without bringing any extra strain upon the ends of the boiler to which it is attached. An incidental advantage growing out of this expansion and contraction is that it operates effectually to loosen and dislodge the scale and sediment which may be deposited on the flues.

The annexed table exhibits the comparative performance of the boiler and engine of several



THE FOX CORRUGATED BOILER FLUE.

steam vessels, of equal tonnage and dimensions. The marked superiority of performance in the case of those fitted with the triple expansion engines and corrugated furnaces over those having compound engines and plane furnaces, will be noticed. The results are obtained from average voyages at sea.

The Fox corrugated furnaces are used by the leading ship-builders of Great Britain and the United States. Among the principal users of the invention we may name the following: Canard, Anchor, Guion, National, Atlas, Great Western, French Transatlantic, North German Lloyds, Peninsular and Oriental (P. and O. Line), State and Dominion lines, John Elder & Co., J. & G. Thompson, of Glasgow; Oswald Mordant & Co., of Southampton, England; Grand Trunk Railroad, Levis Maritime and Industrial Co., and Watrous Engine Works, Canada; Pacific Mail Steamship Co., John Roach, Wm. Cramp & Sons, Harlan & Hollingsworth Co., N. Y. Safety Steam Power Co., Burland, Brown & Co., I. P. Morris Co., Edgemoor Iron Co., and Risdon Iron Works, Cal., in the United States, and hundreds of others in all parts of the world.

These furnaces are manufactured by the

Leeds Forge Co., of England, under the personal supervision of Samson Fox, the inventor and patentee. The sole agents for the Pacific Coast are the Risdon Iron Works, of San Francisco.

## Lead Mining in Nevada.

During the past year the Eureka Consolidated mine, at Eureka, Nevada, has been worked almost entirely by tributaries. No new ore bodies have been found, and it is not thought that the chances of finding any above the 930-foot level will warrant spending any money in prospecting there. The hydraulic pumping machinery at the new shaft is all in running order, and the new hoisting engine is of sufficient capacity to work the mine to a depth of 3000 feet. A refinery and other improvements have been added to the furnaces for the purpose of reworking the rich slags, etc., accumulated at the furnaces, with the low-grade ores from the mine, large quantities of which may be obtained at little cost. It is thought the new improvements will enable the company to again place itself on the list of dividend-paying mines.

In the company's "receipts" for last year were 18,399 bars, equal to 995 tons, valued at \$313,334; from assessments (3), \$150,000. The

total receipts were \$523,135.

The principal items of disbursement on mine account were: \$30,142 on tribute ore (4120 tons); \$10,136 payroll; \$6459 prospecting labor; the total on mine account being \$61,439.

On a new shaft account, \$51,538—the new hoisting engine cost \$16,000, and \$3764 for freight; labor payroll, \$14,336.

The smelting account aggregates \$231,610. The principal items are: Payroll, \$29,590; charcoal (235,696 bushels), \$54,072; purchased ore (3590 tons), \$124,164.

The improvement account amounts to \$31,260, of which the payroll is \$6858; building material, \$7003; water jacket and castings, \$4598, and the payroll in refinery, \$5980. The speiss experiments cost the company \$5233.

In the refinery account the only large items are \$10,200 for salaries, \$25,290 for refining 18,399 bars base bullion, and freight on this, \$28,299.

The company has now resources of \$98,050, against which are liabilities of \$55,823, leaving \$42,227 net resources. The total receipts and disbursements aggregated \$523,135 for the past year.

## The Iron Mountain Fiasco and Its Effects.

About one year ago certain capitalists, residents of San Francisco, began negotiations for the Lost Confidence, better known as the Iron Mountain mine, situate in Shasta county. In due time these negotiations led to the purchase of that property for the sum of \$125,000, \$50,000 cash and the rest payable out of the net earnings of the mine. This accomplished, the new owners proceeded at once to put up a 20-stamp mill on the mine, the entire transaction, both the purchase and the equipment of the property, having been undertaken and conducted throughout at the instance and under the personal superintendence of a man claiming to be conversant with the whole business, and in whose experience, judgment and integrity these parties reposed such confidence that they followed his advice explicitly throughout, consulting no other mining expert or metallurgist in the premises. This was not a wise thing to do, as the outcome of this venture tends to establish.

But, as remarked, a mill was put up, after which ore-crushing commenced; and now, for the first time, it becomes apparent that this Iron Mountain ore cannot be reduced by simple mill process. It is found to carry too little lead for smelting and too much antimony and other base stuff for treatment without roasting; which latter method would, no doubt, have been adopted, had it not about the same time become apparent that this ore was of too low grade to warrant its beneficiation by such costly process. This having been determined to the satisfaction of the parties investing, they concluded to abandon the enterprise, whereupon the entire property, mill included, was disposed of for less than a tithe of what it had cost them, their total loss having amounted to more than a hundred thousand dollars.

But the loss sustained by these worthy and enterprising gentlemen, though severe and much to be deplored, is trivial, compared with the damage this Iron Mountain fiasco has inflicted upon Shasta county, and to some extent on the entire mining industry of the State.

From this deplorable event one or two useful lessons may be gleaned: First, that it is extremely dangerous for those about to undertake costly mining investments to rely solely on the advice and opinions of any one man, even though he enjoy a reputation based on a long and successful experience. To rely on a person of limited practice or mediocre ability is, in such case, altogether perilous, as the parties in question have found to their cost. Again, \$125,000 is too much money to pay for a mine so little proved as this on Iron Mountain appears to have been. Then, to put up a costly mill without some considerable ore developments made, is always a mistake, while to put up reduction works of any kind without having first determined that they are adapted for the work to be done, is worse than a mistake, since there can be no possible excuse for it. It is a matter for astonishment that, with these fatal blunders repeated year after year, they should still be of such frequent occurrence! Seeing them so repeated over and over one is led to query, will there ever come an end to them—will ever either the miner or the investor learn what to most people seems so obviously the dictate of common sense?

PROFESSOR RISING, the State Analyst, will read a short paper on "A State Bureau of Chemistry—Its Relation to Manufacturing and Producing Interests," at the annual meeting of the Manufacturers' Association, next Monday night, at the Mechanics' Institute building, on Post street. The association intends having brief special discourses at its sessions hereafter.

ACADEMY OF SCIENCES.—At the last meeting of the Academy of Sciences, Prof. E. S. Holden, of the University of California, read a paper "On the Distribution of Stars in Space," which we shall publish in the Press shortly. Prof. Davidson read a paper descriptive of the recent occultation of Aldebaran.

DIVIDENDS.—The mining companies paid \$160,500 in dividends in this city in October, as follows: Homestake, 40 cents, or \$50,000; Jackson, 10 cents, or \$5000; Martin White, 25 cents, or \$5500; Ontario, 50 cents, or \$75,000; Plymouth Con., 25 cents, or \$25,000.

COMPARATIVE RESULTS OF TRIPLE EXPANSION ENGINES AND FOX'S PATENT CORRUGATED FURNACES vs. COMPOUND ENGINES AND PLANE FURNACES.

Builders.	Name of Steamer.	Tonnage.		Dimensions.			Triple Expansion Engines. Boilers fitted with Fox's Corrugated Furnaces.	Compound Engines, Plane Furnaces.	Average knots per hour.	Tons of coal used per day.	In net gain speed.	Percentage of gain in speed.	Net gain in economy of coal.	Percentage of gain in economy of coal.
		Net.	Gross.	Length.	Breadth.	Depth.								
Richardson, Duck & Co. 1884. Engined by Blair & Co.	"Burgos." Corrugated Furnaces.	1205	1843	260	36	20	Three cylinders, 20 in., 33 in., 54 in. Stroke, 33 in. 170 lbs. steam pressure.		8.5	8.5	.5	6.25	4.5	34.61
Richardson, Duck & Co. 1883. Engined by Blair & Co.	"Eros." Plane Furnaces.	1203	1843	260	36	20		Two cylinders, 32 in. and 60 in. 39 in. stroke, 160 H. P. 90 lbs. steam pressure.	8.0	13.0				
E. Withy & Co., Hartlepool. 1884. Engined by T. Richardson & Sons.	"Para." Corrugated Furnaces.	1160	1790	258.6	34.8	19.5	Three cylinders, 19 in., 35 in., 53 in. Stroke, 33 in. 150 lbs. steam pressure.		9.16	8.71	.41	4.685	4.29	33.0
E. Withy & Co., Hartlepool. 1883. Engined by T. Richardson & Sons.	"Wandle." Plane Furnaces.	1152	1783	258.5	34.5	19.5		Two cylinders, 33 in. and 61 in. stroke, 33 in. 75 lbs. steam pressure.	8.75	13.0				
R. Dixon & Co., Middlesbrough. 1884. Engined by T. Richardson & Sons.	"Jacatra." Corrugated Furnaces.	1562	2433	314.5	33.1	25.4	Three cylinders, 22 in., 37 in., 58 in. Stroke, 36 in. 150 lbs. steam pressure.		10.25	12.93	.75	7.9	5.32	29.15
R. Dixon & Co., Middlesbrough. 1883. Engined by R. & W. Hawthorn.	"Macassar." Plane Furnaces.	1472	2285	300	37	25.7		Two cylinders, 38 in. and 70 in. stroke, 42 in. 80 lbs. steam pressure.	9.5	13.25				



## MECHANICAL PROGRESS.

## Important Invention in Copper Gas Tubing.

The English correspondent of the *American Manufacturer* refers to what appears to be an important improvement in the manufacture of gas tubing, as follows: A new invention which, if heartily taken up, seems likely to prove of considerable value in the gas-tube trade, has just been developed by Mr. Thomas Budworth Sharp, the manager of Numby's Metal Company, Birmingham. His new discovery is the manufacture of small gas tubing in coils of an indefinite length out of copper, intended to supersede the ordinary composition piping used in the gas-fitting trade, and as also made and sold in coils. The sizes in which the new manufacture is produced up to the present are in tubes of one-fourth, three-eighths and one-half inch.

## The Question of Cost.

The practical question which at once arises upon the face of the invention is: How can copper take the place of composition when the former is from three to four times as costly as the latter? The inventor has an easy answer. As a tube of equal or even greater strength can be made with only one-third to one-fourth the weight of metal in it for any given length of tube, the weight per foot is inversely proportionate to the price per pound, and the price per foot becomes the same. Seamless copper tubes are made in lengths of hundreds of feet. Mr. Sharp makes these long tubes without even a suspicion of a joint of any sort, dead uniform throughout, equally smooth in and out, and in lengths of hundreds of feet. The samples of the new manufacture which are now on exhibition in Birmingham give promise of every success.

## The Mechanical Methods Employed in the New Process.

Mr. Sharp dispenses with the cylindrical mandril and bulbed rod employed in the ordinary method of producing copper tube, and employs instead a loose plug. The fore part of this plug is of the diameter which it is intended the interior of the tube shall have after the drawing process, while the rear part of the plug is of larger diameter. The fore end of the tube to be drawn down is reduced in the ordinary way, so that it will pass through the drawing hole; the plug is then introduced into the tube, its smallest end foremost. The plug having been pushed up to the draw place, the tube is drawn in the ordinary way through the drawing hole. The plug stations itself by the motion of the tube at the "eye" of the draw plate. The small diameter of the drawing hole, between which and the rear of the plug the tube under operation is situated, prevents the advance of the plug; and between the plug and the drawing hole, the reduction of the external and internal diameters of the tube, as well as the reduction of the thickness of the metal of the tube, takes place. This process gives very cheap results, but in order to cheapen it still more for tubes of small diameter, the inventor dispenses with the mandril and uses in its stead two drums, from one of which the tube is coiled on to the other, with the reducing tools fixed between them.

**MULTIPLE MOTORS.**—The old maxim that "there is economy in aggregation" may, like most other maxims, meet with some exceptions when put into practice. The power necessary to drive the machinery of a large mill can of course be developed more economically in one large engine than it could in a number of small ones. The first cost will be less, the performance more economical, the cost for attendance and repairs lower, and everything seems to point to the desirability of such a system. Yet is there not a point where the increased cost of putting up, maintaining and running long lines of shafting to convey this power to distant points, the expense attending the running of shafting for the whole establishment when only a portion of the machinery is run, the enormous expense of running a single department overtime, and the liability of stoppage to the whole of the works through accident to one machine, more than equals all the economical advantage derived from the concentrated motor? On a recent visit to a large manufacturing establishment constructed upon the most modern principles, we noticed that one of the departments, although easily accessible to the power of the main engine, was provided with a small Westinghouse engine, it being believed that the additional convenience of being able to run this branch independently of the main shop with a motor suitable in its capacity to the work of that department, would more than compensate for the increased expense of running.—*Exchange.*

**COMBINATIONS OF METAL AND GLASS.**—At last year's Gorlitz exhibition specimens were exhibited of a new ware, partly of metallic luster and partly yellow and red, like amber, topaz or ruby-colored glass. In this new patent process (described in the *Eisen Zeitung*), network of soldered bronze wire, exactly fitting the vessels to be prepared, is pressed into the wooden or iron casting molds, and the mass of glass is then blown in, so that it not only fills up the meshes of the wire netting, but partially surrounds the metallic substance, a durable union of the two component parts being thus effected. The articles are decorated with an

elegant and tastefully arranged filigree work. In some places the wire netting is brought into contact with small plates of the same metal. The difficulty of the process is the discovery of a suitable metallic mixture the properties of which are commensurate with the great heat to which the glass has to be exposed. After the casting the metal is completely black, and has to be gilded to restore its luster.

**A SELF-FEEDING HAMMER** for driving tacks or small nails has been invented by Mr. Emmet Horton, of Dundee, N. Y. It consists of a small hopper or nail receptacle placed above the ordinary hammer-head that separates and feeds nails, and sets and drives them by the swinging motion given the hammer. It holds about one pound of nails thrown in promiscuously, and is designed to be used in all places where rapid nailing is required, such as shingling, lathing, nailing boxes, and a smaller size for upholstering, tacking down carpets, etc. When the device is operated a single nail is forced into a pendent position and so held firmly by springs until the nail is set in its place, then by jerking the hammer upward again the clamp is released from the nail thus stuck in the wood—in other words, the spring clamp slipped from off the struck nail—after which the nail may be driven home by striking it on its head with the hammer-head. It is claimed that in shingling one-third more work can be done than by the ordinary hammer.

**ROLLING SMALL WIRE RODS.**—A patent has recently been granted to Benjamin Weaver, of Pittsburg, Pa., for improvements in rod-rolling mills, which have for their object the rolling of small wire rods such as are used for fence and telegraph purposes. These are at present obtained by what is known as the wire-drawing process, it being impossible to roll the smaller sizes of wire rod with the mills now in use. Mr. Weaver's, it is claimed, will combine in its operation both the rolling and drawing processes. This is made possible by the peculiar construction and arrangement of the mills and their driving mechanism, by which the rod is passed automatically through two pairs of rolls, the second pair of the series drawing it through the first pair. This operation is repeated in succeeding sets or series of rolls until rods of the desired size are obtained. Experiments have, it is said, left no doubt of the practical value of this invention. It is stated that a syndicate of prominent rolling-mill owners have offered Mr. Weaver \$80,000 for his patent.

**HIGH SPEED AND INCREASE OF FUEL.**—A correspondent of the *Boston Journal of Commerce* says: "I have always been told that high speed and high-steam pressure was the most economical way of using steam. I am running a Corliss engine; until recently I ran it 530 feet piston speed per minute. My engine was heavily loaded, and crank pin heated so badly I was compelled to run a small stream of water on it all the time. I increased the size of my driven pulley 20 per cent, and put up my engine to 640 feet piston speed per minute; since that time my crank pin has run perfectly cool, but I find a large increase of fuel consumed. I had a mechanical engineer to indicate my engine as soon as started at the high speed, and he pronounced the valves in fine working order. Will some one tell me why the consumption of fuel has so much increased?"

**PISTON AREA AND HEATING SURFACE.**—However much change may be effected in the type of a locomotive, certain proportions appear to be incapable of alteration without doing harm; 2½ square feet of heating surface ought to be provided for each square inch of piston area, or, what comes to the same thing, the area of one piston multiplied by 5 will give the proper heating surface. Thus, the area of a 17-inch piston is 227 square inches, and 227 multiplied by 5 equals 1135 square feet. In like manner the proper surface for 19-inch cylinders is 1417 square feet. Of course, this is not to be regarded as a hard and fast rule, but it is quite in accord with the best locomotive practice of the day, and that when an attempt has been made to reduce the proportion, the engines have not proved good steamers with heavy trains.

**IMPROVEMENT IN SETTING TIRES.**—Mr. Whitney has adopted a manner of heating driving-wheel tires which is exceedingly practical, quick and economical, and which the writer does not remember to have seen practiced in any other shops. A circular trough, open at the top and having several supports for the tire, extending perhaps three inches from the bottom, is filled almost to the top of these supports with water, after which a gallon of kerosene oil is poured upon the water, which, being ignited, heats the tire so that not more than 15 minutes are required to prepare it for being pressed upon the wheel. This avoids the necessity for building a wooden fire underneath the tire and waiting upon this necessarily slow process. It also avoids the danger from sparks.

CONSIDERABLE interest is awakened in experiments now proceeding in Pittsburg, which seem to prove that excellent steel can be made directly from iron ore by mixing in small pieces with 20 per cent of Rhode Island graphite, reduced in an ordinary heating furnace to a spongy mass, the phosphorus and other impurities flowing off with the slag and the mass being ready to be drawn in two hours.

## SCIENTIFIC PROGRESS.

**GRAVITATION ON THE DIFFERENT PLANETS.**—Among the other wonderful and curious truths which science teaches is the fact that beings similar to those on the earth could not exist on some other worlds, for the following reasons: "It is the attraction of gravitation that makes weight. An inhabitant of our planet could jump to an amazing height in the moon, because its mass is so much smaller than that of the earth. This same effect would be produced upon all other bodies. Horses would travel at a greatly increased speed, and if the rider was thrown the consequences of his fall would be much less serious; the elephant would become as light-footed as a deer; a stone from the hand of a careless boy might fall in an adjoining town before accomplishing its mission of destruction; armies could engage in battles at great distances from each other; and nearly every kind of labor would be lightened, from the diminished weight of tools and materials. In other planets an opposite state of affairs would ensue. Jupiter, Saturn, or the sun, with their immense masses, would exert so strong an attraction that we should scarcely be able to move, and would crawl along as slowly as if our feet were weighted with lead. It is possible, even, that the larger animals would be crushed by their own weight; and, if there were no other reasons, this would be a sufficient one against the theory that the sun and larger planets are inhabited by beings like ourselves."

**PICTURES IN THE FIRE.**—The taste for decorative art finds a fresh field of fancy to manifest itself in through the agency of natural gas. The absolute cleanliness of the gaseous fuel has presented opportunities for converting the fire-sides in many Pittsburg homes into beautiful pictures made of gems of the ceramic art. The general method of decorating a natural gas fire-grate is to partially fill it with finely broken fire-brick. Then over this is laid a layer of long-fiber asbestos. Scattered about in artistic confusion are pieces of bric-a-brac in decorated china, milkmaids and shepherds and shepherdesses, dogs, curious little vases, articles of Japanese bijouterie—the whole making a rare picture when the gas flames play around them. One well-known gentleman residing in the East End has a perfect representation of a winter scene as the adornment of his parlor grate. Salt and asbestos give the semblance of snow and ice, while the background is made of decorated tiles and gives a fine idea of perspective. Another grate in his house gives a farm-yard scene, with house and barn made of fire-clay in colors, with cows, horses and chickens, the farmer and his wife and servants, while a miniature farm makes up the background. The figures are fashioned out of fire-clay. In another room he has a life-sized hen setting on a dozen eggs, while a number of little chicks just half out of the shell complete the picture.

**LIGHT AS A SPEED INDICATOR.**—M. Gustave Hermite has proposed the use of intermittent light to indicate the speed of engines or other moving bodies. His plan is to illumine a Geissler tube by the sparks of an induction bobbin giving a constant and known rate of vibration per second, say from 30 to 40, each vibration giving a corresponding flash of the Geissler tube. By optically arresting the moving objects at different points of their course he proposes to obtain their speed. For example, if a disk of cardboard is made to revolve by clockwork at a uniform and known speed, one turn per second, for example, and if it be lighted by the Geissler tube, giving 30 flashes per second, we shall see the disk 30 times during one second, or, in other words, while it makes one revolution; and if there is a visible spot on its surface 30 spots will be seen. If the disk turn 10 times per second, the succession of images will disappear, owing to the persistence of impressions on the retina, the disk will appear to be immovable, and we shall see three spots on its circumference occupying fixed positions. If the number of turns of the disk is equal to the number of flashes of the tube, the disk will be seen to be immovable. A printed page revolved in this way could be read as if it were fixed. Mr. Winhurst's well-known influence machines illustrate this phenomenon in a very beautiful manner.

**FORCE OF EXPLOSIONS.**—The power exerted by an explosion on surrounding objects is in the inverse ratio of the cube of the distance from the point of an explosion. Thus, at 100 feet from the exact point of an explosion, the power is only the cube of 1.100, or 1.1,000,000 part, of what is at a distance of only one foot from that point, or, in other words, if the power at one foot from the spot be represented by 1,000,000, at the distance of 100 feet it will be but one. It is thus seen that the effects are intensely local, and but comparatively trifling at even short distances. Nitro-glycerine and dynamite do not, when exploded, exert such a force as is popularly believed. To speak precisely, the power developed by the explosion of a ton of dynamite is equal to 45,675 foot-tons. One ton of nitro-glycerine similarly exploded will exert a power of 64,452 foot-tons; and one ton of blasting gelatine similarly exploded 71,050 foot-tons. These figures, although large, are not enormous, and need not excite terror. Seventy-one thousand tons of ordinary building stone, if arranged in the form of a cube,

would measure only 90 feet on the side, and if it were possible to concentrate the whole force of a ton of blasting gelatine at the moment of explosion on such a mass, the only effect would be to lift it to the height of a foot. These figures are said to have been derived from careful experiments.

**WORLDS GREAT AND SMALL.**—The heavens, as well as other parts of creation, have their tiny and almost infinitesimal specks of matter, and also those of immense proportions. Our sun is so large that, if it were a hollow globe with the earth in its center, the moon in its revolution around the earth would represent a disk but little more than half the diameter which a disk through the center of the sun would represent; and yet the well-known star Sirius is thought to be 3000 times larger than the earth. Per contra, the diameter of the two satellites of Mars, which are pronounced by Newcomb by far the smallest heavenly bodies yet known, cannot be stated with any degree of accuracy, but that of the outer satellite may be as small as five miles, while that of the inner satellite lies between 10 and 40 miles. Ceres and Vesta, the largest of the asteroids, are supposed to be between 200 and 400 miles in diameter, while others of the group may be as small as 20 miles, or even less. There are some reasons for believing, indeed, that the ring of asteroids may include bodies of unlimited minuteness—fragments far too small to be visible with the aid of our largest telescopes.

**THE ELECTRIC SUBMARINE CABLE** does not work instantaneously, nor is the first impression at the other end the strongest. After the contact between the instrument and the conductor is made here, no sensation is felt at the station on the other side of the ocean for about two-tenths of a second, when a faint sensation is perceived. This increases in intensity for three seconds. After four-tenths of a second about 7 per cent of the maximum force has been felt; after one second about half of the force has crossed the ocean, and at the end of three seconds the force in a continuous current is as strong as it will be or can be made, unless the battery is increased. The average time fixed by experimenters for a certain ascertained impulse through the ocean cable is four-tenths of a second.

**ANNUAL RINGS OF TREES.**—Prof. D. P. Penhallow, having studied the relation of annual rings to the age of trees, concludes that the formation of rings of growth is chiefly determined by whatever operates to produce alternating periods of physiological rest and activity. In cold climates the rings are an approximately correct, but not always certain, index of age; but in warm climates they are of little or no value in this respect. The influence of meteorological conditions in determining the growth of each season is most important, particularly with reference to rainfall. Periodicity in rainfall corresponds with periodicity in growth.

**THE ROLL OF THE OCEAN.**—It has long been a question of doubt as to how far beneath the surface the roll of the ocean could be felt; but it has generally been supposed that the action of the waves does not extend more than 60 or 80 feet below the surface. The fact, however, has recently been discovered that the wave motion extends to a very much greater depth. A diver at work on the steamer *Oregon*, recently sunk near New York harbor, at a depth of 120 feet, found the roll of the sea so heavy that he could not keep his position while making fast to a trunk which was to be hoisted up.

**JUPITER'S GREAT SPOT.**—The famous red spot which appeared on the planet Jupiter in 1878, and after attracting universal attention and perplexity for five years faded almost entirely away, is reported by Mr. Denning, an English astronomer, to be again becoming darker and more conspicuous. A search of astronomical records has shown that this spot is identical with one seen by two observers in 1843. If such is the case, it must represent some permanent Jovian feature of immense size.

**TORPEDO INVENTORS.**—A circular has been issued from the Navy department, directed to all inventors of torpedoes, or those interested in the subject, inviting them to communicate with Commodore Sicard, Chief of Ordnance. Seventy-five thousand dollars was appropriated at the last session of Congress for the purchase, manufacture or testing of torpedoes, and a board of naval officers, of which Capt. A. P. Cooke is president, was appointed several weeks ago to examine and test such torpedoes as may be submitted.

**THE ELECTRIC LIGHT.**—It is said that Boston contains a larger number of electric lights than any other city in the world. That city also looks more closely after those lights than any other—the street lights. Any defect in an electric street light—unsteadiness or any other trouble—receives immediate attention and prompt and thorough repair. This is the chief reason why the electric light is being more generally introduced there than elsewhere.

**STRENGTH OF ICE.**—It has been found that a sheet of ice three inches thick affords a perfectly safe passage for infantry or horses marching in single file, and for light carriages; with a thickness of six inches it will bear all sorts of wagons and cannon.



**ABOUT BURNING COAL.**—The grading for the new coal shed here is nearly completed and several new side tracks are being put in. The building will be 350 feet long and 60 feet wide, and will be capable of containing 4000 tons of coal. There will be four side tracks in the building, and engines will be loaded by a derrick and donkey engine fixed up on a small flat car. All of the engines running through to Sacramento have been changed from wood to coal burners, but those running to Rocklin, some 15 in number, will not be changed, but will continue to burn wood. The supposition prevails that the railroad company finds it cheaper to burn coal than wood, but a prominent railroad man informs us that such is not the fact. While the first cost of wood is a little more than coal, yet when the effect of coal upon machinery is taken into consideration, it is said that wood is the cheaper. With the use of coal, the fire-boxes and flues of locomotives soon burn out and have to be replaced every few years, and the gritty cinders adhering to the working parts of the machinery cause them to wear rapidly. In wood burners the fire-boxes seldom have to be replaced, and there are several engines in the division that still contain the same boxes which were put in at the time of their construction, nearly 20 years ago. Therefore, wood is considered the cheaper fuel. Other motives than those of economy seem to have moved the railroad company to make the change they have. We hope that the change will not be a permanent one, as a serious blow would be dealt to one of the important industries of this vicinity.—*Truckee Republican.*

**A GREAT DROUTH AT THE EAST.**—A prolonged drouth is one of the worst afflictions which can come upon our eastern friends, who count upon frequent showers during the summer and fall. In California our conditions and calculations are different and summer showers are unwelcome. The area east of the Rocky mountains which has suffered this season is very large. It covered the great country from Texas to Wisconsin and seriously affected grazing and dairy interests. We have not followed the subject closely and cannot say how far eastward of the prairie States the drouth extended, but present reports are of severe lack of water in New England. It is said that springs and wells in some of the southern counties of Vermont, that were never known to fail before, are now dry, and great difficulty is experienced in getting water for the stock. In the vicinity of Wareham, Massachusetts, families can with difficulty secure water enough for domestic uses. The various ponds and small lakes are very low. A trench has been dug to connect the Little Quittams' pond with Acushnet river in order to increase the water supply for the town of New Bedford. Throughout the States mentioned the drouth is widespread.

**A LONG-HEADED DUMP PICKER.**—Miners will enjoy the following story, which loses none of its flavor although it comes all the way from Ishpeming, Michigan. A good-natured tramp applied at the mines for work as a sort of extra. One day he would work and two days he would loaf. After awhile he went to the Winthrop Hemetic Co.'s mines and offered 25 cents per ton for the dumps, to be paid as they were removed. The company gave him a contract, and he also bought the dumps of neighboring mines at the same price. After the contracts were signed, he dropped his character of a tramp, reappeared as a business man, set a crew of men to work sorting the dump, which turns out to be 50 per cent of ore worth \$5.50 per ton. The Winthrop dump netted him \$1,000,000, and the other dumps about \$4,000,000. Jones has the dumps and the mine-owners have the dumps, so it's an even set-off, begging your pardon, gentle reader, for the pun.

**MANUFACTURERS' ASSOCIATION.**—The new Directors of the Manufacturers' Association of California have organized by electing the following officers: W. T. Garratt, President; William Harney, Vice-President; N. W. Spaulding, Treasurer; Geo. C. Hickox, Secretary. After appointing Executive and Finance Committees, the Association resolved to hold public meetings more frequently, when questions of interest can be discussed and papers of importance read. Professor W. B. Rising, of the State University, will read the first of a series of papers at the annual meeting, to be held Monday evening, November 22d, at the Pavilion. The recent amendments to the by-laws extend the right of membership and bring it within reach of all engaged in any industrial pursuits, and the new spirit manifested by the Directors to give vigor and usefulness to the organization gives promise of success.

**TEMPERING BRASS.**—Brass, not hard by mixture, but by compression, either rolling, hammering, wire-drawing, or any other process which compresses the particles of metal, can be tempered regularly, just as easy and in the same manner as you would temper an equalized piece of hardened steel, viz., by heat. By placing a small piece of polished steel on the brass object to be tempered, and applying the heat so as to affect equally the brass and steel, you will know by the color of the steel the temper of the brass, which by this process may be tempered in exact proportion to every shade of color of the steel.

The pay-rolls of the Comstock mines for the month of October foot up about \$137,000.

## USEFUL INFORMATION.

**DANGER FROM TARRED CAST-IRON WATER PIPES.**—For some weeks past tarred cast-iron pipes have been used for the supply of water in urban districts. That the tarring operation ought to be executed with the amount of care that it does not always receive, appears clearly from a report on the subject recently published in *Stahl und Eisen* by Dr. Thorner, analytical chemist, of Osnabruck. After an exhaustive consideration of the subject, Dr. Thorner concludes as follows: "To sum up the results, both of analytical and synthetical experiments made, it is now fully demonstrated that in badly tarred pipes in which the water is liable to recede and the pressures are consequently subject to many variations, hydrate of iron is formed in quantities large enough to render the water unfit for human consumption. Valves may be used to prevent the water from receding, but, notwithstanding this, variations of pressure of such magnitude take place in most conduits that it becomes imperative to apply the utmost care to the tarring operations." Dr. Thorner recommended that the pipes should be previously painted over with a suitable substance, such as alcohol, petroleum, essence of paraffine, etc. These substances should, however, be selected with due regard to their properties, especial care being taken that they should commingle well with the tar. Thus the tar may be heated in a vessel with the application of a worm, and when a coating of petroleum has been applied to the surface of the pipe it may be stood upright in the tar vessel, and both the painting over and dipping may take place gradually. The principal thing is, after all, that the pipes should be perfectly clean and that there should be no spots of rust on them at the moment when the operation takes place.

**ARTIFICIAL PUMICE-STONE.**—At Bietigheim, in Germany, and Pilsen, in Austria, natural pumice-stone has been superseded by an artificial stone, to which a suitable shape can be given and different degrees of fineness of grain obtained, which allows the stone to be used in all the industries where natural pumice-stone was formerly employed. The ingredients are white sand, feldspar and fire-clay, mixed in suitable proportions to obtain the desired composition. The paste is poured into plaster molds, and then placed in fire-clay receptacles and baked in ovens. At Bietigheim, sand of various thicknesses is prepared by means of sieves, and each thickness corresponds to the different numbers of the stones. The feldspar is used in a calcined state and in almost impalpable powder. The sand is white, very fine, and contains a great quantity of vitreous matter. The fire-clay is very pure and contains no sand. About 60 per cent of powdered feldspar and 5 per cent of diluted refractory earth are added to the sand, and this mixture, after receiving the necessary quantity of water, is poured into plaster molds.

**A TRANSPORTABLE ELECTRIC LIGHT TOWER** has been lately invented by M. Beduwe, a builder in Liege. The idea is to furnish the light in any place on short notice, and it is thought the apparatus might prove useful in public works, cases of accident, gatherings in public places, fetes, etc. The constituent parts are (1) a telescopic system of copper tubes bearing the light; (2) a three-cylinder steam engine to drive either a Gramme machine or a suction and force pump; (3) a vertical boiler on the tubular system, and (4) a reservoir for water. The whole is mounted on a four-wheeled carriage. The light is raised by hydraulic force.

**TO OBTAIN mother-of-pearl designs on tissues,** a thin layer of caoutchouc is spread over a thin copper plate and the design is carved in the same. The tissue is laid over the copper plate and a hot cylinder is rolled over it. The heat liquefies the caoutchouc, and this remains sticking to the tissue, which is then covered with mother-of-pearl powder and a hot cylinder is rolled over it. The excess of mother-of-pearl powder is brushed away, or the cloth is shaken. In order to prevent the powder falling from the tissue, this is covered with fine crepe which has been first dipped in gum water.

**A LIVELY APPETITE.**—A reputable scientific authority quotes the statement that, by careful estimate, a spider ate 4 times its weight for breakfast, nearly 9 times its weight for dinner, 13 times its weight for supper, finishing up an ounce, and at 8 P. M., when he was released, ran off in search of food. At this rate a man of 160 pounds would require the whole of a fat steer for breakfast, another with a half-dozen good sheep for dinner, and two bullocks, eight sheep and four hogs for supper, with about four barrels of fresh fish as a lunch before going to his club banquet.

**TO SOFTEN BRIGHT WORK.**—To soften bright work without damaging the finish, place the pieces in an iron box and fill in the interstices with iron turnings; close the box, lute the cracks with fire-clay and heat to a red, allowing the box to cool as slowly as possible. It is a good plan to let the furnace fires go out and leave the box in the furnace to cool.

**HOW TO PREVENT CROWING.**—It is admitted that in the act of crowing a bird stretches his neck to its full extent. A small lath, loosely

suspended about 18 inches above the perch, will obviate this. It in no way interferes with the bird's roosting; but the moment chattering commences a nuisance the swinging lath comes gently in contact with his comb and effectually stops him. I have a dozen birds and none of them presume to crow till the hour that I let them out.

**ALL sediment cocks in kitchen boilers** should be left open at least once a week for the space of 15 minutes, so as to clean and wash out all foul sediment. Oftentimes when complaint is made that the water smells, or that it doesn't heat properly, the real cause will be found to arise from this neglect alone.

**FURNITURE** needs cleaning as much as other woodwork. It may be washed with warm soapsuds quickly, wiped dry, and then rubbed with an oily cloth. To polish it, rub with rotten-stone and sweet oil. Clean off the oil, and polish with chamois skin.

**COPPER TELEGRAPH WIRES.**—It is stated that Roehling's Sons have this year used more than 1000 tons of copper in the manufacture of telephone and telegraph wire, and that copper is being substituted for iron very generally for these purposes.

**PAINTING ZINC WORK.**—There is no absolute need of painting zinc work, for exposing it to the atmosphere has the effect of coating it with a thin film of oxide which separates it from the further action of the air as effectually as paint does.

**TO KILL GREASE-SPOTS BEFORE PAINTING.**—Wash over smoky or greasy parts with salt-peter, or very thin lime whitewash. If soap-suds are used they must be washed off thoroughly, as they prevent the paint from drying hard.

**LEAD AND OAK WOOD.**—Plumbers should be careful not to use lead in connection with oak, unless the latter is perfectly dry and free from sap, otherwise the gallic or acetic acid in the wood will turn the lead into acetate of lead.

**THE TYPE-WRITER,** now in such common use, dates back to 1714, when Henry Mill got a patent for it in England; but it was not really made practicable until 1867. It now seems indispensable.

**WHY NOT HERE ALSO?**—Unclaimed dogs in London are killed painlessly by being sent to sleep in an atmosphere of chloroform, bisulphide of carbon, and carbonite oxide.

## GOOD HEALTH.

### Swallowing Edge Tools.

The Academy of Medicine in Paris has just been listening to a report from M. Polaillon on an unusual surgical operation which ended successfully. The case was that of a young man who, out of bravado, had swallowed a fork. It was extracted by an incision in the stomach. For many days after, the patient confined himself strictly to a diet of soup and iced champagne. Later on he took some milk, and on the twelfth day was allowed a cutlet. He is now quite well.

The above will remind some of our readers of a case reported in this paper, about a year ago, of a young man who swallowed a small open penknife, at the residence of his parents, near Port Costa, in this State, which, however, was removed by natural means, two days later, while the young man was under the care of a physician in this city.

Another case of fork swallowing, in France, has recently been reported with the following particulars: The surgeon was afraid to cut into his stomach lest he should not find the pronged implement there, and would thus still more endanger the patient's life. An electrician, M. Trouve, was then called in, who devised a *sonde œsophagienne* connected with an electrical apparatus and a bell, and made in such a manner that contact with a metallic substance allowed the passage of the current and made the bell ring. The bell was heard very distinctly. In addition, he made some very simple as well as convincing experiments that the surgeon ought to have thought of. He placed a very sensitive magnetic needle in the vicinity of the patient, and saw the needle turn toward him. He brought a large electro-magnet into the vicinity of the stomach, and each time the current was on, the fork came toward it, upheaving the skin and muscles of the abdominal walls in a marked manner, and at length the surgeon was convinced and he performed the operation.

**MEAT SHOULD BE BOLTED, NOT EATEN.**—Mr. Gladstone is "out of it" again. Everybody has heard how the late Prime Minister ascribes his splendid health to having learned one simple physiological lesson, namely, to make 25 bites at every bit of meat. Mr. Littleton has recorded the fact in his little book on training, and Sir John Lubbock repeated it the other day in an address on technical education. And now there comes a "Physiologist F. R. S.," who writes to the *Times* to say that the pretty little tale is merely "another illustration of great ignorance of natural things in the pres-

ence of high and even wonderful conceptive faculties." So far from needing 25 bites, meat does not need any bites at all, for it is digested not by the mouth juices (as vegetable substances are) but by the stomach juices, and as the secretions of the mouth are alkaline, whereas the digestive fluid for meat is acid, too much mastication actually interferes with digestion. So Mr. Gladstone must go to school again after all, and learn the old nursery saw, "to boil the meat, but chew the potatoes."

**BREATHING THROUGH THE MOUTH.**—Tight dressing, though the most serious hindrance to the habit of good breathing, is not the only obstacle. There are careless ways of sitting and standing that draw the shoulders forward and cramp the chest, and it is as hard for the lungs to do good work when the chest is narrow and constricted as it is for a closely bandaged hand to set a copy of clear, graceful penmanship. Then there are lazy ways of breathing, and one-sided ways of breathing, and the particularly bad habit of breathing through the mouth. Now, the nose was meant to breathe through, and it is marvelously arranged for filtering the impurities out of the air and for changing it to a suitable temperature for entering the lungs. The mouth has no such apparatus, and when air is swallowed through the mouth instead of breathing through the nose, it has an injurious effect upon the lungs. A story is told of an Indian who had a personal encounter with a white man much his superior in size and strength, and who was asked afterward if he was not afraid. "Me never afraid of man who keeps mouth open," was the immediate reply. Indeed, breathing through the mouth gives a foolish and weak expression to the face, as you may see by watching any one asleep with the mouth open. It may be noted that an anemic or low condition of the blood is seldom found where there is an established habit of full, deep breathing with the mouth closed.—*Helen Clark Swazy, in St. Nicholas.*

**SLEEP AS A TONIC.**—A scientific writer says: Sleep, if taken at the right moment, will prevent an attack of nervous headache. If the subjects of such headaches will watch the symptoms of its coming, they can notice that it begins with a feeling of weariness or heaviness. This is the time when a sleep of an hour, or even two, as nature guides, will effectually prevent the headache. If not taken just then it will be too late, for after the attack is fairly under way it is impossible to get to sleep till far into the night, perhaps. The giving of anodynes and the forming of the disastrous opium habit has often arisen out of such circumstances and ignorance of the preventive value of sleep. It is so common in these days for doctors to forbid having their patients awakened to take medicine if they are asleep when the hour comes round, that the people have learned the lesson very well, and they generally know that sleep is better for the sick than medicine. But it is not so well known that sleep is a wonderful preventive of disease—better far than tonic regulators and stimulants.

**MILK AS AN ODOR ABSORBENT.**—Those dairymen who do not believe in the power of milk to rapidly absorb and become contaminated by surrounding noxious smells will do well to try the following simple test, the results of which will doubtless immediately convince the most skeptical: Take a wide bowl or soup-plate to the cow stable when you go to milk; pour into it a pint of fresh milk, set it on the floor or at the height of a milk-stool, so as to expose it fully to the air of the stable, behind and close to the cows. If the day is close and heavy and the milk is cold, and the stable not cleaned out and aired, the result will be surprising. Take it to the house, or anywhere away from the stable, and try to drink it.

**SUGAR AS AN ARTICLE OF DIET.**—Dr. Phipson advocates, in a German scientific journal, the general use of sugar as a regular article of diet. For 40 years he has eaten at least a quarter of a pound daily, not counting sugar-forming substances taken at the same time, and has found it very healthful. Man's condition would be greatly improved if the use of sugar should substitute that of alcohol.

**STRENGTH OF BLOOD-VESSELS.**—Experiments reported to the Paris Academy of Sciences prove that the pressure necessary to cause the rupture of blood-vessels is very much greater than that to which they are normally subjected. The carotid artery of a dog required from 35 to 55 times the normal pressure of the blood, and the jugular vein from 32 to 35 times the usual force.

**TARWEED FOR MEDICINE.**—The *Vallejo Chronicle* says: "For the past few days a man has been at the navy yard clearing out the tarweed that grows in such abundance at the rear end of the island and bringing it over to Vallejo. He is going to dry the weed and use it for medical purposes. Several truckloads will be cut. It is worth \$1 a pound when properly dried."

**POISON OAK ANTIDOTE.**—A standing antidote for poison by poison oak, ivy, etc., is to take a handful of quicklime, dissolve in water, let it stand half an hour, then paint the parts with it. Three or four applications, it is said, will cure the most aggravated cases.—*New York Herald.*



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**DOWNS.**—Amador Ledger, Nov. 13: The sinking operations at this mine near Volcano were finished the 12th of last month. The shaft was sunk 200 feet, making a total depth of 700 feet, by far the deepest shaft in the upper section of the county. A drift at the 700-foot level has been run 60 feet in one direction and about 30 feet in another. So far no developments of any importance have been made, although the drifts have about reached the points where it was expected to encounter the ledge. The pumping machinery is working satisfactorily.

**MISCELLANEOUS.**—The pumping machinery will soon be placed in position at the McKay mine. This will enable the water to be controlled and sinking prosecuted at the same time. The new five-stamp mill in process of construction at Clinton, for S. G. Spagnoli, will be completed in a day or two. At Middle Bar, mining matters are quiet. At the Sargent claim they have a large quantity of ore on the dump, which, we are told, is to be shipped out of the county for treatment. At the Big tunnel there is nothing new to report. The Moore mine is running slowly, with six or eight men employed.

**SUTTER CREEK.**—Twenty stamps of the Mahoney mine were started the latter part of last week, and have been running steadily ever since. The dump is full of ore, but the other stamps will not be started for some time yet. There is plenty of ground to operate upon, and if it pays, the prospect is good for a long run. Another slight accident occurred at the South Spring Hill mine a few days ago. The old ore bin gave way, letting the ore on the ground. A new bin has been constructed. There is renewed talk of starting up the Wildman mine. The property was bonded nearly a year ago to John Tregloan, Sr., and it is reported that he has succeeded in organizing a company in New York which will commence operations very soon. The Amador canal is running short of water, and considerable machinery is idle in consequence thereof. A good rain is anxiously looked for.

## Calaveras.

**ANGELS MINES.**—Mountain Echo, Nov. 10: It is reported that operations will be resumed at the Gold Cliff mine in a few days. Clark & Maltman have recently purchased a Kendall mill, and will put it in position at their mine as soon as the machinery arrives. The Utica mine is running full-handed night and day. Some high-grade ore is now being milled and it is expected that a large cleanup will be the result of the present run. A slight cave took place in the old works one day last week; no damage was done. The Stickle mine and mill is running in full blast. Some very good rock is being stoped in the north end, and everything looks favorable for an abundant yield of the precious metal at the next cleanup. The Stickle is a model mine and bids fair to prove the best mine in the county.

## El Dorado.

**CRUSHING.**—Georgetown Gazette, Nov. 13: Two weeks ago 80 tons of ore was crushed in the Eureka mill from the Alpine mine near town, the result of which is only known to the owners. The opinion of those who saw the plates at different stages of the crushing is that the ore yielded very fair returns. What has since been done shows most conclusively that the yield justifies a further development of the mine. One hundred and twenty tons is being hauled to the Eureka mill, which is now nearly all in, and the mill will start up right away. Further, Supt. Lindsey has just furnished the mine with a new 15-horse power steam engine for pumping and hoisting. All in all, the Alpine promises to become a big property. Already many thousands of dollars have been paid out to resident laborers for work of developing the mine, to say nothing of the supplies furnished by our merchants.

**HART.**—Work of development on the Hart mine, (two miles south of town) continues right along. Last week, Ad. Porter, Cliff Cheek and Ben Robson entered upon contract to run 100 feet of tunnel on the ledge from the point where the ledge was tapped last month by the main tunnel. The paying character of this mine has not yet been satisfactorily determined, but Supt. Morton will not stop short of a thorough test.

**MUD SPRINGS.**—Placerville Observer, Nov. 13: Owing to the rich mining developments in and around Mud Springs, arrangements are complete for putting on a line of stages between that place and Plymouth. The stock will be of the best, and the trips are to be made tri-weekly.

**GRAND VICTORY.**—During the week we had occasion to visit the Grand Victory mine, and were gratified to see the many substantial improvements made in and about the mill. A large ore bin has been built in the rear of the mill, besides two new rock-breakers which have just been completed. Ten stamps were running and we were informed by B. B. Bunker, who has charge of the mill, that within the month the additional stamps would be put in motion. A large force of miners are employed and men are being added to the mining force daily. The ore body is simply immense, there being enough in sight to keep the mill running steadily for two years. Surely the prospects of the Grand Victory are very flattering.

## Fresno.

**MT. RAYMOND DISTRICT.**—Cor. Fresno Republican, Nov. 12: "Mt. Raymond district, situated on the north side of Fresno county, is but little known of outside of its own vicinity, yet it is destined to become one of the greatest mineral producers on the Pacific Coast. Looking nearly north from Fresno city, Mt. Raymond is visible on any clear day, standing out bold and majestic on the northern horizon. Mt. Raymond mining district was formed in 1882. But little development has been made as yet, as the parties owning the principal mines here are men of limited means. Several efforts have been made to induce capital here, but the undeveloped condition of the district and depreciation in the price of silver has been the principal drawback in inducing capitalists to invest. Mr. Ulyard, a practical mining man and assayer,

came here this fall, and, being surprised at the amount of ore in sight and at the immense large lodes, concluded to give them a thorough test, which had never been done before. To the great surprise of every one he has discovered that gold as well as silver exists here in large and paying quantities. Lodes that were considered worthless are found to be rich in gold. Mr. Ulyard is at the present time, with the assistance of some Fresno gentlemen, developing a lode which is proving beyond a doubt to become a famous bonanza. The writer predicts prosperity near at hand for this district. On the 30th of October Mt. Raymond put on her first coat of winter in the form of one foot of snow, and winter has apparently set in, although we may yet have several weeks of pleasant weather.

## Lake.

**SHUT DOWN.**—Lower Lake Press, Nov. 13: We see from jottings of our Middletown correspondent that the Great Western mine has indefinitely shut down. We cannot understand why this should be done, when it appears that that mine produced a larger quantity of quicksilver than any other mine in this part of the State for the month just past. Quicksilver is now very high and it seems quite strange that so valuable a mine, in productiveness, should cease operations. Mr. Andrew Rocca, the superintendent of the mine, is one of the most accomplished and successful miners in this State. He has tided the Great Western over many and trying difficulties, and in doing so has shown great genius and ability as a mine governor. And there were very trying times a year or so ago, when quicksilver was at its lowest ebb, and mine after mine was closed because of depreciated value of their product. But the Great Western, under Mr. Rocca's able control, survived the difficulties then attending and has been yielding profitably all the time.

**MAMMOTH.**—Placer Republican, Nov. 14: Col. Davis had the best of good luck at the Mammoth Bar mine this season. Not a break has occurred in the machinery and the hydraulic lift has proved a success. Good pay has been taken out all the time and the proposition demonstrated that the best ground had never been worked. It will take years to work out the claim.

## Mariposa.

**CHISPA.**—Gazette, Nov. 13: A chunk of gold weighing ten pounds and six ounces avoirdupois weight, was brought over from Sherlocks about two weeks ago by Capt. Diltz. It was taken out of the Diltz mine, and is here on file as evidence of the sort of country that is around Sherlocks, Saxtons, Colorado and Whitlocks. There is some rusty, iron-stained quartz blended with the gold, but probably not amounting to ten per cent of its entire weight. It is estimated to be worth about \$2000. Some smaller pieces of the same sort were found nestling close to the parent nugget, and there are strong symptoms of more of them in the immediate neighborhood.

## Mono.

**BODIE.**—Bodie Miner, Nov. 15: Winze below the 700 is extended 8 feet. East crosscut from south drift, 800, is extended 17 feet. We are crushing about 25 tons of ore per day.

**BULWER CON.**—North drift, 75-foot level on the Stonewall ledge, is extended 20 feet in fair ore. North drift, east ledge, 100-foot level, 18 feet in fair ore. North drift, 200-foot level, Stonewall ledge, is extended 16 feet in fair ore. The vein is 2 1/2 feet wide. We shipped to the mill 400 tons of ore average pulp assay, \$24.35. We are cleaning up at the mill, and will ship bullion to-morrow.

**MONO.**—We are taking out ore below the 700.

**STANDARD CON.**—South drift, 300 level, advanced 15 feet; west drift, same level, advanced 17 feet; north drift, same level, advanced 12 feet; upraise, same level, advanced 14 feet; north drift, No. 2, same level, advanced 13 feet. South drift, 1000 level, advanced 20 feet. Ore shipped to mill, 330 tons. Mine looking well.

## Nevada.

**THE OLD STYLES MINE.**—Foothill Tidings, Nov. 10: "The Styles ledge, on Deer creek and nearly in the town of Nevada City, used to be a good mine and with great promise many years ago. It is now to be worked for results. The Transcript says that Edwin Tilley & Co. have completed their contract of sinking the shaft at the Styles mine an additional hundred feet. The prospecting of the ledge will now commence, and the State of Nevada capitalists who have a bond on the property will soon be able to determine whether they want to buy the property or not.

**MACHINERY.**—Nevada Herald, Nov. 9: Two or three loads of machinery for the Baltic mine, above Washington, passed through town a day or two ago. The company are erecting a 10-stamp mill, and making other additions in the way of a permanent plant.

**GRASS VALLEY NOTES.**—Union, Nov. 13: At the Badger mine, work is going on with splendid prospects ahead. The walls are no less than 8 feet apart, with two feet of quartz which shows well in bright, free gold and very rich sulphurets. There is considerable rock now on the dump, and scarcely a piece can be picked up but shows well in gold and heavy sulphurets. It looks very much as though the rock being taken out of the shaft would pay the expenses of the sinking. The main shaft is about 250 feet deep. The Crown Point continues to look well. The ledge on the 300 level is from 5 to 7 feet wide; all good milling ore. In the stopes of the 180 level the ledge continues large, and is very rich. There is no telling what may be developed in the Crown Point as the shaft grows deeper. Some very rich rock was brought to town yesterday from the Coe mine, it being taken from the main drift, about 100 feet west of the works of J. Manseau, on the same ledge. A shaft has been started west at a depth of about 100 feet, and the ledge in the face of the drift is two feet wide, of splendid rock, showing gold in all directions. In fact there was never better rock taken out in this district than that now being taken out of the main shaft. Mr. Manseau, who has a contract to work a portion of the ground east of the main shaft, is also taking out some very fine ore, and has several tons now on the dump which will pay handsomely. There is nothing being done at present on the Powning mine, the eastern extension of the Coe, but there is every reason to believe that there is as good rock in the Powning as in the Coe, and work will probably be resumed before many

weeks. Work on the W. Y. O. D. (Work Your Own Diggings) claim, near the Pennsylvania mine, is progressing favorably. A shaft was sunk some time ago, to the depth of 70 feet, and a tunnel run for the ledge. At a distance of a little over 300 feet, the ledge was cut, which is of good width, and shows well in the yellow metal. The claim is owned and being worked by a number of Grass Valley young men, and from the present outlook the boys have a good thing. The mining outlook in Grass Valley district was never better than at present, and the several prospects that were commenced 6 or 8 months ago begin to assume the proportions of mines in fact.

**DELHI.**—North San Juan Times, Nov. 11: We have had no news concerning the Delhi mine for a week. All we know concerning the Delhi is that the company is still running its tunnel ahead with a view of tapping the ledge as near the mill as possible. The rock milled is rich, and hopes are entertained of a continuance of the same kind of rock for months to come.

**THE IDAHO MINE.**—Foothill Tidings, Nov. 10: There are but a few smoldering sparks in the old shaft at the Idaho mine, and cool judgment and prompt action are accountable for that condition of affairs. The old shaft is entirely blocked from the balance of the mine, so that there is no danger of the fire spreading elsewhere. This morning the mine was entirely free from smoke in its lower levels and the miners went to work on regular time. The mill will be closed down about 18 hours, commencing at 12 o'clock Sunday night. In a conversation with the Messrs. Coleman they stated to us that the loss would probably be in the neighborhood of \$2000 or \$3000 to the company.

**A TEST ON WHICH MUCH DEPENDS.**—Transcript, Nov. 16: The sacking of 10 tons of ore from the Central mine, near this city, preparatory to shipping it to the reduction works at Reno, where a test working will be made to ascertain the true value of the deposit, began yesterday. If favorable results are obtained, the gentleman who has the bond on the claim and his associates will have no difficulty in getting certain capitalists to proceed with the development of the lode.

**PENNSYLVANIA MINE.**—Tidings, Nov. 16: Work in the above mine is going forward with energy. A crew of picked and experienced miners are underground, among them being James Gluyas, foreman, John S. Lick, Wm. Curnow, Robert Hicks, Wm. Dunstan and others. Ore is now being taken from the very bottom of the incline, which is 240 feet in length, and the ore looks well. It is estimated that this ore, at the very least, will pay \$75 to the load. This at the deepest workings augurs well for the Pennsylvania. The last three crushings from this mine averaged, sulphurets included, \$45 a load. The new crew of miners will tumble the pay stone on to the dump pile in a rapid kind of a way.

## Placer.

**NORTH FORK DAM.**—Placer Republican, Nov. 10: It is expected that the new work on the North Fork dam will be completed to-day or at least this week. Mr. Ambrose has had a large force of men there since October 13th, and they have accomplished an immense amount of work. They have been favored by unusually good weather at this time of the year, since very little rain has fallen and the river has remained low enough to make the work on the dam possible. They began by building a wing dam one-quarter of a mile above the big dam, so as to turn the water over to the south bank of the river. At this end of the dam where the bulk-head was torn away last winter, they sank down to bedrock, on which was built a solid buttress of timbers and stone 28 feet high. On this is built the new well-house of big timbers and two-inch planks, with sand gate and everything complete. It is stayed and anchored so that it is impossible for it to be carried away, and it will certainly last longer than the dam itself, which good judges say will not hold out more than five years at the best. For at least that length of time the ranchers and miners who are dependent on the North Fork ditch will probably have no more trouble. Shurtleff & Robinson are still having good luck in the Doig and St. Patrick mines at Ophir. Mr. Shurtleff was in town last week with a big piece of quartz literally covered with free gold, and the handsomest specimen seen in Auburn for some time. Mr. Shurtleff also showed a curious specimen in the shape of quartz crystals held together by gold sulphurets and masses of silver. Miners say it is the first specimen of that description ever found in this part of the country.

## San Bernardino.

**CALICO DISTRICT.**—Calico Print, Nov. 10: Since the cold weather set in the activity of mining operations in Calico district has increased considerably, especially in that character of mining called chloriding. Considerable prospecting is going on and rich finds are reported every few days. The principal mines of the camp, the King, Waterloo, Sue, Red Jacket, Garfield group and Silver Odessa, are working the usual number of men, sometimes rich deposits of ore being struck which causes the bullion yield to run above the average. The ore from the Waterloo keeps the 15-stamp mill of the Oro Company busy night and day, and it is reported that the mill will be increased in capacity in order to crush the ore from the other mines belonging to this company. The Waterloo has several hundred feet of openings, which require considerable timbering on account of the loose character of the rock. There is an immense quantity of ore in the mine, the quality of which is sufficient to pay a good profit in spite of the low price of silver. As developments progress the number of miners is proportionately increased, and in a few months a large force of men will be working in the many drifts. The Sue has reached a depth of several hundred feet, and there seems to be no end of the ore, which pays well and is hauled to the Waterman mill every other day. The King is being prospected in the lower levels with renewed vigor, and the indications of rich developments in the near future are good. The Garfield mine is filled up with rich ore, the accumulations of many months, which is being reduced at a lively rate by the new 15-stamp mill of the Runover Company. The Thunderer and the other mines connected with the Garfield are being thoroughly prospected and developed, the ore continuing in paying quantities as the work progresses downward. The ore taken from this group of mines will soon run up into the millions of dollars. The Red Jacket

is turning out several tons of ore daily, which is crushed at the Waterman mill. This mine is developing into a good-paying property. The Silver Odessa group of mines keeps the Odessa mill at Hawleys in constant operation, and turns out the usual amount of bullion. The low price of silver caused operations to diminish a little on these mines, but since silver commenced to raise operations have commenced to increase, and soon a large force of men will be at work delving in the rich deposits which still remain and which will most likely continue to show up for years to come. The Humbug has several men at work quarrying out the ore in the usual manner and netting profitable returns from their labors. Operations are confined to the surface comparatively, and the quantity of the ore seems to be inexhaustible. Chloriders on the Blackfoot, Kearsarge, Comet, Invincible, Little Waterman, Josephine, Red Cloud, Bismarck and others are all doing unusually well, turning out an amount of ore considerable in the aggregate. The Iron Clad, situated just west of Calico, is being worked at a point a few rods above and west of Wall Street canyon. It is owned by H. B. Stevens, E. E. Stacy and G. H. Cook, and was given the above name on account of the heavy iron croppings on the claim. Mr. Stevens recently commenced to prospect on the ledge, which is two or three feet wide. After sinking a few feet he broke into a small cave about five feet in diameter, which presented a fine showing of ore. The Silver Monument, in the edge of the east side of town, directly opposite the Iron Clad and as favorably located, is showing up splendidly. The three companies chloriding on the same have increased their force of men, and are taking out in the aggregate from 12 to 15 tons of 30 to 75-ounce ore daily. Stevens, Wilson & Co. have worked 12 days and sunk over 20 feet, taking out over 1000 sacks of ore ranging from 30 to 75 ounces to the ton. The showing now is better than when they commenced. Allyn, Madison & Co. have also sunk a shaft to about the same depth as the other parties. Within the past eight days they have taken out over 400 sacks of ore ranging from 25 to 100 ounces. The Harwood boys, who have been working diligently for about three weeks, have run a cut in from the east side of the hill about 50 feet and sunk a shaft over 50 feet. They have taken out about 700 sacks which assayed from 30 to 75 ounces, the average assay being about 45 ounces. The ore lies in blankets or deposits and extends over a considerable portion of the claim. It is easily worked and a good deal of it will pay without assorting. The chloriders have a prospect of making handsome stakes before the expiration of their leases.

## Shasta.

**BULLYCHOOP DISTRICT.**—Associated Press Dispatch, Nov. 10: The Bullychoop mining district is exciting much interest in Northern California. The Mammoth mine is uncovered, and shafts sunk upon the same show an ore deposit of about 40 feet in width, the entire deposit milling \$20 per ton. It is free gold bearing quartz. The steam-mill is now crushing 15 tons per day. A great many prospectors are now in the camp, and more are daily arriving. The Stevens hotel is filled beyond its capacity. One hundred men are at work, and great preparations are being made for the winter. The district is 6000 feet above the level of the sea, and it is now conceded beyond a doubt that the district is a success. Many new buildings are being erected. The principal property of the district belongs to Senator Foster and Judge Wallace.

## Sierra.

**TENNESSEE RAVINE.**—Sierra Tribune, Nov. 13: Fine pay gravel has been struck at the Tennessee Ravine near Poker flat, in the diggings owned by Thos. Corlett. These same diggings were worked seven or eight years ago and abandoned. Three years ago Mr. C. again commenced work there and continued with ordinary success, until about four weeks ago, when for a large number of days he panned out \$175 to \$200 a day. His is the only place on the ravine that carries quartz gravel.

**THE YOUNG AMERICA MINE.**—The cleanup at the Young America mine for the month ending October amounts to \$34,000. A dividend of 4 per cent has been declared. During a portion of the month only 15 stamps were running, because of insufficiency of water at the mill. This shows itself in the result of the cleanup.

**THE CALICO MINE.**—The many rumors concerning the richness of the ledge at this mine appear to be well founded. The Tribune reporter paid a visit to the ledge last Sunday, and personally took from it some rock which, on being pounded up, prospected remarkably well. The ledge is about four feet wide. One of the owners (a Chinaman) sold his one-fourth interest the other day for the sum of \$1000.

**CHLORINATION WORKS.**—The Sierra Buttes Co. are making strong efforts to remedy the "smoke evil." Mr. Preston stated to a Tribune reporter that costly experiments with a view of conveying the smoke without the city limits, are daily being made.

**THE EMPIRE MINE.**—Operations at the Gold Valley mine have been partially suspended. Only a few men are now at the mine. Next spring work will be commenced with renewed vigor and activity.

**BUNKER HILL MINE.**—Work has again been resumed at the Bunker Hill mine, Howland flat, which recently discontinued operations on account of the petering out of their pay gravel. Nich Barrett is said to have struck good pay gravel there.

## Tuolumne.

**SOULSBYVILLE.**—Cor. Union-Democrat, Nov. 13: Mining is dull at present, owing to there being no water. Several mining men from below have been looking at different mines in the mountains, and, no doubt, they will make some investments in the near future. The Soulsby mine is entirely closed down until water is turned in the Soulsby branch ditch, and that will not be until sufficient rain falls to start the streams in the mountains; nevertheless the mine looked fine when closed down, and no doubt will turn out considerable bullion the coming winter. The Black Oak mine is closed down for the same reason as the above. The owners are below. It is reported that the mine will change hands soon. They will no doubt do considerable work this winter. The Rising Sun mill and mine has been purchased by a S. F. Co. and work has been commenced on a small scale (cleaning out ditches and one of the tunnels), pre



paring to start up in full blast when water comes. Messrs. McCann & Hamilton are doing work on the Basin mine on the east side of the north fork of the Tuolumne river. They have a good property. I feel confident that it is one of the best mines in California, and if their company invests in it they will be well paid for their investment after machinery is erected to work the mine and crush the ore. In this mine they have six veins, three principal and three smaller ones. The first principal vein runs up to three feet (or over) and is chiefly sulphurets, containing considerable galena. The sulphurets assay into the thousands. The other two principal veins are three feet each and are very rich (free gold). The remaining veins are about 8 or 10 inches and are rich. It is said that rock crushed from the small veins yielded \$100 per ton. Messrs. Mitchell & Davey have bonded the Hibbing mine, and have flattering prospects; the indications are good for this to be among the best of Soulsbyville mines. Further developments will be required before much can be said of its future. Mr. J. Johnson is sinking a shaft on the Fifth Ward mine; he has some very rich rock. The vein is small, but no doubt in sinking the vein will increase in size. The Louisiana mine is bonded and they will commence taking out the water as soon as rain comes to get water in the Soulsby Branch ditch to run the pumps, etc.

## NEVADA.

## Washoe District.

CON. CALIFORNIA AND VIRGINIA.—*Enterprise*, Nov. 13: On the 1300 level the drift started north from the station in the Consolidated Virginia shaft has been advanced 60 feet; total length 248 feet. The 1300 and 1400 levels still continue to yield good milling ore. On the 1435 level the drift running south from the north end of the mine has been advanced about 50 feet; total length, 310 feet. This drift has cut into good milling ore, which evidently extends from the ore development on the 1400 level. On the 1500 level the drift running north from the Con. Virginia shaft has been advanced 24 feet; total length, 89 feet. The drift running south from the Con. Virginia shaft, on the same level, has been extended a total distance from the shaft station about 305 feet. On the 1650 level good ore was struck the first part of the week, in a drift running easterly from the old stopes, at a point under the ore struck on the 1400 level. During the week about 8200 tons of ore were shipped to the Eureka and Morgan mills, the ore averaging a few dollars more in value than in the past week.

OPHIR.—The shaft station on the 1065 level has been completed.

UTAH.—The main drift started from the station in the shaft on the 472 level has been advanced 63 feet.

SIERRA NEVADA.—On the 520 level west crosscut No. 5 from the north lateral drift has been advanced 35 feet; total length, 138 feet.

MEXICAN.—Workings still confined to extending the joint Union Con. crosscut and the advance of the joint Union north drift on the 1300 level.

UNION CON.—On the 1300 level, the joint Mexican and Union drift, which was started north from the station in the Ophir shaft, has been advanced 36 feet; total length, 99 feet.

OCCIDENTAL.—The upraise from the lower tunnel, owing to the hardness of the rock, has been advanced but nine feet; total length, 59 feet. About 10 tons of ore have been extracted from the upper tunnel.

CHOLLAR.—Work has been resumed through the main tunnel, on the 250 level, but only a small number of miners are, at present, employed. From the 250 level down will be reopened through the old Chollar shaft.

HALE AND NORCROSS.—The machinery is now in good shape for running. The shaft has been repaired down to the 1300 level, and the incline from the 1300 level to the 1700 level is being repaired. Work will soon be actively resumed from the 800 to the 1700 level.

GOULD AND CURRY.—On the 425 level the main west drift from the station has been reopened and retimbered a total distance of over 420 feet. The south drift from this main west drift has been reopened and retimbered a distance of 49 feet; total distance, 153 feet.

SAVAGE.—The south lateral drift on the 500 level has been advanced 40 feet and is now out about 100 feet south of the north line. On the 600 level it now lacks but 100 feet of connecting with the old Savage shaft. On the 800 level they are now out about 250 feet south of the north line. The ground on these levels is being stripped preparatory to crosscutting, which will be commenced in a few days.

BEST AND BELCHER.—On the 600 level, east crosscut No. 1 has been advanced 47 feet; total length, 548 feet. At a point in this east crosscut No. 1, 486 feet from the north lateral drift, a drift started due east has been advanced 21 feet; total length, 128 feet. The flow of water, which at first bothered them, has been stopped and work resumed with the above result. The old north lateral drift on the 800 level has been retimbered and reopened during the week 50 feet, making the total distance of reopening and retimbering 595 feet.

BULLION.—They are preparing and making arrangements to erect hoisting works at the Croesus shaft, which is situated at the north end of the Bullion ground. The objective point in sinking will be the 300 level, which will be thoroughly prospected for the ore which is known to exist all the way from the 300 to the 600 level of the Croesus shaft. Work will actively commence about Dec. 1st. In Gold Hill the usual amount of prospecting is being done, and the usual amount of ore extracted in the different mines. The Carson river has a full head of water, which will continue throughout the winter and summer, enabling the mills to run full-handed.

## Columbus District.

CANDELARIA.—*True Fissure*, Nov. 13: The mill will resume operations next Monday morning on Georgene ore. Additional flues have been put in and the mill otherwise overhauled and repaired. The machinery for the Georgene hoisting works is daily expected. In the meantime the shaft has been sunk about 125 feet with a windlass. The shaft is a double compartment and is 11x6 feet. Under the foremanship of Thomas Curlett, it has been sunk

faster, considering the means, than any shaft ever put down in the district. There are 33 men at work in the mine.

TILDEN.—There is quite a pile of rock on the dump, and about three tons of assorted ore, which assays very high, will be put through the Fleming mill as soon as a cleanup is made from the Overland run.

OVERLAND.—Fleming's mill, Columbus, started up last Thursday on a small test run from this mine. The ore is very good and the result is hopefully looked forward to.

## Eureka District.

ORE SHIPMENTS.—*Eureka Sentinel*, Nov. 13: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Richmond Works—Silver Lick mine, 17 tons; Dunderberg, 123; Plute, 10; White Pine, 3; Bay State, 20; Geddes and Bertrand, 7; Seventy-six, 16. To the Eureka Con. Works—Jackson mine, 10 tons; Bay State, 4; Diamond, 25; Marguerita, 7; Featherstone, 16; Wood-chopper, 5; Altoona, 10; Watson, 3½; Barton, 6; Fairbanks, 15½; Norris, ½; Wide West, 5; Schenck, 8.

ANOTHER DIVIDEND.—The four owners of the Silver Connor mine declared another dividend yesterday of \$1500, or \$375 each. The ore in this property shows no signs of exhaustion, and the present production is liable to continue for many months yet from the body which supplies the shipments now being made. A portion of the ore shipped during the past month worked \$100 in gold to the ton. What the owners term second-class ore went \$50 in gold.

## Gillis Mountain District.

QUIET.—*Cor. Virginia Enterprise*, Nov. 13: Four men and one old tomcat comprise the full active working force of the district. The writer is busily engaged in the development of a series of ten select claims, designed on merit, for a syndicate capital. The annual assessment work on these claims for the year 1886 is now completed. The Hidden Treasure mine (my nearest neighbor), an ore-producing claim, has been closed down for the past two months on account of the low price of silver. The Burnley mine is now being worked, and producing ore equal in richness to its original standard. A recent shipment gave returns for first-class \$1000, for second-class \$400 per ton. Any district producing ore of this character ought to be entitled to some consideration. I am informed by one of the owners that one-third of the claim has been sold to a man of means, and that the work of development will now be vigorously prosecuted in a systematic manner. There are many idle claims in this district, some on account of the low price of silver, others for want of capital. With the price of silver at its original and just standard, the mining industry of this section would take new and active life.

## Mount Rose District.

PARADISE VALLEY.—*Silver State*, Nov. 15: Milling ore produced, 157 tons, 530 pounds; shipping ore, 12 tons, 1036 pounds. Average assay value, per ton, 86.25 oz. silver; 0.45 oz. gold. Concentrations produced, 340 sacks, 27,255 pounds, par value, \$6735.52; shipping ore, 184 sacks, 25,036 pounds, estimated value \$2503.60; total, \$9239.12. Mill work—Three Huntington centrifugal roller mills; six Triumph concentrators. Mill run 166 hours; worked 104 tons. Number of men on payroll, 121. We will resume sinking the engine shaft on receipt of supplies, soon to arrive, and continue to the 250 level which we will crosscut first, as our prospects should be more favorable at that point. No. 4 tunnel-face shows some change with more favorable indications. The Wild Goose drift from No. 4 tunnel gives indications of nearing the vein. Everything running smoothly in and about the mill and mine.

## Ophir Canyon District.

BULLION SHIPMENTS.—*Belmont Courier*, Nov. 13: The Chicago Mining and Reduction Company continues to make regular bullion shipments from Ophir canyon. Their mine is looking well and producing sufficient ore to keep the mill running steadily.

## Silver Peak District.

SALE.—*Candelaria True Fissure*, Nov. 13: The long-contemplated sale of a large group of mines in this district has at last been consummated, a syndicate of English capitalists being the purchaser. The group comprises 17 patented mines and others unpatented. It is expected that work will be begun at once. This is the most cheering news that Southern Esmeralda has heard for many days. This county will yet show to the world that it is the richest mineral-bearing section in the country.

## ARIZONA.

NOTES.—*Prescott Courier*, Nov. 9: Milling and concentrating are the processes that will free the precious metals from most ores of this section. Mr. Riley, lessee of the Nevada mine, Groom Creek district, is stopping down ton after ton of rich gold rock. Clark and Adams are going to put up and run a Huntington mill, in connection with their sawmill, on Groom creek. A big bar of silver bullion, from the Peck mill, was brought in Tuesday evening by Shull & Austin's stage. Wm. R. Morgan is in Humboldt district and says, in a letter to us, that he likes it and will pass the winter there. He had already struck one good prospect. Aleck Harris is visiting his mine near Cienega. Bob Dougherty will do some prospecting in the Bradshaw mountains. His latest work was done in Calico, California. He thinks this portion of Arizona is a better country than he has seen for many years past.

ORE.—*Mohave Miner*, Nov. 14: J. J. Goshorn shipped a carload of ore from the Altata mine last week, which is expected to run over \$200 per ton. Messrs. Tourtellotte and Leffler recently had 18 tons of gold ore from the Vanderbilt and Wyoming mines worked at the Mineral Park mill. The cleanup gave them a handsome bar of bullion worth \$1165. The boys are much elated over the result. Messrs. Christie and Dunn, of the Rural mine, will ship a carload of ore to the Selby Smelting Works at San Francisco in a few days. The ore is expected, so Mr. Christie tells us, to run about \$2000 per ton, and will be by far the most valuable shipment ever made from this county. We hear that Messrs. Johnson and Clack, of the C. O. D. mine, near

Stockton, have sold that claim to Messrs. Howell and Dana, the well-known mining men, who are now operating on the Prince George mine at Stockton Hill. The exact consideration is not known, but is supposed to be in the neighborhood of \$20,000. Every one who is interested in mining in this district will be pleased to hear that Johnny Mackenzie has leased the Cupel mine at Stockton Hill for a long term, and will at once proceed to erect steam hoisting works and make many other much needed improvements on that valuable property. We wish Johnny all the success in the world in his undertaking. It is rumored that the old Moss mine, in the San Francisco district, has been bonded to C. B. Dahlgren, of Brooklyn, N. Y., for the sum of \$50,000, the real purchaser for whom Mr. Dahlgren is acting being a company of wealthy English capitalists. This mine is owned by Messrs. Kuencer, Curtis, Wright and Zimmer. Mr. Curtis is now in London negotiating for the sale of other properties in this county to the same company.

## COLORADO.

IRWIN.—*Elk Mountain Pilot*, Nov. 11: The Bullion King is taking out some good ore now, and Supt. Repell is correspondingly happy. This mine is being worked in the most systematic manner of any mine in the county. Contractor Coleman has finished his contract on the shaft and crosscuts. Supt. Chas. Krueger is taking some very rich ore out of the claims of the Gunnison Mining and Milling Co., on Ruby Hill. The pay streak is not very large, but the ore is solid and very rich, and as depth is gained they are bound to come to the front as producers. Nelse Bergh is working a new discovery just south of the Little Crown shaft-house, and at the depth of 12 feet has a very rich streak of ore about four inches wide that will mill away up, and is improving as depth is gained upon it. The Gunnison Mining and Milling Co. have for some time past been at work on the Yellow Jacket lode, a sister claim to the Fairview. The title is in dispute, the owners of the Fairview, who were the original owners, claiming to have done their annual work, while those who are now in possession claim they did not.

## IDAHO.

OVER \$100,000!—*Wood River Times*, Nov. 10: The Minnie Moore is proving to be a wonderful mine, indeed. Although scarcely prospected, it already shows ore that will yield a net profit of over \$1,000,000, and its monthly shipments already exceed \$100,000. During the month of October last this mine yielded (and shipped) 106½ tons of ore, which sold for \$136,683.19. This ore, after paying for sampling, smelting and freight, yielded a net profit of over \$100,000. This is a really wonderful showing, and the managers and owners of the Minnie have the satisfaction of knowing that this property, last month, shipped more than double the amount of ore of any other mine in Idaho. The Idahoan, which has been the banner mine of Wood River for a long time, will have to yield that title to the Minnie Moore.

THE QUEEN AND KING OF THE HILLS.—Chas. Popper, principal owner of the Queen of the Hills group of mines, near Bellevue, and of the King of the Hills group, near Bullion, is in from New York City to make an examination of his properties before winter sets in. He says that the Queen is doing finely and yielding satisfactorily, and that she will doubtless continue to do so for some time, anyway. The King of the Hills is also showing considerable ore, and proving an excellent property under Superintendent Gibbons' management, but Mr. Popper says that he does not care to extract ore in any quantity at present. Next spring, however, he may do differently. Until then he proposes to employ 8 to 12 men, but to keep them on development work.

BOISE NOTES.—*Statesman*, Nov. 13: The El-mira mine, at Banner, continues to yield handsome returns to its owners. Almost every week a consignment of bullion is sent down to the express office at Idaho City. The Forest King mine, owned by the Moriarity boys, near Idaho City, Boise county, continues to show up well and yield to her determined and persistent owners a fair return. The mine is not yet developed, but the boys have gotten beyond doing all dead-work and are getting some pay. Geo. Riebold crushed recently 4200 pounds of rock from the Little Giant mine in Warrens, and the resulting amalgam realized \$2100, gold, an average of 50 cents a pound. There is probably not another mine in America which yields such uniformly rich rock as that same Little Giant. Owyhee county is rapidly coming to the front as a mining county and is assuming some of her old-time importance and activity in that line. A number of mines on War Eagle mountain, and at Filat and Wagontown, are being very successfully worked and are paying good returns to the owners. It will not be at all surprising if inside the next two or three years Silver City once more becomes a prosperous mining town. At the rate of advance Idaho has made this year in its production of precious metals it will not be many years until it is well up in the front among the largest producers of gold and silver and will rank with California, Montana and Colorado. Eight of the 14 counties have permanent and prosperous mining camps, and new and rich discoveries are constantly being made and new mines opened up, and the Territory is not half prospected. That rich gold deposits lie buried in the hills north and east of this city is demonstrated in the discovery of the Boise Black Rock lode within five miles of the city. This ground has been prospected over for years, but no one seems to have hit upon the right spot until Staggs & Mutter made their recent discovery. Nor is it reasonable to suppose that they have discovered the only lode. The fact that a recent assay of their ore run over \$6000 to the ton will doubtless stimulate others to continue the search in the same locality.

## MONTANA.

THE EMPIRE AND ITS OUTPUT.—*Helena Independent*, Nov. 11: During the month of October the Empire 10-stamp mill run 27 days, crushed 437 tons of ore, yielding \$14,500, or an average saving of over \$33 per ton. The mine shows material improvement during the month, particularly in the tunnel level and in the 500-foot levels, both east and west.

THE DRUM LUMMON OUTPUT.—During the

month of October the Montana Co. (limited), with 60 stamps in 27 days, crushed 3133 tons of ore and cleaned up \$137,400. The saving averages nearly \$44 per ton. The new 60-stamp mill is now about complete, and Mr. Bayliss, the managing director, expects that its stamps will begin dropping next week. In all its appointments this mill will be the most complete as well as one of the very largest in Montana.

A RICH SIGHT.—Yesterday the Merchants' National bank displayed on its counting tables a lot of gold dust just received, valued at \$12,000. It was mined by Whittier Bros., during the season just closed, in the Blackfoot district. One pan of the lot was composed entirely of very coarse gold, including many large nuggets, that had been cleaned up without quicksilver. The other was slightly amalgamated, but not enough to interfere with its inimitable color. The Merchants' National has in its vaults a peculiar nugget, taken out of Greenhorn gulch the past season. It is a thin, flat chunk of gold in the form of a curve, nearly six inches long and from one to two inches wide at different portions of its length. The miner in digging it up struck it with his pick and broke it in halves, but this will be repaired and the peculiar nugget will be added to the beautiful and valuable collection owned by the Merchants' National.

## NEW MEXICO.

SOCORRO.—*Bullion*, Nov. 13: Mudge & Zeigler are working their various claims in Water canyon. Robinson & Glasson are working their gold claim successfully in Garcia canyon, near the Ruby. Gen. Cook's Sulphuret, situated near the Ruby and Bonaparte, is shipping ore to Socorro. Major J. B. McGee got back from Kingston on Sunday. He reports a big strike in the Calamity. Prospector Kelly is delving in his Bonanza, and preparing to pack ore on burros from the summit of the Magdalenas. Leddy & McLeish, in their 55-foot tunnel in the Bonaparte mine near the Ruby, have intersected a 3-foot vein of rich lead carbonate ore. Mike Wallace, one of our best miners, has returned from Kingston. He is now working his Georgia Bell and Iron mines in Water canyon. Shands & Co. and T. Leeson, of the St. Vincent mine, let a contract on Wednesday, to A. R. Bryson, for 50 feet of additional work in that property. Bumbaugh & Peterson continue operations on their gold claim in the Socorro mountains. They have performed to date 790 feet underground work. The Ruby mine is being worked without intermission. At 50 feet in the main tunnel a full face of mineral meats the eye, in which free gold occurs from time to time. Superintendent Bates, of the Imperial mine, is in the city. He reports work on that property advancing in a promising manner, and that he will shortly ship mineral to Socorro for treatment. Stack No. 3 at the Billing works blew in on Monday last. The works are now running in full blast, operating all three of their stacks and the roaster for the first time in several months, and we take it as a good omen for the future.

## UTAH.

THE PARLEY'S PARK.—For the last two years or more, everything around the old Parley's Park property has been as quiet as death. Early this week J. G. Kennedy, the old superintendent of the company's affairs, who lately arrived from New York, began making arrangements to get up steam and go down the shaft on a tour of inspection. On Thursday the steam whistle sounded and some of the machinery grated with rust. However, the trip was made to the 700 level in a way that reminded Superintendent Kennedy of old times. The shaft was found in a dry and first-class condition, considering everything. No doubt the mine is drained by the Ontario. After Mr. Kennedy has made a thorough inspection of the property a report will be made to the millionaire stockholders, mainly those composing the Standard Oil Co., and if acted on favorably work will begin at once.

ORE AND BULLION SHIPMENTS.—During the week the Crescent shipped 148,283 pounds of concentrates and 154,912 pounds of first-class ore. For the week ending yesterday the Mackintosh sampler received 424,740 pounds of Ontario ore; 9250 pounds of Daly, and 10,750 pounds of Sampson ore; total 444,740 pounds. The output of Daly bullion from the Marsac mill for the week was six bars, containing 5776 fine ounces of silver. The Ontario bullion shipment on the 1st inst. was 29 bars, containing 16,920 fine silver ounces, and yesterday the product was 28 bars, containing 14,746 fine ounces of silver.

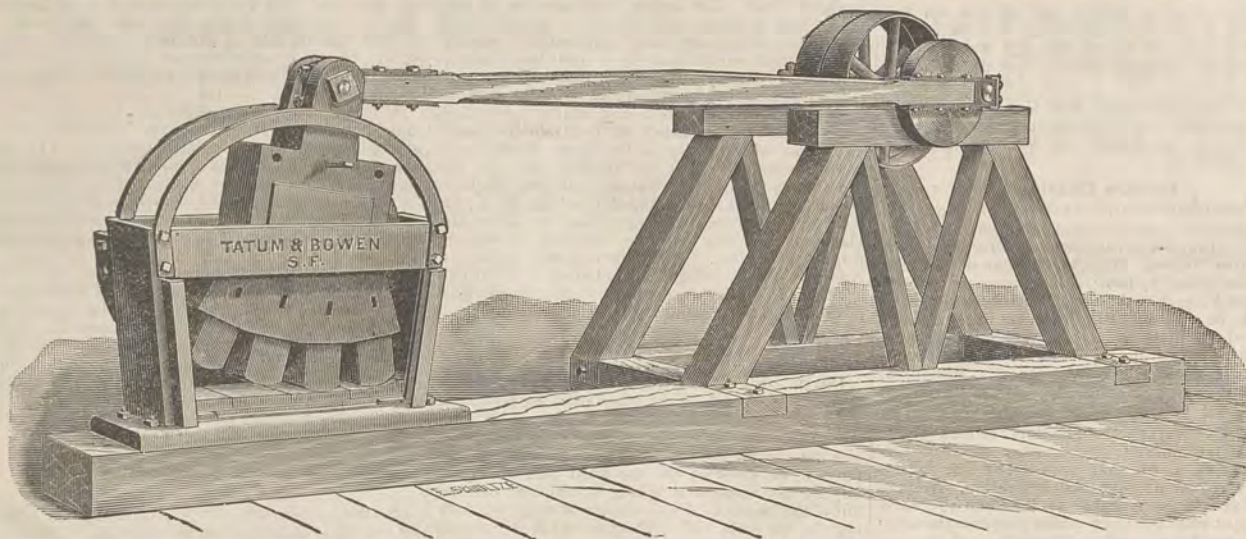
REVIEW.—*Salt Lake Tribune*, Nov. 12: The week has been stormy and unfavorable to the movement of the metals. Miners in various regions beginning to come out of the hills. Prospecting and original developments are practically over for the season. Of course such mines as are established producers are not referred to in this statement. The receipts in this city for the week ending November 10th, inclusive, were \$71,054.16 in bullion and \$55,226.57 in ore; a total of \$126,280.73. For the previous week the receipts were \$119,409.05, of which \$65,973.41 was bullion and \$53,435.65 was ore. The output of the Ontario for the week was 16,385.02 fine ounces and \$9143.66 from ore sales; a total, approximately, of \$25,528.68. The Daly product for the week was 13 bars of fine bullion, 16,960.68 ounces; ore sales, \$7923.01; an approximate total of \$24,883.69. The continued silver shipments from the Bannock, at Era, Idaho, stock of which is mostly owned in this city, were a feature of the week. Three silver bricks were received—1626, 1697 and 1664 ounces respectively, 975 to 980 fine, with \$1 in gold to each ounce of silver. The value of the bars was placed at \$6500. Fine bar receipts for the week were of the value of \$21,081.16; base bullion, \$13,200. The Hanauer smelter produced during the week \$25,063 in bullion. The Stormont sent up on the 4th and 6th silver bars to the value of \$5210. Ore receipts were \$14,506 by Wells, Fargo & Co.; \$37,520 by McCormick & Co., including \$6700 from the Crescent, \$2090 from the Queen of the Hills, and \$1180 from the Overland, and \$3200.57 by T. R. Jones & Co.

STAR.—*Cor. Salt Lake Tribune*, Nov. 5: Star district is not wholly deserted, and work continues on most of the old claims. The mammoth mine has been leased to Mike Monahan. He has now a force of six miners. Work continues on the Adelia, Florence, Rebel, Blue Cloud, Chicago, Rose Cleveland, Jim Keene and many others.



# JAMES' PATENT RECIPROCATING STAMP MILL.

(PATENTED AUG. 16, 1881.)



Weight of Boss and Shoes (1200 pounds) acts on each Shoe separately. It is practically the same as the regular Stamp Mill.

Capacity, 6 Tons in 24 Hours. 4 H. P.

Parties wishing to test the Mill with any ore they may bring, will find one in operation at our works in this city.

## PRICES:

Reciprocating Stamp Mill,	\$350 00
Rock Breaker, - - -	100 00
Automatic Ore Feeder, -	50 00
Single Track Ore Car, - -	40 00

SEND FOR CIRCULAR.

TATUM & BOWEN,

34 & 36 Fremont St., San Francisco.

91 & 93 Front St., Portland, Oregon.



## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

BEST SOFT LAKE SUPERIOR COPPER USED.

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.

E. G. DENNISTON, Proprietor.

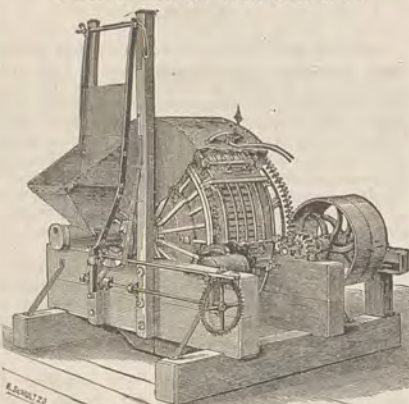
These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

## Tustin's Pulverizer

WORKS ORE WET OR DRY

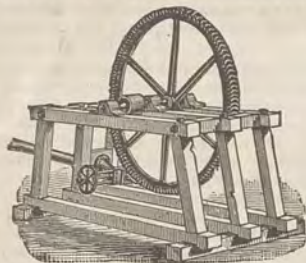
FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLY, SPIERS & HAYES,

KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.

SEND FOR CIRCULAR.

EDWARD A. RIX & CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco.

AUGUST LUTZ,  
METAL SPINNER,

10 Stevenson St., 3d floor, S. F.

The only custom work spinner in the city. Personal attention given to all work. Orders respectfully solicited.

INVENTORS, TAKE NOTICE

L. PETERSON, MODEL MAKER,  
258 Market St., N. E. cor. Front (upstairs), San Francisco.  
Experimental machinery and all kinds of metal, tin, copper and brass.

## H. P. GREGORY & CO.

Nos. 2 and 4 California St., - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

# MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING MACHINERY.

FRANK & CO.'S WOODWORKING MACHINERY.

NEW HAVEN MANUFACTURING CO.'S MACHINISTS' TOOLS.

BEMENT & SON'S MACHINISTS' TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND EXHAUSTS.

SHIMER MATCHER HEADS.

BRAINARD MILLING MACHINES.

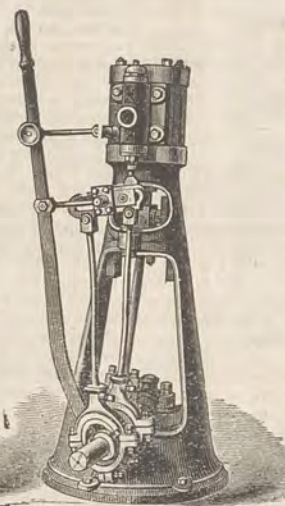
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS.

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISHERS.



YACHT ENGINES.

WILLIAMSON BROS' HOISTING ENGINES.

ATLAS ENGINE WORKS ENGINES AND BOILERS.

PAYNE'S VERTICAL AND HORIZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS.

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECTORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHN'S ASBESTOS PACKING, PAINT, ETC.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 258 Market St., San Francisco.

## HENDERSON'S PATENT TRUSS.

Comfortable and Reliable.



This simple truss can be worn without inconvenience, and gives all the comfort to the wearer that can be obtained from a perfect-fitting, pliable apparatus. The pad is soft and yielding, and on account of its peculiar construction and the connections of its securing bands, cannot get out of place. It will remain in place no matter what position the wearer may assume. The engraving shows the construction of the appliance. It is simplicity itself, and is comfortable and reliable. Address,

JESSE G. HENDERSON,

Grizzly Flat, El Dorado Co., Cal.

RICHARD C. REMMEY, Agent,

Philadelphia Chemical Stoneware Manufactory,  
1100 East Cumberland St., PHILADELPHIA, PA.

Manufacturer of all kinds of Chemical Stoneware — FOR — Manufacturing Chemists. Also Chemical Brick for Glover Tower.



FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.

California Inventors Should consult DEWEY & CO. AMERICAN AND FOREIGN PATENT SOLICITORS, for obtaining Patents and Caveats. Established in 1860. Their long experience as journalists and large practice as Patent attorneys enables them to offer Pacific Coast Inventors far better service than they can obtain elsewhere. Send for free circulars of information. Office of the MINING AND SCIENTIFIC PRESS and PACIFIC RURAL PRESS No. 252 Market St., San Francisco. Elevator, 12 Front St.



## RUPTURE!

A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort night and day. Gives universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDBER, (Druggist) 701 Market Street, cor. Third, San Francisco.

BACK FILES of the MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$5. Inserted in Dewey's patent binder, 50 cents additional per volume.



## STURTEVANT MILL.

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

## FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,  
JIGS and TROMMELS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



HOISTING

ENGINES,

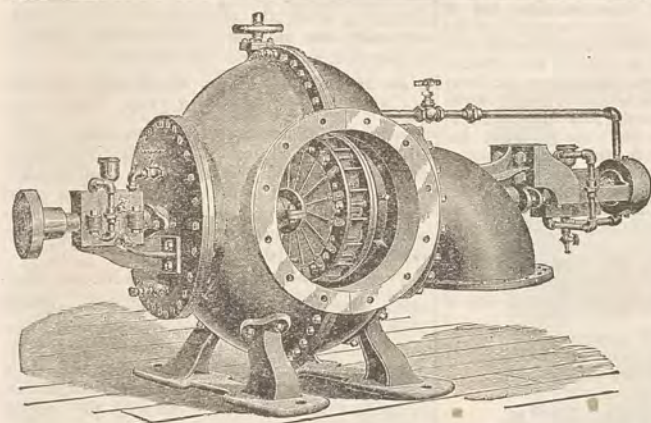
HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.  
NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.  
UTAH OFFICE—SALT LAKE CITY, UTAH.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.  
MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.



## JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.  
Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.  
Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,  
Springfield, Ohio, or 110 Liberty St., New York.  
FRASER & CHALMERS, General Agents,  
Chicago, Ill., and Denver, Col.  
PARKE & LACY, General Agents, San Francisco, Cal.

## MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.



WATER TANKS! WINE TANKS!  
CALIFORNIA WINE COOPERAGE CO.  
FULDA BROS., Proprietors,

30 to 40 Spear St., San Francisco.  
ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

## COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.



## THE CONSUMERS' COMPANY. VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.  
SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,  
The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.  
AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.  
VULCAN POWDER CO.  
218 California Street, San Francisco, Cal.

## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as  
The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,  
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and  
GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,  
CAPS and FUSE for Sale. GENERAL AGENTS, SAN FRANCISCO, CAL.

## THOMAS PRICE'S ASSAY OFFICE, CHEMICAL LABORATORY,

BULLION ROOMS and ORE FLOORS,  
524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.  
WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

## Metallurgy and Ores.

## SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY  
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,  
LEAD PIPE,  
SHEET LEAD,  
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,  
Under Chamberlin Patent.

## JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

## Nevada Metallurgical Works.

NO. 28 STEVENSON STREET,  
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt, )

Mining Engineers and Metallurgists.

J. KUSTEL. H. KUSTEL.

## METALLURGICAL WORKS,

318 Pine St. (Basement, )

Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my

Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

C. H. AARON,

ASSAYER AND METALLURGIST,

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

514 Kearny Street,

SAN FRANCISCO, - CALIFORNIA

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

W. A. GOODYEAR,

Civil and Mining Engineer

MINING EXPERT and GEOLOGIST.

Address care of Dewey & Co., 252 Market Street, San Francisco, Cal.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorey, 529 Commercial St., S. F.



## Mining Share Market.

There has been no such boom in mining stocks for some years as is now prevalent. The whole list has been subject to sharp advances in price. During the last month some few have gone up from less than \$1 to \$25; others from 20 cents to \$10. The lucky buyers at low prices have realized largely. The volume of sales has increased ten-fold, and brokers are once more reaping commissions in a way that reminds them of bonanza days. Around the stock boards the excitement among the dealers is as great as in the times when prices were in the hundreds. It is all supposed to be due to the fact that the lower levels of the Comstock have been abandoned; that work will be confined to the old upper levels, and that bullion shipments from there are on the increase. No special developments in ore have brought about the excitement. The Virginia Enterprise, in speaking of the Comstock mines, says: Nothing out of the general order of things has occurred in the several ore-producing mines during the past week. The center of attraction, Con. California and Virginia, has not increased its output of ore, as it is impossible for the mills to handle more than they are now receiving. The battery assays for the past week show an increase over the previous week of about \$4 per ton. There are mountains of ore ahead, and could the ore houses and mills receive it, more men would be put to work and larger quantities of ore extracted.

The managers of the Savage Mining Company are preparing to crosscut on the 600 and 800 levels, and before the beginning of the new year, the work of extracting the ore, which has been found on these levels, will begin.

The Bullion managers are also actively engaged in setting up machinery, etc., and will erect hoisting works at the old Croesus shaft, after which the shaft will be repaired and vigorous prospecting done in quest of the ore which they say exists on the 300 level near the Croesus shaft and which will mill from \$15 upward.

There has been in the past two weeks in the neighborhood of \$150,000 in bullion shipped below from the Con. California and Virginia. With the indebtedness entirely wiped out, and this amount lately shipped, the stockholders will doubtless soon receive their first dividend.

## New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

TRINITY RIVER TUNNEL AND M. CO., Nov. 16. Capital stock, \$500,000 in 50,000 shares. Directors, W. H. Lawrence, Calixte Denervand, Charles W. Randall and J. Henry Meyer.

AMADOR G. M. CO., Nov. 16. Capital stock, \$400,000 in 200,000 shares. Directors, Martin Jones, W. B. Murdoch, W. E. Adams, Samuel L. Theller and Nathan Atkinson.

MURRIETA AND SAN JUANITO R. R. CO., Nov. 13. Location, San Diego Co. Capital stock, \$240,000. Directors, F. E. Bates, G. Preterbaugh, S. A. Compton and C. L. Morrill.

WESTERN FIBER CO., Nov. 13. Object, to engage in buying and selling patents and patent rights for decorating fibrous materials. Capital stock, \$2,000,000. Directors, E. W. Newhall, George K. Porter, R. H. Lloyd, A. W. Foster, E. Scott, George C. Hickox and Walter S. Maxwell.

SEBASTOPOL G. M. CO., Nov. 10. Capital stock, \$1,000,000. Directors, W. Letts Oliver, F. J. Fleiter, Geo. West, E. Baldwin, A. S. Cheminant.

SHOALWATER BAY MILLING CO., Nov. 10. Object, to carry on a lumber and milling business. Capital stock, \$150,000. Directors, O. Preston, J. J. McKinnon, J. J. Coleman, W. R. McCullough, D. C. Hodgkin.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Alice, Nov. 13, \$22,908; Moulton, 13, \$12,800; Con. Virginia and California, 16, \$76,011; Hanauer, 12, \$2330; Crescent, 12, \$2520; Queen of the Hills, 12, \$1070; Hanauer, 13, \$6733; Bannock, 13, \$4750; Alice, 10, \$57,450; Hanauer, 9, \$6670; Queen of the Hills, 9, \$1020; Bannock, 9, \$6500; Hanauer, 10, \$4425; Queen of the Hills, 14, \$1040; Hanauer, 14, \$2270; Bannock, 14, \$1856; Con. Virginia and California, 13, \$38,786.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
G. W. INGALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
G. R. HUSTON—Montana.  
GEO. McDOWELL—Fresno and Tulare Cos.  
J. H. SMITH—Plumas and Sierra Cos.  
J. C. SWENNEY—Sonoma and Mendocino Cos.  
O. F. BERGMAN—Yolo and Solano Cos.  
M. S. PRIME—El Dorado and Placer Cos.

SILVER is "selling at one dollar an ounce, and is evidently on the up grade to stay. A revival in mining is sure to follow an increase in the price of silver, and then the mines of Nye county will be worked for what is in them.—Silver State.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.									
COMPANY.	LOCATIONS.	No.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Acme M & M Co.	California.	9.	24.	Oct 25.	Nov 29.	Dec 20.	J. M. Buffington.	309 California St	
Aultman M & M Co.	California.	3.	24.	Oct 26.	Nov 29.	Dec 20.	J. M. Buffington.	309 California St	
Alta S M Co.	Nevada.	34.	25.	Oct 16.	Nov 20.	Dec 10.	W. H. Watson.	302 Montgomery St	
Best & Belcher M Co.	Nevada.	35.	50.	Sept 29.	Nov 4.	Nov 24.	W. H. Watson.	302 Montgomery St	
Benton Con M Co.	California.	16.	10.	Oct 27.	Dec 1.	Dec 21.	W. H. Watson.	302 Montgomery St	
Centennial Grav M Co.	Nevada.	2.	62.	Oct 25.	Dec 6.	Jan 6.	J. P. Flannagan.	309 California St	Virginia Nev
Columbus Con M Co.	Nevada.	4.	50.	Oct 27.	Nov 29.	Dec 29.	J. M. Buffington.	309 California St	
Chollar M Co.	Nevada.	22.	50.	Nov 16.	Dec 21.	Jan 13.	C. E. Elliott.	309 Montgomery St	
Diana M Co.	California.	6.	25.	Oct 12.	Nov 22.	Dec 13.	P. J. Flannigan.	318 Pine St	
Excelsior M Co.	Nevada.	23.	20.	Oct 18.	Nov 24.	Dec 15.	C. E. Elliott.	306 Montgomery St	
East Mt Diablo M Co.	Nevada.	4.	10.	Oct 30.	Dec 4.	Dec 30.	G. W. Fisher.	318 Pine St	
Gould & Curry M Co.	Nevada.	54.	50.	Sept 28.	Nov 3.	Nov 24.	A. K. Durbrow.	309 Montgomery St	
Independence M Co.	Nevada.	16.	2.	Oct 12.	Nov 16.	Dec 8.	J. W. Paw.	310 Pine St	
Mountain Tunnel M Co.	California.	2.	10.	Oct 27.	Nov 29.	Dec 20.	A. B. Paul.	328 Montgomery St	
North Banner Con M Co.	California.	15.	4c.	Oct 2.	Nov 6.	Nov 27.	T. J. Mitchell.	Grass Valley	
Pneumatic M Co.	California.	1.	125.	Oct 5.	Nov 11.	Dec 9.	H. Pictor.	320 Sansome St	
Peerless M Co.	Arizona.	9.	10.	Nov 16.	Dec 23.	Jan 17.	A. Waterman.	309 Montgomery St	
Peer M Co.	Arizona.	6.	10.	Nov 12.	Dec 22.	Jan 7.	A. Waterman.	309 Montgomery St	
Potosi M Co.	Nevada.	30.	10.	Nov 10.	Dec 14.	Jan 4.	C. E. Elliott.	304 Montgomery St	
Polar Star M Co.	New Mexico.	1.	07.	Nov 17.	Dec 31.	Jan 15.	J. C. Stump.	309 Montgomery St	
Rocky Bar M Co.	California.	3.	50.	Oct 10.	Nov 20.	Dec 7.	G. W. Hill.	Grass Valley	
Spring Valley G M Co.	California.	1.	25.	Oct 19.	Dec 3.	Jan 3.	H. Pictor.	320 Sansome St	
Santa Anita M & M Co.	California.	10.	14.	Oct 26.	Nov 29.	Dec 20.	J. M. Buffington.	309 California St	
Sierra Iron Co.	California.	5.	250.	Nov 18.	Dec 22.	Jan 18.	H. P. Bush.	431 California St	
Scorpion M Co.	Nevada.	29.	10.	Nov 11.	Dec 17.	Jan 7.	G. R. Spinyer.	318 California St	
Tyrolene M Co.	Idaho.	1.	15.	Oct 23.	Nov 30.	Dec 28.	F. Frankenthal.	121 Battery St	
Tulnlah M Co.	Califor	1.	50.	Oct 31.	Dec 8.	Dec 29.	G. A. Hill.	624 Market St	
Union Con M Co.	Nevada.	34.	25.	Nov 3.	Nov 24.	Dec 7.	J. M. Buffington.	309 California St	

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Esta Buena Con M Co.	California.	J. T. Cross.	806 Market St.	Annual.	Nov 24
Sabine M Co.	California.	J. Tyson.	619 Kearny St.	Annual.	Nov 26
Tolo M Co.	California.	J. Tyson.	619 Kearny St.	Annual.	Nov 26

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Martin White M Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	30.	Oct 11
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	30.	Sept 30
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Aug 16
Young America M Co.	California.			40.	May 20

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Oct. 23.	WEEK ENDING Nov. 4.	WEEK ENDING Nov. 11.	WEEK ENDING Nov. 18.
Alpha.	.70	1.25	.70	.85
Alta.	.50	.75	.75	1.85
Andes.	.40	.60	.35	.45
Argenta.	.15	1.60	1.25	1.35
Belcher.	1.15	1.60	1.25	1.35
Belling.	.10	.15	.15	.20
Best & Belcher.	1.10	2.50	1.45	2.30
Bullion.	.45	.75	.55	.65
Bonanza King.	.10	.15	.15	.20
Belle Isle.	.10	.15	.15	.20
Bodie Con.	1.40	2.45	2.40	2.60
Benton.	.10	.15	.15	.20
Bodie Tunnel.	.10	.15	.15	.20
Bulwer.	1.30	1.65	1.35	1.85
California.	4.45	9.50	6.00	8.25
Challenge.	.25	.30	.25	.35
Champion.	.45	.75	.65	.85
Chollar.	.15	.20	.15	.20
Confidence.	2.10	2.35	2.30	2.90
Con. Imperial.	.10	.15	.15	.20
Con. Virginia.	4.45	9.50	6.00	8.25
Con. Pacific.	.10	.15	.15	.20
Crown Point.	1.10	2.35	1.00	1.25
Day.	.10	.15	.15	.20
Eureka Con.	4.75	5.00	5.00	4.00
Eureka Tunnel.	.10	.15	.15	.20
Excelsior.	.10	.15	.15	.20
Grand Prize.	.35	.60	.65	.85
Gould & Curry.	.75	1.30	.80	1.60
Goodshaw.	1.00	1.40	1.00	1.15
Hale & Norcross.	1.00	1.40	1.00	1.15
Holmes.	2.50	1.10	2.25	2.50
Independence.	.05	.20	.15	.20
Julia.	.45	.90	.65	.70
Justice.	.45	.90	.65	.70
Martin White.	2.40	2.45	2.45	2.50
Mono.	.75	1.65	1.05	1.25
Mexican.	.75	1.65	1.05	1.25
Mt. Diablo.	.10	.15	.15	.20
Northern Belle.	.70	.95	.95	1.00
Nevado.	3.25	5.37	5.37	8.00
North Belle Isle.	1.10	1.50	1.20	1.25
Ophir.	1.95	4.75	2.90	4.45
Overman.	.35	.60	.40	.60
Potosi.	.75	1.00	.80	.85
Pinal Con.	2.45	3.35	2.65	2.90
Savage.	.75	1.40	1.10	1.70
Seg. Belcher.	.05	.15	.10	.15
Sierra Nevada.	.05	.15	.10	.15
Silver Hill.	.05	.15	.10	.15
Silver King.	.05	.15	.10	.15
Scorpion.	.05	.15	.10	.15
Syndicate.	.15	.20	.15	.20
Utopia.	.60	1.15	.70	.85
Union Con.	.85	1.50	1.05	1.45
Utah.	1.15	2.35	1.50	1.70
Yellow Jacket.	1.15	2.35	1.50	1.70

## Sales at San Francisco Stock Exchange.

THURSDAY A. M., Nov. 18.	30	Holmes.	2.25
1870 Alta.	2.00	2.10	2.10
1180 Andes.	.90	.95	.95
130 Alpha.	2.50	2.75	2.75
100 Argenta.	1.50	1.200	1.200
800 B. & Belcher.	5.00	5.12	5.12
790 Bullion.	1.25	1.35	1.35
400 Belle Isle.	.35	.40	.40
150 Bodie Con.	3.25	3.40	3.40
3000 Bulwer.	1.30	2.00	2.00
750 Benton Con.	3.00	3.15	3.15
250 Belcher.	2.30	2.40	2.40
200 Con. Imperial.	.90	.850	.850
1620 Chollar.	5.90	5.50	5.50
400 Con Va & Cal.	.75	.75	.75
15 Confidence.	5.00	5.25	5.25
70 Crown Point.	2.50	2.30	2.30
400 Challenge.	.55	.55	.55
1000 Excelsior.	.80	.850	.850
1930 Gould & Curry.	3.45	3.55	3.55
2220 Hale & Nor.	3.25	3.40	3.40

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

## Thanksgiving Proclamation.

STATE OF CALIFORNIA,  
EXECUTIVE DEPARTMENT.

In accordance with the custom and in conformity to the proclamation of the President of the United States, I, George Stoneman, Governor of the State of California, do hereby designate and set apart Thursday, the 25th day of November, as a day of thanksgiving and prayer. I invite the people of the State to forego their usual business employment and assemble in their places of worship to give thanks to the Supreme Ruler of the universe for the continued enjoyment of the blessings of free government, for the renewal of business prosperity throughout the land, for the return which has rewarded the labor of those who till the soil, and for our progress as a people in all that makes a nation great. Let us, in the midst of thanksgiving, remember to dispense charity liberally to the poor and needy, so that our services may, by such acts, be made acceptable to God.

In testimony whereof I have hereunto set my hand and caused the great seal of this State to be affixed, at the State Capitol, on this the 10th day of November, A. D. 1886.

GEORGE STONEMAN, Governor.  
Attest: THOMAS L. THOMPSON,  
Secretary of State.

## San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Nov. 18, 1886.	
ANTIMONY—French Star.	94 1/2
BORAX—San Bernardino.	8 1/2
Argonosa.	— @ 62
LEAD—(Glenbrook 100).	— @ 25 1/2
Eglington, ton.	— @ 22 1/2
American Soft, No. 1, ton.	23 00 @ 24 00
Oregon Pig, ton.	21 00 @ 23 00
Clippard Gap, Nos. 1 & 4.	22 00 @ 23 50
Clay Lane White.	21 50 @
Shotts, No. 1.	23 50 @
Steel—English, lb.	16 @ 25
Black Diamond, ordinary sizes.	10 @
Flows.	4 @ 5
Machinery.	5 @ 6
Sanderson Bros.	10 @
COPPER—	
Bolt.	18 1/2 @
Sheathing.	19 @
Ingot.	12 @ 13
LEAD—Pig.	4 75 @
Bar.	5 25 @ 5 50
Pipe.	8 @
Sheet.	8 @
Shot, discount 10% on 500 bag.	1 65 @
Buck, # bag.	1 85 @
Chilled, do.	2 05 @
ZINC—German.	8 @ 9
Sheet, 7 1/2 ft, 7 to 10 lb. less the cost.	39 00 @ 40 50
QUICKSILVER—By the flask.	1 05 @
Flasks, new.	85 @
Flasks, old.	5 00 @
TINPLATE—Coke.	6 50 @

## New York Metal Market.

Telegraphic advices dated Nov. 18th give the following New York prices:

BORAX—5 1/2 @ 6 1/2.  
BAR SILVER—101 1/2 per oz.  
COPPER—LAKE—12.00.  
IRON—No. 1, \$18 @ 19.00.  
LEAD—\$4.85 @ 4.95.  
QUICKSILVER—53 1/2 @ 55c.  
The following is the latest by mail from the "New York Metal Exchange Market Report":  
COPPER—Lively, spot closing @ 11.85 @ 12.10.  
Transferable Notices (Lake) issued at 11.95.  
Transferable Notices (Chili Bars) issued at 4.41.65.  
LEAD—Stronger at 4.42 1/2 @ 4.50c spot. Transferable Notices issued at 4.47 1/2.  
TIN—Quiet at 22.15 @ 22.20. Transferable Notices issued at 22.20.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.30 @ 22.50; Billiton Tin, \$22.75 @ 23.10; Banca Tin, \$23.00 @ 23.50; Baltimore Copper, \$10.55 @ 10.95; Orford Copper, \$10.50 @ 11.00; P. S. C. Copper, \$10.25 @ 11.00; Foreign Lead, \$4.50 @ 4.75; Foreign Spelter, \$4.35 @ 4.75.  
MAKER'S PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18.50 @ 19.50; No. 2, \$17.50 @ 18.50; Grey Forge, \$16.00 @ 16.50. Hudson River, Grade No. 1, \$18 @ 19.50; No. 2, \$17.50 @ 18.00; Grey Forge \$15.50 @ 16.50. Southern, Grade No. 1, \$18.00 @ 19.00; No. 2, \$17.00 @ 18.00; Grey Forge \$15 @ 16.

THE Etna Quicksilver Mining Company, of Napa county, has declared a dividend amounting to \$10,000.

## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING NOVEMBER 9, 1886.

352,385.—ROAD ENGINE—W. Applegarth, Fresno, Cal.  
352,181.—WINDOW—M. B. Burk, Dayton, W. T.  
352,182.—IRONING BOARD—L. M. Darrow, Stockton, Cal.  
352,482.—OPERATING VALVES OF HYDRAULIC ENGINES—Jos. Moore, S. F.  
352,483.—TRACTION WHEEL—R. R. Moore, Modesto, Cal.  
352,346.—SELF-PROPELLING WAGON-TRAIN—J. B. Osborne, Daggett, Cal.  
352,260.—WRENCH—J. M. & W. H. Parsons, Great Western Mine, Cal.  
352,278.—LINIMENT—O. W. Storer, Snelling, Cal.  
352,282.—FUMIGATOR—Jos. Watson, Petaluma, Cal.  
16,979.—DESIGN—F. S. Johnson, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.



## Assessment Notices.

**Tallulah Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Sierra Mining District, Humboldt County, Nevada.

NOTICE is hereby given, that at a meeting of the Directors, held on the 30th day of October, 1886, an assessment (No. 21) of thirty cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 634 Market street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 8th day of December, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Wednesday, the 29th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

GEORGE A. HILL, Secretary.

OFFICE—With Estate of Samuel Hill, 634 Market St., San Francisco, Cal.

**Acme Mill and Mining Company.**—Location of principal place of business, San Francisco, Cal. Location of works, Volcano Mining District, Amador County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 25th day of October, 1886, an assessment (No. 9) of two and one-half cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 29th day of November, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 20th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Sec'y.

OFFICE—Room 4, 309 California St., San Francisco, Cal.

**Aultman Mill and Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Georgetown Mining District, El Dorado County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 26th day of October, 1886, an assessment (No. 3) of two and one-half cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 29th day of November, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 20th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Sec'y.

OFFICE—Room 4, 309 California St., San Francisco, Cal.

**Santa Annita Mill and Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Nevada County, Cal.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 26th day of October, 1886, an assessment (No. 10) of one and one-half cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 29th day of November, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 20th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Secretary.

OFFICE—Room 4, 309 California St., San Francisco, Cal.



**H.H.H. HORSE LINIMENT.**  
THE H. H. H. Horse Liniment puts new life into the Antiquated Horse! For the last 14 years the H. H. H. Horse Liniment has been the leading remedy among Farmers and Stockmen for the cure of Sprains, Bruises, Stiff Joints, Spavins, Windgalls, Sore Shoulders, etc., and for Family Use is without an equal for Rheumatism, Neuralgia, Aches, Pains, Bruises, Cuts and Sprains of all characters. The H. H. H. Liniment has many imitations, and we caution the Public to see that the Trade Mark "H. H. H." is on every Bottle before purchasing. For sale everywhere for 50 cents and \$1.00 per Bottle.

For Sale by all Druggists.

## Books on Working Ores.

By GUIDO KUSTEL, M. E.

ROASTING OF GOLD AND SILVER ORES (Second Edition) and the Extraction of their Respective Metals without Quicksilver. By GUIDO KUSTEL, M. E. 1880.

This rare book on the treatment of gold and silver ore without quicksilver is liberally illustrated and crammed full of facts. It gives short and concise descriptions of various processes and apparatus employed in this country and in Europe, and the why and wherefore. It contains 156 pages, embracing illustrations of furnaces, supplements and working apparatus. It is a work of great merit, by an author whose reputation is unsurpassed in his specialty. PRICE, \$3, coin, postage free. Sold by DEWEY & Co., Publishers, 252 Market St., San Francisco, Cal.

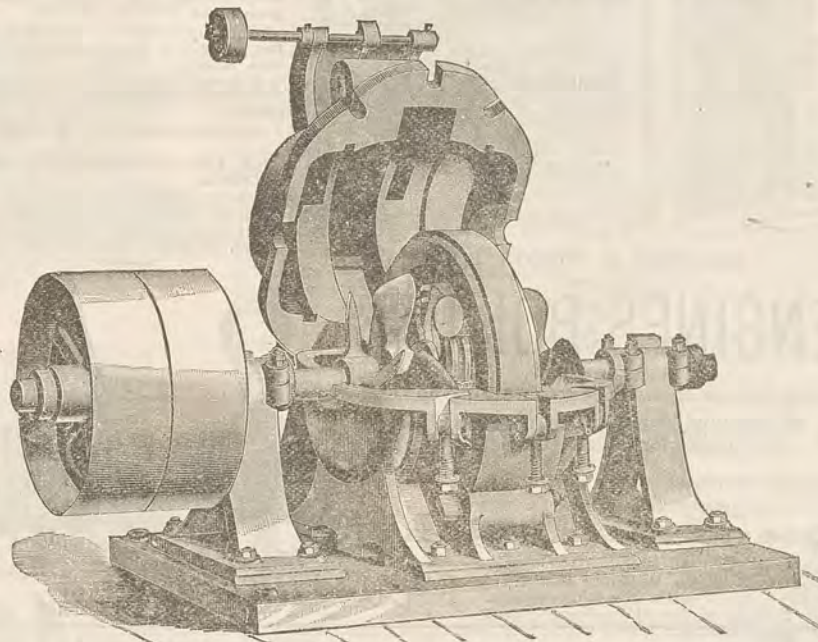
By C. H. AARON.

AARON'S LEACHING GOLD AND SILVER ORES, the most complete hand-book on the subject extant; 164 pages octavo. Illustrated by 12 lithographic engravings and four wood cuts. Fully indexed. Plainly written for practical men. In cloth, \$3. Sold by DEWEY & Co., S. F.

BACK FILES OF THE MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$5. Inserted in Dewey's patent binder, 50 cents additional per volume.



## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.

Certificates as to performance of the Mills, and any information required, furnished on application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 & 106 Washington St., NEW YORK.  
OR PACIFIC IRON WORKS, SAN FRANCISCO.



LIFE SCHOLARSHIP, - \$75.00  
Full Business Course.

SIX MONTHS' COMBINED COURSE, \$75.

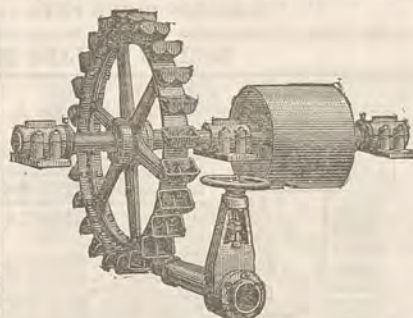
Including the Business Course, Academic Course, Modern Languages, Telegraphy, Shorthand, Type-Writing, etc. Ladies admitted into all Departments. Day and Evening Sessions during the entire year.

CALL OR SEND FOR CIRCULARS.

Practical Treatise on Hydraulic Mining.  
By AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by DEWEY & Co., Publishers, 252 Market St., San Francisco.

## PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

Engraving. Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.

## Dewey & Co.'s Scientific Press Patent Agency.



OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

DEWEY & CO., Patent Agents.

No. 252 Market St. Elevator 12 Front St  
S. F. Telephone No. 658.

A. T. DEWEY. W. B. EWER. GEO. H. STRONG.

## CALIFORNIA HAND ROCK DRILL,

—FOR—

TUNNELING, DRIFTING, and SINKING.

Buy the best and latest improved Hand Rock Drill; can be run by hand, steam, compressed air, or water power. Machine made entirely of crucible steel; light, compact and durable. Strikes 250 blows per minute with 7-lb hammer. A perfect reproduction of hand drilling; will drill one inch per minute in the hardest rock, using one-quarter the number of drills required by hand labor.

Machines on exhibition at No. 32 First St., San Francisco.

Send for circulars.

GEO. T. EMERY, General Agent.

## MACHINISTS, ATTENTION!

AN OUTFIT FOR A MACHINIST.

Good Tools, Patterns and an Established Business

FOR SALE AT A BARGAIN,

If applied for immediately.

Address, B. A. W.,  
Care of this Paper.

## American Exchange Hotel,

SANSOME STREET.

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50  
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

**HEALD'S BUSINESS COLLEGE,**  
24 Post St. S. F.  
Send for Circular.



NOTICE TO  
**MINING MEN,**  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.

### Engineers' Tables of Progress

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, Etc. address:

**INGERSOLL ROCK DRILL CO.,**

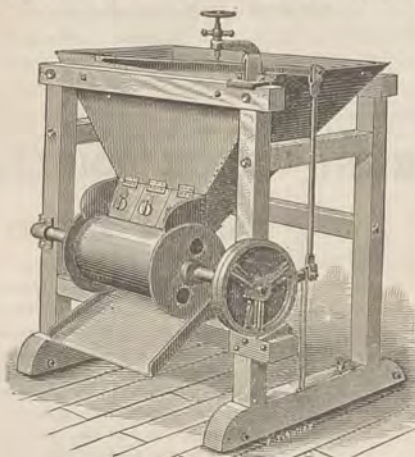
REPRESENTED BY

**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

THE ORIGINAL  
**Roller Ore Feeder.**



This form of Ore Feeder is well adapted  
for its peculiar work.

In reference to a similar form of "Roller" Feeder, which is being manufactured and offered for sale in this city, and of which a cut appears in this journal, we have to say that the Superintendent of the Bunker Hill Gold Mining Company states that the "Challenge" is far superior to the "Roller," he having had both of them operating side by side. We shall be pleased to show this letter, upon application, to any one interested.

We are also manufacturers of the "Challenge" and "Stanford Improved."

Prices furnished by the  
**JOSHUA HENDY MACHINE WORKS,**  
39 to 51 Fremont St., San Francisco.

### ORE FEEDERS.

We direct attention to an advertisement, which appears in our journal, of the "Original Roller" Ore Feeder, manufactured by the "Joshua Hendy Machine Works," of Nos. 39 to 51 Fremont St., this city.

As the manufacturers of a similar form of Feeder, known as the "Templeton Roller," claim that it is superior to any other style, and cite those in operation at the "Bunker Hill" mill in Amador county, we expressly contradict the statement, and in substantiation submit a copy of a letter shown to us by a representative of the "Joshua Hendy Machine Works," which speaks for itself.

BUNKER HILL GOLD MINING CO.,  
AMADOR CO., CAL., July 12, 1886.

To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: We have used the "Challenge" and "Roller" or "Templeton" Ore Feeders in our mill for the past three years, and I am free to say that I consider the "Challenge" far superior to the "Roller" Feeder, in that most important of all things in a quartz mill, namely, the regular feeding of ores to the batteries. If the "Roller" Feeder is regulated to feed finely pulverized ore, the coarser ore will choke the outlet of the Feeder, and no ore can reach the batteries. If, on the other hand, it is regulated to feed coarse ore, then the fine ore when it comes will sluice right through and fill the batteries. The "Roller" Feeder requires constant attention. Yours truly,

(Signed) N. W. CROCKER, Supt.

**NATIONAL ASSURANCE CO.,**  
OF IRELAND.

**ATLAS ASSURANCE COMPY.,**  
OF LONDON.

**BOYLSTON INSURANCE COMPANY,**  
OF BOSTON, MASS.

H. M. NEWHALL & CO.,

GENERAL AGENTS,

809 & 811 Sansome St., San Francisco, Cal.

**Dewey & Co.** { 252 Market St. } Patent Ag'ts

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake. The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**

316 California St., San Francisco.

## FULTON IRON WORKS,

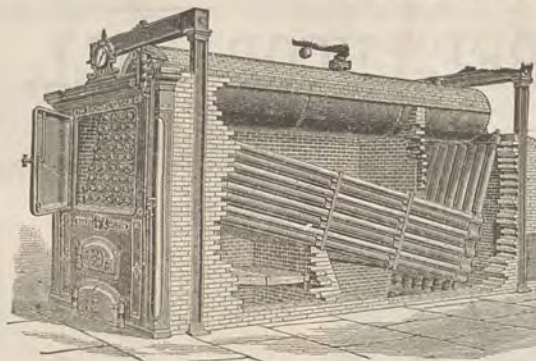
HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

MANUFACTURERS OF

San Francisco.



BABCOCK & WILCOX BOILERS.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure or Compound, Stern or Side-wheel Engines.

MINING MACHINERY—Hoisting Engines and Works, Cages, Ore Buckets, Ore Cars, Pumping Engines and Pumps, Water Buckets, Pump Columns, Air Compressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for Dry or Wet Crushing, Amalgamating Pans, Settlers, Furnaces, Retorts, Concentrators, Ore Feeders, Rock Breakers, Furnaces for Reducing Ores, Water Jacks, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MACHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines and Boilers, Dredging Machinery, Powder Mill Machinery, Water Wheels.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish Tanks for Salmon Canneries OF EVERY DESCRIPTION.

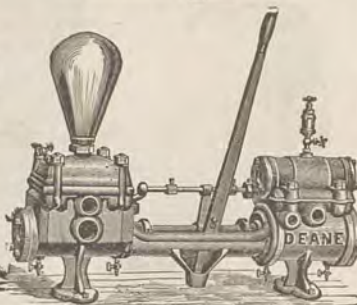
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers, Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

—ALSO—

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**

**FRASER & CHALMERS.**

CHICAGO, ILL.  
U. S. A.

General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.

Mexico Office:  
No. 11  
Calle de Sanchez  
Chihuahua, Mex.

PERFORATED METALS FOR  
REVOLVING and SHAKING-SCREENS,  
JIGS & STAMP BATTERIES.

Utah Office—SALT LAKE CITY, UTAH.

## Iron and Machine Works.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

—BUILDER OF—

Steam Engines, Flour Mill, Mining, Saw Mill and Dredging Machines

Brodie Rock Crushers, Steam Power, Hydraulic, Side Walk and Hand-Power ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. **ORDERS SOLICITED.**

### UNION IRON WORKS,

SACRAMENTO, CAL.

**ROOT, NEILSON & CO.,**

MANUFACTURERS OF

Steam Engines, Boilers,

AND ALL KINDS OF

MACHINERY FOR MINING PURPOSES.

Flouring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front St., bet. N & O Sts., Sacramento, Cal.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

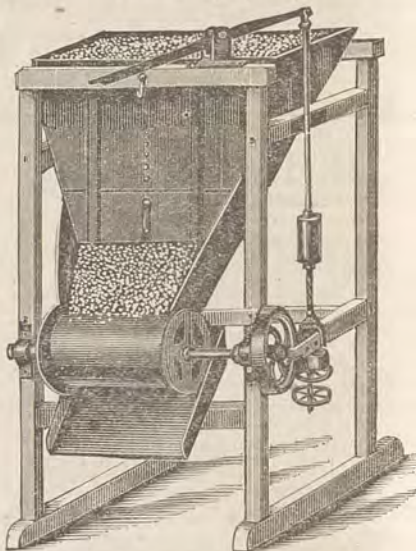
**EUREKA FOUNDRY,**

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

## THE ROLLER ORE FEEDER

[Patented May 28, 1882.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

**Golden State and Miners' Iron Works.**

Sole Manufacturers,

227 First Street, San Francisco, Cal.

## N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

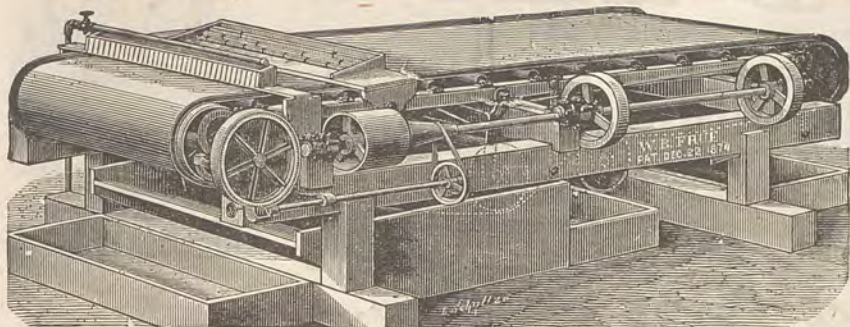
## Saws.

**SAW MILLS AND MACHINERY**

Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR**  
OR VANNING MACHINE.

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS**  
(\$575.00) F. O. B.

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

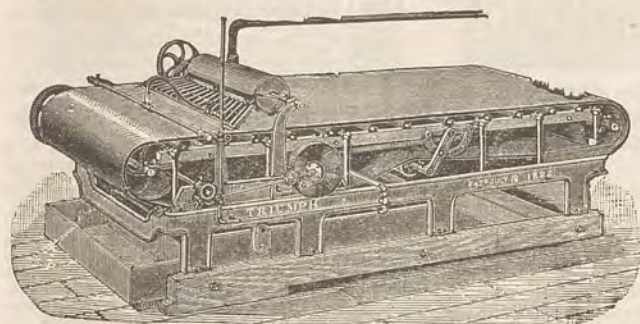
THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.  
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).  
N. B.—Since the above was written the 20 Vanners having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,  
Room 7, No. 109 California Street, SAN FRANCISCO, CAL.

# \$1,000 CHALLENGE ACCEPTED, PRICE, FIVE HUNDRED AND FIFTY DOLLARS (\$550.00).



**THE "TRIUMPH" ORE CONCENTRATOR.**

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE, placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

JOSHUA HENDY MACHINE WORKS,  
Nos. 39 to 51 Fremont St., San Francisco, Cal.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.  
J. C. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

## STEAM, AIR, AND HYDRAULIC MACHINERY.

### Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

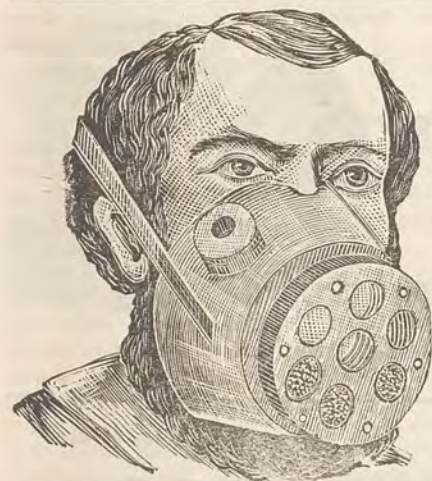
TRY OUR MAKE, CHEAPEST AND BEST IN USE.

## UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



## PATENT LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, Threshing and Stock-driving, and all other occupations where there is dust, poisonous vapor, or bad odor.

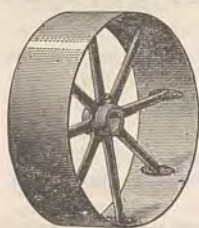
In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,  
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.



## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.  
**CLOT & MEESE,**

Sole Licensed Manufacturers of the

### Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

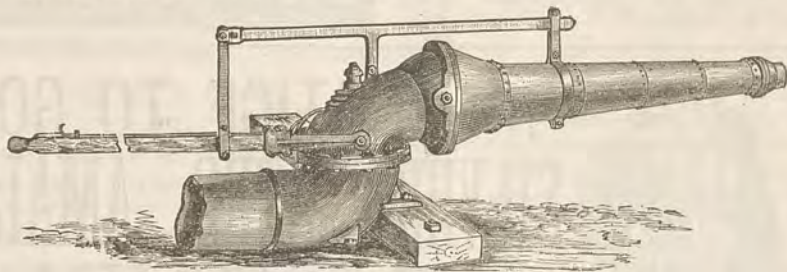
### SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

N. 29 & 131 Fremont Street,

San Francisco, Cal.

## IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to  
JOSHUA HENDY MACHINE WORKS,  
39 to 51 Fremont St., San Francisco, Cal.



## IMPROVED HYDRAULIC MACHINE.

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Miners and intending purchasers are hereby notified that we are the sole owners of the patents covering this style of Giant; we will prosecute to the fullest extent of the law manufacturers or users of an infringement.

HOSKIN & CO., Marysville, Cal.



## Chicago Prices Beaten!

ESTABLISHED 1860.

### S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

### J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chases, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed

## THE RUSSELL PROCESS COMP'Y. San Francisco Cordage Factory.

Established 1858.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice

TUBBS & CO.

611 and 613 Front St., San Francisco.

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY

Room 709.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



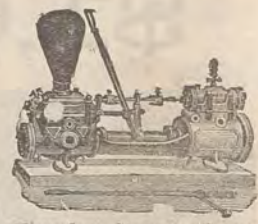
Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Knowles Steam Pump  
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.



1850.

1885.

**RANKIN, BRAYTON & CO.,**  
BUILDERS OF...  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

### WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



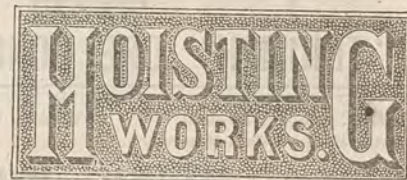
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



### BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700-pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE OF CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



## NOTICE TO GOLD MINERS! SILVER-PLATED AMALGAMATED PLATES For SAVING GOLD!

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER FULL WEIGHT OF SILVER AND BEST QUALITY OF WORK GUARANTEED.

GET OUR PRICES BEFORE ORDERING ELSEWHERE. SAMPLES FURNISHED ON APPLICATION.

**SAN FRANCISCO NOVELTY AND PLATING WORKS,**  
No. 108 FIRST STREET.

NOTICE.—All our plates are guaranteed to have the full weight of silver agreed upon, and are tested before leaving our works, thereby avoiding the complaints about "light weight," made so often before we started in this branch of industry.

**JUSTINIAN CAIRE, Agent,**  
521 & 523 Market St., San Francisco,

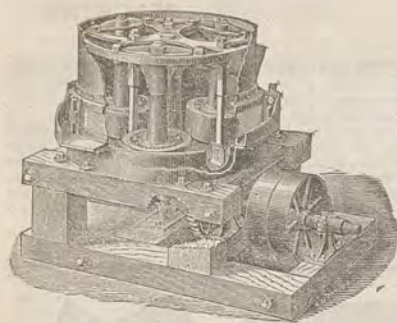
—DEALER IN—

Assayers' and Mining Material.

—MANUFACTURER OF—

BATTERY SCREENS AND WIRE CLOTH.

Agent for HOSKINS' HYDRO-CARBON ASSAY FURNACES.



Centrifugal Roller Quartz Mill.

## F. A. HUNTINGTON,

MANUFACTURER OF

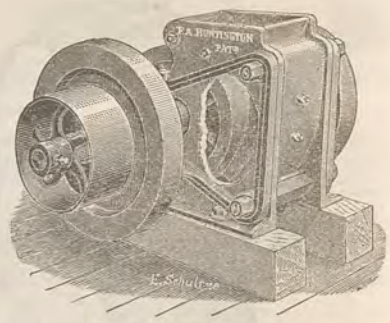
### Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,

Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

## THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamships.

Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.

Send for Circular and Price Lists.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, NOVEMBER 27, 1886.

VOLUME LIII  
Number 22.

## A New Hydraulic Gravel Elevator.

Gravel elevators are used in this State in gravel mining operations, where there is no dump and the material has to be raised to secure the necessary dump. It must be elevated sufficiently to be thrown into the flume so as to pass off, otherwise the pit would become choked up with material. In fact, without these appliances, many pieces of ground could not be worked at all. This elevation of the gravel is usually done by a closed pipe, the upper end in communication with the main chute or flume, and the lower end with the pit or hole in the bed, into which the gravel is washed. A hydraulic nozzle connected with a branch pipe carries water under pressure into the lower end of the elevator, and the force of the stream is such that it carries the material behind it, on the principle of an injector, and carries it up through the pipe.

Lafayette and Wm. W. Eastlick, of Oro Fino, Siskiyou county, in this State, have just patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, a new form of gravel elevator, in which they do away with the tight-closed pipe and use an open-top chute, which is rendered effective as an elevator, both by reason of its construction and the arrangement of the hydraulic nozzle or nozzles in communication with the lower end, whereby the material which is fed to the chute is forced directly up by the stream, not by suction, as is the case with the closed pipe, but by direct impact.

The accompanying drawings show this invention. The elevator chute *A* is composed of two sides and a bottom, there being no top, so that the chute is open above. The interior walls, both of sides and bottom, are lined with separate heavy blocks, *a*, adapted to be removed and renewed. The chute is practically indestructible, a very desirable result, as it is subject to great wear and tear. The whole chute is properly braced to increase its strength. *B* is a nozzle let into the lower end of the chute through a cross-beam *b*, which serves as a rest for the feed-flume, as hereinafter described. The nozzle is on the end of the branch pipe *C*, communicating directly or indirectly with the elevated water source.

In some cases a second or supplementary nozzle, *D*, is connected with a second branch pipe, *E*. When this nozzle is used the floor or bottom of the chute is made higher or thicker at its lower portion, so that an offset, *a'*, is formed through which the nozzle enters, as shown in Fig. 1.

In Fig. 2, *F* is the bed; *G* is the feed-flume into which the material is washed. This flume rests within the lower end of the elevator chute *A*, and discharges its material therein immediately in front of the nozzle *B*. The main flume is shown at *H*.

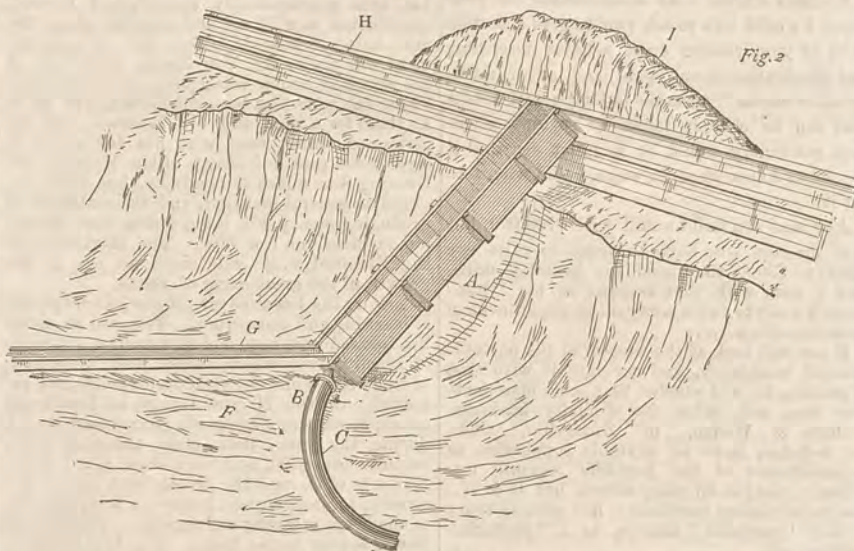
The elevator chute is set at an elevation, say of 40 degrees, its lower end being in the bed, *F*, and its upper end arranged to discharge its contents either directly into the flume *H* or against a cut in the bank, *I*, from which it flows back again into the flume. The force of the stream from the nozzle, *B* (which in the practice of the inventor's is a three-inch one connected with a 15-inch branch pipe, *C*, the water being under a head of about 275 feet), is so great that the material fed from the flume, *G*, is forced directly by the impact of the stream up the elevator chute into the flume *H* or against the cut in the bank, *I*. This direct impact enables them to use the open-top

chute for an elevator instead of the closed pipe, being less costly and easier to repair.

If the elevation be too great for the effective operation of the single nozzle, *B*, they use the supplementary nozzle in connection with it, so

was appointed: John Oswald, M. McAvoy, Owen Pegg, John Holland and W. J. Moore.

ANOTHER PROCESS FAILURE.—The Truckee Republican reports that the works erected at

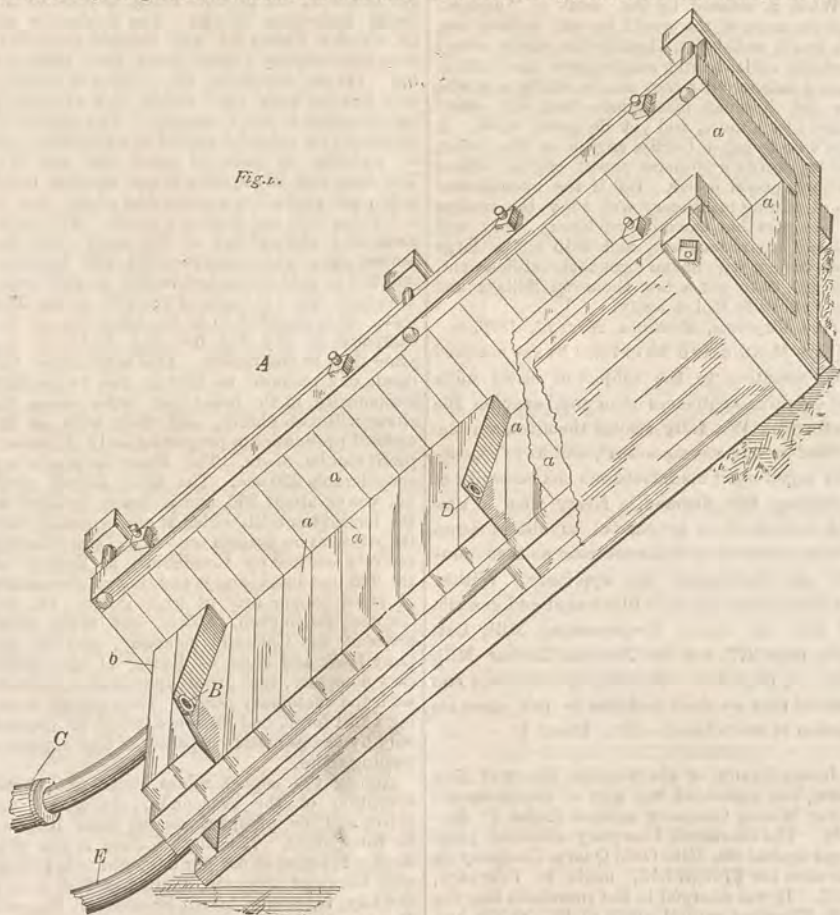


EASTLICK'S IMPROVED HYDRAULIC GRAVEL ELEVATOR.

that the material meets with a fresh impetus on its way up.

At a meeting of the Pacific Coast Association of Stationary Engineers, a discussion was had

the Meadow Lake mine this summer have proven a failure, so far as the "new process" is concerned. The new rotary ore crusher cannot stand the work and wears out too fast. The electric apparatus for separating the gold



OPEN-TOP GRAVEL ELEVATOR CHUTE.

as to the advisability of presenting a bill to the next Legislature for the passage of a law compelling boiler inspection, and an examination and licensing of engineers. For the purpose of drawing up such bill the following committee

was a failure, and that part of the process will be abandoned. The company, however, are not discouraged, but in the spring will put in stamps and try a method of concentration.

## Copper.

England controls the price of copper in the markets of the world, although her own mines in Cornwall do not produce much over 100 tons of this metal a month. The statistics prove that she does an immense trade in copper. For the first nine months of this year England imported 84,593 tons of copper (metal) and exported 44,488 tons. The British production is only 900 tons. The English home consumption was 33,294 tons; imports into France, 9339 tons; export of English copper to France, 5442 tons; French consumption of copper imported direct, 9677 tons; French consumption of English copper and of copper imported direct, 15,119 tons; English consumption and French consumption of copper imported direct and from England, 48,413 tons; English consumption, English exports and French consumption of copper imported direct, 87,459 tons.

Board of Trade returns and statistics kept by James Lewis & Son, Liverpool, segregate some of these figures. The imports of ore amounted (in tons of fine copper), in the first nine months of 1886, to 10,718, of which 5782 came from Chili and only 420 came from America. This shows we are working our ores at home more in this country than formerly. Last year in the same time we sent nearly four times as much ore. Of regulus, where Chili sent to England 10,718 tons, we sent from this country 10,246. Of bars and ingots, where Chili sent 18,583 tons, we sent 4424.

The apparent English consumption of foreign copper was 33,294 tons. The apparent French consumption was 15,119 tons, or not quite half that of England. The total consumption of the two great nations mentioned aggregated for the first nine months of this year 87,459 tons, as against 100,000 tons in the same time last year.

On the first of this month the total visible supply of copper was 63,127 tons, of which 54,495 tons were in Liverpool, Swansea and London, and some little in France.

Chili has shipped to Liverpool and Swansea in the first ten months of this year 23,914 tons, and America has sent 12,633. The American arrivals in England and France for the past ten months are 16,094 tons, fine, against 29,264 tons during the same period of last year, a decrease of 13,170 tons—or nearly half. Lewis & Son's circular states that an uneasy feeling was created in Liverpool by reports of the early starting of the Anaconda mine. It expresses the opinion that in view of the fact, that the plant of this mine has been extended and improved, and a decline in freights and wages is probable, the cost of production will be materially reduced in future. This prediction begins to look as if it was a good one, as the dispatches this week say that the Anaconda smelter will resume with a small force of men at a reduced scale of wages. The force will be increased as fast as men can be secured until the smelter is in full operation. The reduction of wages from the old scale is about 15 per cent. The smelter has been closed down about four months. If this statement be true, then the efforts to reduce wages have been successful, notwithstanding the refusal of the Knights of Labor to accede to the request to do so.

The Pacific Borax, Salt and Soda Company is shipping considerable salt to the Candelaria Water Works and Milling Company, of Nevada.



## CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

## Mining Matters in Southwestern Montana.

EDITORS PRESS:—A lively and general interest is now noticeable among mining men of all parts of the country, particularly Colorado, Montana, and sections that have heretofore been considered too isolated to command attention. These are now thronged with men who seem to be making the most thorough investigations, and the indications seem to be that next season will be the most important that Southwestern Montana has ever seen. A party of gentlemen from Leadville, Colorado, are now at Red Bluff examining for the third time the fine property of Messrs. Olds & Hickman—the Golconda—and it is understood that the transfer is about to be made. This property is extensively developed and in a condition to be made a very large ore producer at once. It is understood that extensive works will be erected for the treatment of the Golconda ores and such custom ores as the Red Bluff district produces. Shipments have been going forward from this district, and the results of their treatment are very satisfactory to prospectors and mine-owners, and have encouraged and stimulated mining very much. Ores on the dump in any accessible place in the district are as staple and salable as any other commodity. The ores of this district are very rich, though somewhat base, and have not been successfully treated by the old free-milling process. The Revenue Mining Company are now very active, and will soon have 10 stamps at work. This mine is a large producer, and the ores, while very rich, have not been successfully worked. Roasting machinery is now being added to the already ample plant of the company, and it is thought by well-advised persons their ores will now be treated more successfully. The ores from this mine come from an incline about 125 feet on the vein, at a perpendicular depth of 60 feet, up to which point no water has been encountered. A good body of ore has been opened up, sufficient at least to keep the present plant at work for some time to come. Much activity is displayed by mine-owners, owing mostly to the success met with the past year in the shipment of the high-grade ores East, for which good prices have been realized.

Very little deep mining has been done in any of these districts. The owners of the Pilgrim mine, in the Cherry creek, or Havana district, have perhaps displayed more real grit and nerve, and developed better staying qualities, than any other company in Southwestern Montana. Work was begun on this property in August, 1885, and has been prosecuted quite vigorously ever since. The prospect was most encouraging from the start, and a new vein of very rich ore struck near the surface. Water, however, was encountered at a depth of 40 feet, and has been a source of great annoyance ever since, though work has progressed and ore been extracted during the entire period. From surface indications it was believed from the start that three veins ran through this property. The main shaft was sunk to a depth of 116 feet, the hoisting done by horse-power, and the water raised with large iron buckets. For the purpose of prospecting for other veins, a drift was started south, 100 feet below the surface, which has been continued a distance of 83 feet, at which point an immense vein of talc and quartz was lately struck, and the crosscut continued through this vein matter 33 feet, and the south wall has not been reached. Much of the quartz is very rich, showing free gold and silver. From the talc, or clay, your correspondent found free gold. We had some difficulty in getting into the mine for the purpose of examination, owing to the absence of the superintendent.

A careful examination of this great vein leads us to believe that it will develop into one of the greatest properties in Montana. The formation is granite and porphyry. The company, we understand, are about to place in position a very large hoisting plant, with pumping machinery of large capacity, and will at once sink to a depth of 300 feet and again crosscut. The further development of this property will be watched with great interest. While they now have abundance of ore it is understood that no move will be made toward the erection of reduction works until the mine has been thoroughly prospected to a depth of at least 300 feet, and the character of the ores in all of the veins is thoroughly understood. This property is owned by the Bozeman Gold and Silver Mining Company.

The attention of the large copper producers of Butte has been attracted toward the extensive group of mining districts lying in what is known as Southwestern Montana, and heavy mining men are considering and advising as to the best and most practicable way to reach these fine districts with a railroad from Butte, that these rich silver ores may be secured and mixed with the low-grade copper ores of Butte, which already contain a few ounces of silver to the ton, but not enough to pay to separate. The mixing of these ores would enrich the Butte ores, and make it profitable to separate the silver from the copper, and the silver which the copper ores contain would thereby be saved. By this method of treatment better profits

would be realized, and with the present prospect of reaching the coal fields of the Yellowstone valley, with better railroad facilities, thus securing cheaper fuel for Butte, and make it possible and practicable to work the lowest grade ores, the great silver city would soon double her reduction facilities and also double her already marvelous output, and largely increase the number of dividend-paying mines. The following, clipped from the Helena Independent, shows the

DIVIDENDS PAID BY MONTANA MINING COMPANIES SINCE JANUARY 1ST, 1886:	
Alice.....	\$ 75,000
Amy and Silversmith.....	136,608
Boston and Montana.....	180,000
Elkhorn.....	50,000
Granite.....	820,000
Hecla.....	150,000
Helena.....	59,670
Montana.....	448,800
Moulton.....	60,000
Total.....	\$1,980,078

This, in our opinion, will be largely increased before the end of the coming year. More California mining men are needed in this great Territory to develop its great mining wealth and profit by its marvelous richness. More improved California machinery is needed to work the baser ores of Montana's numerous mining districts. OBSERVER.

Red Bluff, Nov. 8, 1886.

## Cheap Gold and Silver Mills.

EDITORS PRESS:—As a subscriber to your paper I would like to ask you to give a certain class of your readers some articles describing and illustrating cheap gold and silver mills. In other words "portable mills," small outfits that can be cheaply taken to regions where such machinery would be in great demand if the miner knew what he wanted and where to get it.

Any man can build a mill with \$100,000, but it is the men who have to rustle to raise say \$2000 to \$3000, that need the portable mills, and a man with that amount as his "pile" doesn't want to fool it away on an experiment of some manufacturer.

If one will look at the success of the portable sawmill machinery, and compare it with that of mining, he will wonder that some manufacturer does not enter the specialty business. Griffith & Wedge, of Zanesville, Ohio, for instance, have an enviable reputation as manufacturers of the portable sawmill machinery class; so do many others, but G & W., also make mining machinery, but nobody hears of their "portable" stamps, or a "portable" crusher, etc.

One or two concerns at Chicago make a portable battery, but they are too flimsy for any use.

The small operator looks at all these things and then, out of desperation, flies to the new-process man, and gets left—always does—but that does not deter the next "rustler" from following his footsteps.

What is wanted by the most of "camps" and the most of the would-be mill enterprises, are small, well-built, cheaply-run, easily moved portable mills, having ample power, and built in such a manner that they can be run by men who are not thorough machinists—that will stand abuse like a mule, and yet do good work. It won't do to put a Corliss engine on the boiler, nor try to run a 20-horse power engine with a 10-horse power boiler. But if the manufacturers of mining machinery will copy the success of the portable sawmill machinery, they will enlarge their business, and help out a large class of men who haven't got their millions yet, but who have got a few thousand dollars and can't afford to fool it away.

Fort Maginnis, Montana, Nov. 13, 1886.

[THE MINING AND SCIENTIFIC PRESS has paid more attention to the subject of small mills and crushing appliances than any paper on the continent. We fully realize the situation described by our correspondent, and have repeatedly urged upon manufacturers the necessity of supplying this demand. Every time a new mill is devised we are careful to obtain accurate descriptions and illustrations so that miners can understand the appliance. Within the past month we have illustrated and described two—the James Reciprocating Mill, Oct. 30th, page 277, and the National Rocker Mill, Nov. 13, page 309. Our correspondent can rest assured that we shall continue to pay close attention to the subject.—Eds. PRESS.]

JUDGE BEACH, of the Supreme Court of New York, has dismissed the suit of the Stormont Silver Mining Company against Rufus P. Lincoln. The Stormont Company obtained judgment against the Hite Gold Quartz Company on one note for \$749,874.15, made in February, 1883. It was charged in the complaint that the Hite Company capital stock of \$2,000,000 had never been paid, and that Lincoln, who signed certificate, was guilty of bad faith.

THE Mountain Messenger states that the Rainbow mine has closed down, and that "lack of pay ore was the cause." It is very seldom any such reason is given for closing down a mine, though it is nearly always the true one.

## The Mines of Butte.

## Production of the Big Montana Camp.

The mines of Butte are making a great record for the richness and amount of their product. There are no properties of the phenomenal order in the district, says the *Inter-Mountain*, like the Granite mountain, but there are some equally as valuable, and being stronger and wider and more reliably productive, they are safer for investment than any other mines in the world. The Alice and Moulton are producing great quantities of bullion. The former never shipped so much in one month as it has done in the last, and the latter has never worked a more uniformly high grade of ore. The Lexington is once more big with probabilities. The rich chute of high-grade copper-silver ore on the 800-foot level has greatly stimulated development from the 1000-foot station east, and the workmen are already in the vicinity of its continuation. Should it open up according to promise and precedent, the Lexington will again come to the front as a dividend-payer. The mill is running admirably and giving splendid results on company and custom ore. The Bluebird is probably the most valuable as it is the most extensive silver property in Montana, and when the mill shall start up we expect it will contribute to the bullion product of the camp between \$80,000 and \$100,000 per month. Now that the mine has been systematically opened, and the mill constructed on a liberal and scientific plan, the mine being "proved" before the mill investment was made, Mr. Van Zandt, president of the company, under whose close practical supervision the work has been conducted, will go to England for a time, and Mr. Booraem, an experienced mining man, who has for seven or eight years past had charge of the Morning and Evening Star mines at Leadville, has been engaged as general manager, and the real work of producing money will begin under most flattering auspices in a few days. The starting up of the Bluebird mill will mark an era in the growth of the great camp of Butte.

Among the lesser silver properties everything is booming and prosperous. The rise in silver has infused new hope and new energy, evidence of which is everywhere visible, and a number of rich strikes and heavy ore shipments are reported. On the Narrow Gauge, in Deadwood gulch, some very high-grade ore has been struck during the week, first class assaying \$475, second class, \$200, and third class, \$70. There is plenty of it, and Dr. Musigbrod, one of the owners, foresees a great future for the property, as the ledge is strong and regular. The Narrow Gauge is now under lease. The Clear Grit is also to the front with some high-grade quartz, and considerable shipments of ore assaying from \$500 to \$1000 per ton have recently been made. On the Mountain Chief (west), Hamilton & Co. are pushing explorations with splendid results. They are extracting daily 40 tons of ore which is being concentrated at the Liquidator Works to 35 per cent copper and \$30 in silver, the product being shipped to the Butte Reduction Works. The first-class ore (of which a 20-ton lot was shipped yesterday) nets the company a little more than \$100 per ton. On the Josephine, Mr. Grimes is working on a fine ore body, from which he is extracting and shipping to the Lexington. The Elm Orlu maintains its splendid record as a producer, and is yielding 40 tons of good ore per day. The Amy and Silversmith is not making much noise, nor producing a great deal of ore; but it is looking well and paying a profit. The first-class ore is shipped out of the camp, but the second-class, which assays about \$50 in silver and \$15 in gold, is worked in the custom mill. Dividend No. 5 is declared payable on the 20th inst. It is reported to be the intention of the company to pay but five-cent dividends for some time in the future. This is probably the result of a purpose to curtail the production temporarily, in the belief that better prices for silver will soon obtain, and then with an increased production a proportionately increased profit can be made. The Poser is producing considerable \$30 ore. The Rock Island product assays about \$60, and is being treated at the Lexington mill, which is now running half its batteries on custom ore. The Cora is being actively worked by Rondebush & Young, on the 200 foot level, and is yielding an abundance of silver-copper ore of high grade. On the Gagnon, Burlington, Nettie, and other properties of the Colorado company, and on the Gray Rock and Belle of Butte, of the Silver Bow company, the usual operations continue, with the customary results. They are all working a full force, and their ore yield is limited only by the reduction capacity of the concerns owning them.

Among the copper mines, with the single exception of the Anaconda, operations are active and the prospect has not been brighter for three years. The Clark Colusa is now producing 175 tons of ore per day, which is treated with the most approved appliances that money can buy, ingenuity invent or economy suggest. The smelter is now running exclusively on copper ore, of which it is estimated 200,000 tons are in sight in the mine. The West Colusa, owned by the Montana Copper Company, shows an ore body of from 15 to 50 feet in width, with a 4-foot streak of 40 per cent ore on the lower level. The company could readily supply its reduction works from this property alone, but the ways of copper men, like

the ways of Providence, are inscrutable, if not entirely beyond mortal ken. The Butte Reduction Works and the Colorado smelter are running in good shape and have plenty of ore, while the sampling works is doing a business of about \$100,000 per month.

At no time in the previous history of the camp has so much custom ore been worked or so much money distributed among prospectors, lessees and men with but limited means. In this camp a poor man is likely to make a stake at any time, as hundreds have done in the past, who are now well-known and prominent members of the community.

The only mining sale of any importance which has occurred during the past month is that of a one-fourth interest in the Wild Bill, owned by the Kleinschmidts, of Helena, and sold to the Chambers syndicate a few days ago for \$15,000. The syndicate now owns three-fourths and Mr. Lee W. Foster one-fourth of the property.

Next spring the Goldsmith, which has during the past eighteen months made a rich man of Mr. George Tong, into whose once empty purse it poured over \$100,000, will be stocked and opened up again. The reputation of Mr. Tong as an experienced miner and honorable and successful man will be a sufficient guaranty that the deal will be made on its merits, and that the stockholders will receive the benefit. About half a mile north of the Goldsmith another mine, which also has been idle for some time, will resume operations in the spring. We refer to the Wabash, owned by Captain Emerson & Co., who have raised the capital required to give to that rich property the benefit of a thorough exploitation. The Wabash has produced high-grade ore, and shows a strong and extensive ledge, from which big results may be confidently anticipated.

With such mines and mills and smelters as this camp now boasts, there is no cause for any business man in Butte to look into the future with any feeling save that of buoyant hope and redoubled confidence. That the Anaconda is not in active operation is a matter to be deplored, both on account of the general business of the community and the welfare of the men who expect employment from the company as soon as Mr. Haggin can see his way clear to a resumption and consequent competition with the big Michigan concern which is now ready to attack him in the markets of the world with a better quality of copper and lower rates of production; but Butte is not a one-company camp by any means, and the other interests here are sufficiently varied and extensive to support the present population and maintain business on a solid basis. Butte is to-day the liveliest and most prosperous town in the world of its size. It stands head and shoulders above its most pretentious rivals. The trouble at Anaconda is but one cloud in a sky otherwise of Italian clearness, and that will soon be dispelled by the mutual exercise of reason and intelligence on the part of the management and employees of that company. The onward wave of progress will never leave the Silver City in the rear.

WHAT MAKES THEM PAY.—We have received some inquiries from the East, asking why such mines as the Colorado Central, Mendota, Seventy-Three, Corry City, Terrible, Rogers, Freeland, Plutus, and other well-known properties pay so largely and well. We must reply, good management and judicious development. At the present time there are no broken-down book-keepers, no worn-out schoolmasters, nor any black-sheep family members or cousins managing any of the properties named, nor any other property that is making a record. Champagne, questionable company and blooded horses have been taken from the catalogue of mining necessities, and the gentlemen at the head of each of the properties above named are men who have educated themselves to their business, and who watch it as closely as a prudent merchant watches his business concerns. Most of them are men who took hold of the properties as prospects, and who grew in mining knowledge as the properties grew. The day has gone by for figure-heads in mining concerns.—*Georgetown Courier.*

BLAST FURNACES OF THE UNITED STATES.—The monthly report of the condition of the blast furnaces of the United States, published by the *American Manufacturer*, shows 312 furnaces, with a weekly capacity of 122,641 tons, in blast on November 1, and 272 furnaces, with a weekly capacity of 63,499 tons, out of blast. At the same time last year 233 furnaces, having a capacity of 76,723 tons per week, were in blast. The report shows an increase in the production of charcoal iron over last year of 25 per cent, of anthracite 33 per cent, and of bituminous 80 per cent.

THE DEMAND FOR HEAVY MACHINERY for every conceivable manufacturing purpose was never greater than at this time. Engines with horse-power ranging from 100 to 500 are now in common use, and manufacturers of machinery of huge proportions for textile work and for general manufacturing purposes are overrun with orders.

THE Mexican Cable Tramway Company has elected the following named officers: A. S. Halliday, president; Chas. L. Ackerman, vice-president; D. P. Belknap, secretary; W. Loaliza, treasurer. J. F. Godey, the agent of the company, was authorized to push forward the construction of the cable roads in the City of Mexico.



## The Minting of Gold and Silver.\*

NUMBER 3.

[BY ALBERT WILLIAMS, JR.]

Coiner's Department, Carson Mint.

**Rolling-room.**—The ingots of standard coin metal, prepared in the melter and refiner's department, are next taken to the rolling-room, where they are rolled into strips of approximately the proper thickness, as a preparatory step toward punching out the planchettes. This room is on the west side of the first floor, adjoining the ingot-melting room, and is in charge of the roller. The force here employed is three men.

**Rolls.**—Two pairs of heavy rolls, made of chilled cast steel, are used. One pair, called the breaking-down rolls, first reduce the ingots roughly; the second pair then still further reduce the thickness. The draw-bench in the cutting-room is also fitted with smaller finishing rolls. The rolling-machines were made in Philadelphia; one pair of the heavy rolls were furnished by the Krupp steel works at Essen, Rhenish Prussia, and the others were made in Pittsburgh. The rolls of American make are found to be perfectly satisfactory. Those in the rolling-room each have a face 10 inches long, and are 8 inches in diameter. The trunnions are cast solid with the roller portion, and are 12 inches long and 6 inches in diameter. The journal-boxes are of brass, the lower half being provided with two gibs of babbitt-metal about 90 degrees apart, each  $1\frac{1}{2}$  inches face, and extending the full length of the bearing surface. When new, these babbitt strips project very slightly above the brass face. The rolls are driven at a speed of 78 to 80 revolutions per minute. The limit of play is five-eighths of an inch, and the adjustment is effected by screw hand-wheels. A clock-gauge indicates the distance between the roll-faces with great precision.

**Power.**—The power required to drive a single pair of rolls varies from 8 to 40-horse power, depending upon the character of the work done. When first breaking down the fresh ingots the 30-horse power 10-inch belts often slip, although they are carried on leather-faced hand-wheels. In the final rolling much less power is required. Each roll has its own pulley, the upper and the lower roll being thus driven independently at the same speed in opposite direction. The hand-wheels are 5 feet in diameter, with 10 inches face, and weigh 250 pounds each. They are faced with leather, which is riveted on.

**Rolling.**—An ingot for making standard dollars is  $12\frac{1}{2}$  inches long,  $1\frac{1}{2}$  inches wide, and 7-16 inch thick before passing through the breaking-down rolls. It is reduced in thickness to nearly that of the coin, and is drawn out to a length of 3 feet 1 inch; but the increase of width in the finished strip, as compared with that of the ingot, is almost imperceptible, although it is perfectly free to expand laterally. The strips are rolled and re-rolled as often as may be necessary until they assume the proper thinness. To prevent any flexure of the strips, the rolls are provided on the discharge side with loose, flat, hopper-shaped guides, an improvement designed by the machinist of this mint. Only lateral guides are attached to the feed-side of the machines.

**Testing the thickness of the rolled strips.**—A power cutting-press, similar to those in the cutting-room, is used as a test-punch. It is fitted with adjustable dies and collars for the different sizes of planchettes, and with its trial planchettes are struck from the strips as the rolling progresses. These are tested on a small pair of Troemner scales in the room. The roller is allowed a margin of 0.06 per cent in excess of the standard weight, but of course must not roll the strips too thin.

**Shearing the rolled strips.**—For convenience in subsequent work the long strips are each cut into two equal lengths. This is done by a shearing-machine, which consists in a movable upper and a fixed lower jaw of chilled steel. The jaws are four inches long, and have an extreme bite of three-quarters of an inch at the outer end.

## Annealing-room.

After having been sheared, the strips are taken to the annealing-room, which is in the basement, adjoining the cutting-room, and is in charge of the annealer and his assistant. The work here done is to anneal the strips of gold and silver standard coin metal after their preliminary reduction by the large rolls and preparatory to their finishing treatment on the draw-bench of the cutting-room. The object is to prevent any brittleness in the metal, which would seriously interfere with the subsequent operations, particularly that of coining.

**Furnaces.**—There are two annealing furnaces of the same size and character. They have heavy cast-iron frames and doors, and are lined with Santa Cruz fire-brick. The doors are  $12\frac{1}{2}$  inches wide and 11 inches high. The fire-chamber is 18 inches high, and the grate area is 14 inches by 5 feet 8 inches. The grate bars are arranged across the furnace hearth, and are  $1\frac{1}{2}$  inches wide with 1-inch spaces. Split yellow pine, in 4-foot sticks, is used as fuel. When the mint is running steadily the furnaces are used daily, and consume  $1\frac{1}{2}$  cords per week.

**Annealing canisters.**—The strips are protected by cylindrical copper tubes, capable of hold-

ing several strips each. These canisters are closed at one end and fitted at the other with copper covers, which are luted on with fire-clay. For gold strips they are 3 feet 6 inches long,  $4\frac{1}{2}$  inches internal diameter, and 3-16 inch thick, and for silver strips 3 feet 2 inches long,  $4\frac{1}{2}$  inches internal diameter, and 3-16 inch thick. Two canisters are charged in a furnace together, and are heated a dull red for 40 minutes. The length of exposure to the heat is the same, whether the strips are gold or silver. The average life of the canisters when in constant use is two months; there are 27 in stock.

**Cooling the heated strips.**—On removal from the furnace the strips are gradually cooled in warm water. This is done in two annealing vats, made of wood and lined with sheet copper and provided with hinged wooden covers, also copper-lined. They are rectangular in shape, 4 feet 6 inches long, 18 inches deep, and 2 feet wide. Steam-pipes rest upon the bottoms of the vats, through which live steam from the engine boilers passes, raising the temperature of the water (before the introduction of the strips) to 180° F. The time occupied in cooling the strips to below the boiling point is 10 minutes, making the whole duration of the annealing process 50 minutes.

## Cutting-room.

After annealing, the strips are transferred to the cutting-room. This room is at the southeast corner of the basement, adjoining the annealing-room, is 16 feet square, and is in charge of the cutter. The total force is three men. The work done here is: *a*, The final dressing of the rolled strips by stubbing their ends and reducing them to standard thickness on a draw-bench; *b*, cutting and weighing trial planchettes; and, *c*, cutting out the planchettes for coining.

**Stubbing.**—This consists in pinching one end of each strip so that it can be fed through the rolls of the draw-bench and be seized by the dogs or clutches of that machine. The stubbing apparatus consists of a pair of small chilled steel rolls,  $3\frac{1}{2}$  inches diameter and  $2\frac{1}{2}$  inches face, the upper roll being a plain cylinder, but the lower a cylinder of the same shape, except that its periphery is beveled with four flat facets, each  $1\frac{1}{2}$  inches wide. These stubbing-rolls are adjusted by hand-screws to regulate the distance between the faces according to the character of the strip operated on; that is, whether it is intended for dollars, for halves, or for other coins. The length of the stubbed portion of a strip is 2 inches. The strips are "doped" before treatment, the silver ones by dipping in tallow and the gold ones by being beeswaxed.

**Drawing the stubbed strips.**—The draw-bench is similar in principle to those used in wire-works, but is designed for flat drawing. It has two small adjustable steel rolls, set vertically and revolving freely in opposite directions. The stubbed end of the strip is fed by hand between these rolls, when it is seized on the discharge side of the rolls by the draw-dogs and pulled through. The dogs are clamped by a treadle, worked by the operator. The draw-bench thus completes the rolling of the strips which the large rolls of the rolling-room began.

**Punching the planchettes.**—Two cutting-presses are used. These are of similar size and pattern, and run at the rate of 250 strokes per minute while cutting, but there is a loss of time in feeding the successive strips. Power is applied by means of eccentrics on a counter-shaft under the presses. The feed is by hand, and is regulated by a fixed gauge. Double dies, the invention of the coiner, Levi Dague, are used in cutting out the dime planchettes. They punch two planchettes, side by side, from the strip at a single stroke. A considerable saving in time is effected in this way; but for larger coins it would be impracticable to use double dies, unless with very powerful machinery.

**Testing the planchettes.**—A trial blank is taken from the middle and from each end of every third strip, and is tested on a pair of Troemner assay scales by the cutter's weigher. The power required in the cutting-room is about 10-horse power. The planchettes form about 60 per cent of the original weight of the strips, the remainder being clippings. These clippings, as already stated, are returned to the ingot-melting room, and are there used in filling up the crucibles in which the standard alloys are melted. The planchettes themselves are washed in hot water with potash and soap, dried in pans, and then sent to the adjusting-rooms.

## Adjusting-rooms.

Adjusting consists in filing the planchettes sent from the cutting-presses, if necessary, so that they are brought to the standard weight or within the limit of working tolerance. This work is done by eight women under the supervision of a forewoman. Each adjuster has a small pair of Troemner scales, upon which the planchettes are tested. If a planchette is found to weigh more than the working tolerance allows, it is filed on the edge by rolling it between the thumb and fingers lengthwise over a 10-inch bastard file, thus reducing its circumference uniformly. If its weight is already within the prescribed limits, it is passed without adjusting; if too light, it is condemned. The legal tolerance in weight is: For double-eagles and eagles,  $\frac{1}{2}$  grain; for half and quarter-eagles,  $\frac{1}{4}$  grain; for standard dollars,  $1\frac{1}{2}$  grains. The work is kept well within these limits. Each gold planchette, after adjusting, is re-weighed separately by the forewoman, and all the adjusted pieces are again weighed, by drafts, in the coiner's office. After leaving the adjusting-rooms and being checked in the coin-

er's office, the planchettes are milled in the press-room, rechecked, and sent to the whitening room.

## Whitening-room.

This is on the first floor, at the middle of the north end of the building. The manipulations conducted here consist in: *a*, Cleansing the milled planchettes (at this stage called "blanks") in a hot alkaline bath; *b*, rinsing with hot water; *c*, heating; *d*, immersion in acidulated bath; *e*, rinsing in cold water; *f*, partial drying in riddles with sawdust; *g*, final drying in closed pans. For convenience and for economy of fuel these operations are performed only every other day, except when the mint is running at full capacity.

**Washing the blanks in the alkaline bath.**—The vessel used is a stout copper pan, 30 inches in diameter at the top and 9 inches deep. The charge is 1000 blanks of the dollar size, or a corresponding amount of blanks for other denominations. Both gold and silver are treated alike at this stage. The bath is a strong hot-water suds of soda and bar soap, and its object is to remove the grease. The time occupied in this washing is about five minutes for each draft of blanks.

**Rinsing after the alkaline wash.**—The rinsing vat is a wooden tub, 30 inches in diameter and 18 inches deep, lined with sheet-lead and having a protecting rim and a partial lining of sheet-copper at the top. In this the blanks are thoroughly rinsed with undistilled boiling water.

**Heating the blanks.**—At the next stage of the process the blanks, after having been washed in the alkaline bath and rinsed, are heated to a cherry red in suitable furnaces. There are two of these furnaces, each 2 feet square, made of common brick and lined with fire-brick. The frames and doors are of cast iron. The fuel is yellow pine. The silver blanks are charged in open earthenware pans, and are exposed to the heat for 15 minutes. Gold blanks are charged in rectangular cast-iron canisters hermetically closed and luted with potter's clay, and are heated 20 minutes.

**Pickling the heated blanks.**—The heated blanks are next subjected to an acidulated hot bath. For gold blanks this is a pickle composed of 4 ounces of commercial nitric acid to 16 gallons of undistilled water, and for silver blanks the bath contains from  $4\frac{1}{2}$  to 5 ounces of sulphuric acid (62° Baume) to 16 gallons of water. The pickling process occupies five minutes. A single tub is used for both the nitric acid and the sulphuric acid baths. It is 30 inches in diameter and 16 inches deep, and is of unprotected wood. It is proposed to substitute a lead lined wooden vat for the sulphuric acid pickle. The object of pickling the blanks is to remove oxidation and discoloration due to the canister copper, and, in effect, a slight proportion of the copper of the alloy is removed from the faces of the blanks, thus brightening the surface of the coin. The loss of metal in this process is 0.05 ounce in 1000 ounces of gold blanks and 0.10 ounce in 1000 ounces of silver blanks.

**Rinsing after pickling.**—The blanks are now rinsed with undistilled cold water in a plain wooden tub 18 inches deep and 30 inches in diameter.

**Partial drying with sawdust.**—After rinsing, the blanks are placed in a coarse copper riddle and are partially dried by being shaken with sawdust. For this purpose basswood sawdust, brought from Philadelphia, is employed.

**Final drying in closed pans.**—The drying chambers are of wood, rectangular in shape, 33 inches by 6 feet, and 10 inches deep, and provided with loosely fitting flat covers. They are lined throughout, covers included, with sheet-copper, and are heated to 180° F. by means of a steam coil fed with live steam from the engine boilers and arranged under each pan. In 15 minutes the blanks are thoroughly dry and are now ready for coining.

## Press-room.

The room containing the milling-machines and coining-presses is on the first floor at the northeast corner. Here the adjusted planchettes are milled into blanks, and the blanks (after whitening) are made into coin. The blanks are fed to the machines and presses by women.

**Milling-machines.**—These turn up the edges of the blanks, making them perfectly true. Three are in use: One for standard and trade dollars, requiring one-horse power each; one for subsidiary silver coins, requiring half a horse-power; and one for gold coins, requiring one-horse power.

**Coining-presses.**—No. 1 coins double-eagles, standard dollars and trade dollars. This model is said to be the most powerful coining-press in existence, and is known as the Ajax. The one in the Carson mint was exhibited at the Philadelphia exposition. Its pressure is rated at 152 tons, but employees of the San Francisco mint rate the pressure of the Ajax type at 200 tons. The working speed is from 85 to 98 pieces per minute. The power required is only 5-horse power, and the adjustment is so perfect that a coin may be struck by simply turning the fly-wheel by hand. No. 2 press is of medium size, and is designed for coining eagles, half-eagles, standard and trade dollars, halves, or dimes. It strikes 95 pieces per minute at the usual working speed, and requires nearly 5-horse power. No. 3, the smallest press, is intended for coining quarter-eagles, quarter-dollars, and dimes, but is not in use, as the mint does not make these denominations. Its capacity is 140 pieces per minute, and it requires 2-horse power. The

total press capacity of the mint is one-third in excess of that of the preparatory appliances. Their arches are of the best Scotch pig cast-iron, that of the Ajax weighing over 7000 pounds, that of No. 2 press over 5000 pounds, and the arch of No. 3 about 3500 pounds. The levers are of brass. The original arch of No. 2 cracked on the line of a bolt hole while coining standard dollars and was replaced by a casting  $1\frac{1}{2}$  inches thicker. All the presses run with beautiful smoothness. A 10-inch emery wheel,  $\frac{1}{4}$ -inch face, is used to dress the bottoms of the dies evenly. It is driven at a speed of 800 revolutions per minute by a rubber friction roller in contact with the fly-wheel of the small coining press.

Denomination.	Size.		Weight.	
	Diameter in tenths of an inch.	Thickness in thousandths of an inch.	Grains.	Troy ounces.
Double-eagle.....	27	0.077	516	1.075
Eagle.....	21	0.060	253	0.5375
Half-eagle.....	17	0.046	129	0.26875
Quarter-eagle.....	14	0.034	64 $\frac{1}{2}$	0.134375
Standard dollar.....	30	0.082	412 $\frac{1}{2}$	0.559375
Trade dollar.....	30	0.082	420	0.8760
Half-dollar.....	24	0.057	182.0	0.401875
Quarter-dollar.....	19	0.045	96.45	0.200937
Dime.....	14	0.032	35.58	0.080375
Half-dime.....	12	0.023	19.29	0.0401875

The specific gravity of United States gold coins of 0.900 fine standard is 17.165.

## Tribute to a Dead Prospector.

Hon. C. C. Goodwin, the gifted editor of the Salt Lake Tribune, was a resident of Eureka in the early days and knew the late Captain Foley intimately and well. When he learned by telegraph of the Captain's tragic death, he wrote in his paper of him feelingly as follows: The wires bring news of the death, in his cabin near Eureka, Nevada, of Capt. J. M. Foley. He died from an explosion of giant powder. Poor old Captain Foley! He has been dreaming, for 20 years, of reaching the golden mountains, whose glittering crests he believed all the time that he could see just over the next night. We hope he has found them now. He was the most inveterate of prospectors, and to hear him describe the surface presentations of one of his claims would make a stranger's mouth water, and lead him to believe that when the claim should be fully opened the purchasing power of silver and gold would depreciate 50 per cent. Some men build castles on the solid ground. Captain Foley never built more than a cabin on the ground, but Aladdin's palace, compared to the palaces which the sanguine Captain erected in the air, was no more than a two-room adobe house in this city is, compared to what the Saints' temple will be when completed. So he was careless where his body rested, because his soul enjoyed all the luxuriant surroundings of his enchanted homes a little above the earth. He built them every day, built them, decorated them and furnished them. We have no doubt that, like Israel's King, he peopled them "with men-singers and women-singers," and "gathered also silver and gold and the peculiar treasures of kings and the delights of the sons of men." And "whatever his eyes desired he kept not from them." So he lived, and his dreams made his judgment unsteady. He could see silver where there was only lead, and where there was only iron, and with both he believed that gold was blended in marvelous quantities. So when food was scarce in the cabin it did not matter. He dined above the earth with those he had peopled his palaces with, and the winter wind that might have searched too keenly threadbare earthly garments, never caused a flutter, even, of the robes which were worn on his nights. We are glad, inasmuch as he was to die, that the summons came swiftly and painlessly, and we hope he was translated to where all the outcroppings are pure gold; where the clothing is never shoddy or the groceries bad; where no bills are sent around at the end of the month; where camping out is never uncomfortable, the hills never steep, and where the assessment work is of the easiest kind.

**NEW GOLD FIELD.**—The railroad company is having a well bored at the town of Sites, in Antelope valley, and it was down Thursday 145 feet, without a sufficient supply of water. It had been all the way pretty much through slate. On Thursday afternoon a large piece of quartz was brought up, which showed, so the men said, quite rich in free gold. We saw the piece of quartz and what appeared to be gold, but it was after sundown and we could not tell so well as if it had been light. All hands who had seen it by a good light agree that it was a very rich specimen. As there is very little water in the way, it would pay to sink a shaft 150 feet and drift on a rich quartz ledge. Gold is found almost everywhere in the Coast Range, from Sulphur creek on the south to Elk creek on the north.—*Colusa Sun.*

**THE Sanchez mine,** near Victor Station on the California Southern Railroad, has been relocated and purchased by Los Angeles capitalists. The mine is an old one, not having been worked since 1880. There are two shafts, one down 90 and the other 100 feet, besides a 10-foot tunnel and a 50-foot crosscut. Assays made of ore recently taken from the mine show a high percentage of gold and silver.

\*From the census report on the "Statistics and Technology of the Precious Metals," by S. F. Emmons and G. F. Becker, special agents. The description of the mints and the processes applies to the year 1881, at which time the mints were examined.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER, SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month. Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Nov. 27, 1886.

## TABLE OF CONTENTS.

EDITORIALS.—A New Hydraulic Gravel Elevator; Copper, 341. Employment for Our Young Men; New Hydraulic Nozzle and Gate; Australian Mines; Old Minerals, 344. The Drumlunnon Mine, 345.

ILLUSTRATIONS.—Fig. 1.—Open-top Gravel Elevator Chute; Fig. 2.—Eastlick's Improved Hydraulic Gravel Elevator, 341. Section of the Drumlunnon Mine, Montana, Showing Levels, Ore Shoots, etc., 345.

CORRESPONDENCE.—Mining Matters in Southwestern Montana; Cheap Gold and Silver Mills, 342.

MECHANICAL PROGRESS.—The Structure of Metals; Cold Hammering Iron; The New Steel; To Temper Steel Very Hard; A New Piston Packing; A New Process Welding Steel, 343.

SCIENTIFIC PROGRESS.—Brain Work; Discounting the Telephone; Melting Minerals; A Geological Rarity; A Phenomenon Explained; Interesting Archeological Discovery; The Rapid Absorption of Heat in Iron at a Certain Temperature; Propagation of Flies; A Scientific Curiosity; Sunlight on the Fire; Weather Forecasts; Friction Without Heat, 346.

ENGINEERING NOTES.—A New Railroad Era in California; Ancient Engineering; The Suez Canal, 374.

USEFUL INFORMATION.—The Management of Lamps; Oil on the Water; How to Keep Cider Sweet; The Effect of Certain Odors; Galvanized Water Tanks; Yellow Pine and Bedbugs; Handy Device for Detecting Gas Leakage; A New Coffee Tree; The Lion and the Tiger, 347.

GOOD HEALTH.—To Prevent Diphtheria; A Health Hint for Teachers; Is There a Toothless Time Coming; Signs of the Tongue; Bald Heads from a Scientific Standpoint; The Treatment of Whooping Cough with Illuminating Gas; Quince Hair Tonic; Liniment for Earache; Excellent Bitters; Stopping Hiccough, 348.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 348-49.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 352.

## Business Announcements.

Machinery—Ridson Iron and Locomotive Works, Quartz Mills—National Iron Works.  
Pens—Iverson, Blakeman, Taylor & Co., New York.  
See Advertising Columns

## Passing Events.

The one day in the year when we pause from our business occupations and devote a short space of time to giving thanks for our prosperity occurred this week, and in accordance with time-honored custom was made a legal holiday.

The dispatches indicate that the labor troubles at the Anaconda mine, Montana, have been partly settled by some of the men going to work for the reduced wages. If the company can get others to do the same, the whole plant will be again operated at once instead of lying idle until May, as was expected.

Saturday of last week brought the widest-reaching storm of the season. It was quite a cold rain and brought from the north some of its normal temperature. Its extension south was at least as far as Los Angeles, where over an inch of water was precipitated. Heavy snows fell on the Sierras—in fact, snow was telegraphed as far eastward as Ogden. On the other side of the continent there was a complement to our storm, snow and rain being reported at prominent points all over the Great West. The winter has now fairly begun.

The Con. California and Virginia sent down \$100,000 in bullion last week, the largest single shipment from the Comstock in a long time. More mills are to be built in that region and more low-grade ore worked. The market for mining shares continues in an excited state.

## Employment for Our Young Men.

There was a time, and that not very long ago, when a white boy or girl was almost a novelty in California. Many of us can remember when children of American or European parentage were here so rare as to attract special notice. To-day we number almost as many youth in proportion to our adult population as are to be found in the Eastern States, and in this city perhaps more. In the matter of multiplying the race California is, as in many other things, a prolific country. Then our native-born population are apt to be healthy, a large percentage of them surviving the period of adolescence. Not only so, but they are apt to be precocious, early reaching a stage when it becomes necessary for those charged with their education and care to choose for them some pursuit in life.

Now, to properly make such choice becomes everywhere a grave and perplexing duty. But it becomes doubly so in this State by reason of the few occupations open here for the admission of youth, and the unfavorable conditions that attend so many of these. Compared with other highly civilized countries, our manufacturing industries are limited both in number and extent. With the exception of our woolen mills, the making of cigars, shoes, slippers, clothing and certain other minor pursuits, we have nothing that affords any considerable number of our young people steady employment. The picking of fruit, hops, berries, etc., and the various canneries, give them work for a portion of the year, these industries being largely absorbed, and, in some cases, almost wholly monopolized by the Chinese.

Now, under the circumstances above set forth, it behooves us to carefully canvass our material resources and ascertain in what field of labor, if any, the great number of youth in our midst can find suitable and remunerative employment. In the first place, there is the land, of which we have so much easily obtainable, and to the cultivation of which a majority of the on-coming generation of both sexes ought to have recourse for earning a livelihood. Next, there are the mines, to which a considerable portion of our young men and boys ought to betake themselves for a like purpose, the field here being broad and, to those not afraid of a little rough work, especially inviting. Indeed, we are of the opinion that the gold and silver mines of California present to the right kind of young men better opportunities for not only earning an independent living, but for making money, than are offered by any other pursuit either here or elsewhere; and we would strongly recommend such of this class as have not yet made choice of a vocation, and who believe they have the necessary qualifications for the business, that they turn their attention to this branch of mining.

The field, as above remarked, is a wide one. Confining the view to California, the mineral-bearing territory within the limits of this State is alone ample to give employment to a large population for many years to come. Twice, and very likely three or four times as many men as are now engaged at the business might profitably be set to work here were adequate capital supplied. Silver is appreciating in value, while the demand for gold is everywhere on the increase. Mining for these metals is being placed on a better basis than ever before. The business is growing in favor both with practical miners and capitalists, and this because results are all the while becoming more fixed and certain. We are doing the work cheaper and better year by year, the introduction of labor-saving machinery rendering it all the while less toilsome than it was aforesaid. Gold mining, as now carried on, is by no means the drudgery it was in the early day. The miner is not now forced to make long tramps, packing on his back his blankets, and often his tools and provisions, as he was then compelled to do. He has not only less severe work to perform, but he enjoys many comforts to which he was formerly a stranger. Than the mining regions of California there is no more healthful or beautiful country in the world. The social conditions there are good, life and property being as well protected as in any other part of the State. It is altogether a most comfortable and desirable place of residence, and one in which our young men might well seek to establish a living business and make for themselves permanent

homes. As preliminary to engaging in this business it might be well for this class to attend, for a short time, the mining school at Berkeley, and there acquire some knowledge of geology, mineralogy and assaying, as this would be of infinite advantage to them in their new vocation. It is strange that young men in the enjoyment of health and strength will remain in the cities and towns, seeking clerkships and other light employments that ought to be considered the legitimate perquisites of the female sex, who are precluded from engaging in more laborious and manly pursuits. That they will consent to do so can be explained, it seems to us, only on the hypothesis that they are ignorant of the grand opportunities that await the energetic and ambitious in the mineral regions of the State. Hence these words of information and advice in the hope that they may reach the class for which they are intended, and induce them to abandon a field where they are forced to compete with women and girls, and betake themselves to one that, besides leaving them in the enjoyment of their self-respect, promises to bring them better rewards in the end.

## New Hydraulic Nozzle and Gate.

James H. Byrne and Henry S. Welch, of Nevada City, have patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, a hydraulic nozzle and gate specially adapted for use with hurdy-gurdy wheels. With high pressures of water it has been impracticable to regulate and alter the size of the jet without so altering the shape of the delivery-nozzle as to greatly impair its efficiency.

In the water pipe in which water is brought to the nozzle, a short distance from the nozzle, is fitted a transversely sliding gate with a screw shank, operating nut and hand wheel. A hole is made through the gate of equal size with the interior of the pipe, and the gate itself extends downward below the pipe, sliding within a seat or case, which serves as a guide for it and which may be left open at the lower end. This extension of the lower part of the gate is of such a length as to more than equal the diameter of the pipe, and when the gate is drawn upward the opening through it passing into the upper part of the case, the lower portion will be drawn across the pipe, thus cutting off so much of the water supply as may be desired, and when it has been drawn across the pipe so as to entirely cut off the water, the lower edge of the slide remains within the case or seat. This is important because it prevents the settling of the dirt or sediment within the case which would eventually fill it up and prevent the gate moving into it.

The discharge nozzle may be any size or desirable shape. It is suitably tapered or contracted so as to discharge a smooth and solid stream into the buckets of the wheel. From the upper rear part of the nozzle, a vertical guide extends at right angles with it, and within this guide a slotted slide is fitted to move, this slide having a width or thickness equal to the width of this nozzle at that point. The slide has a screw shank, fixed nut and hand wheel, so it may be raised or lowered.

From the foot of the slide, and forming a part of it, an extension is formed exactly fitting the interior of the nozzle, and extending to the front or discharge end. The lower part of the extension forms the top of the nozzle, and it will be understood that when the slide is moved downward in its guide, this extension is also carried downward, its sides fitting closely against the sides of the nozzle, which space it gradually closes to any desired extent. In thus closing the nozzle its shape is maintained exactly the same, and the front end is always kept in proper form to deliver the diminished stream of water with the best effect. If desired, the entire jet of water may be cut off by this adjusting nozzle without depending upon the gate.

PAUL's 12-stamp mill on the river two miles above the mouth of Middle Creek, Shasta county, is nearly completed.

THE Baltimore chrome mine, San Luis Obispo county, continues to improve both in quantity and quality of the ore.

MINING, ranching and other industries are steadily building up along the line of the Carson & Colorado railroad.

## Australian Mines.

EDITORS PRESS:—Some time ago there was a report going the rounds of the newspapers about some very rich gold deposits which had been discovered in the northwestern part of Australia. I would like to ask if the reports have been confirmed, and which route would be the best to go there?

AUGUST JOERSS.

Dragoon, Cochise Co., A. T., Nov. 18, 1886.

We have given in the PRESS such information as could be gathered concerning these mines, though very few satisfactory details could be obtained. Like most mining excitements at a great distance, however, the discoveries attracted the attention of miners on this coast, some of whom went to Australia with the hope of being early in the field. One of these miners returned from the Australian fields about a week ago, going back to the mining camp at Cœur d'Alene, Idaho, where he started from. He gives the first account of the mines we have seen, which brings the "excitement" out in its true colors. This miner, whose name is Louis Everson, was foreman of the Trail Creek Bedrock Flume Company at Cœur d'Alene, but was for years a miner in Australia before coming to this coast.

When interviewed by a Cœur d'Alene Record reporter, he stated that he left San Francisco in company with 24 other old miners, all of whom were lured away from California by the vague reports of a newly-discovered El Dorado far away in the wild interior of the island continent. When they reached Sydney and Melbourne the excitement there was still intense. Thousands, influenced by Aladdin-like reports, set out for the "new diggings," more than 2000 miles from Sydney, where they confidently expected to find abundance of "gold—the picklock that never fails." When they reached the fabled field they found no gold, and the enthusiasm of hope suddenly gave place to the despondency of bitter disappointment. The few who were on the ground before the great stampede began did find a little gold, but the diggings were neither rich nor extensive and were soon practically exhausted. The thousands who followed were able to reap nothing but a "harvest of barren regrets." Mr. Everson says that hundreds sacrificed their all to get there, and he expresses the belief that many will actually suffer this winter for the want of sufficient food and clothing. He states that he traveled 1885 miles from Sydney to Windom, where he met so many deluded pilgrims on their return that he determined to go no further, and at once set out on his homeward journey.

In view of these facts, as stated by Mr. Everson, our correspondent in Arizona better stay where he is. The distance to the new ground is so very great and expense so large in getting there, that the fields must be very rich to warrant the voyage. But it seems they are not by any means rich; even if they were, however, there are thousands of miners already in Australia who could get on the ground in half the time and take up all that is worth having.

## Old Minerals.

A remarkable collection of minerals exists in the cellars of the Academia San Fernando, at Madrid. It is contained in a number of boxes, which have filled the cellars for about 200 years.

They come down from the golden age of Spanish domination in South America and in Mexico, when the mines of these regions made them the El Dorado of the globe. No one knows exactly the contents of the boxes, but they are believed to contain the rarest objects, although the scientific importance of collections was but little appreciated in the days when this one was made.

It appears also that collections made by Humboldt during his travels in America, and handed over by him as a kind of scientific tribute to the Spanish Government, are in the same academy, and have been locked up in an untouched box since 1804.

A. Y. EASTERBY, proprietor of the cement works, in conversation with a Sentinel reporter, Santa Cruz, said that he intends, in the near future, to build new cement works at the quarries, which are located near Santa Cruz, at a cost of \$100,000, with a capacity of 100,000 barrels a year, and the machinery in the present works will be removed to the new works.



### The Drumlummon Mine.

A Producing Montana Property.

One of the most famous and profitable mines of Montana is the Drumlummon, belonging to The Montana Company, Limited, an English corporation. The mine is a profitable one. The accounts for the last half year show a balance of income over expenditure of £83,035, out of which two interim dividends at the average rate of 20 per cent per annum have been paid, aggregating £66,000; and there is a balance of £10,435 carried to the credit of the current half year.

During the six months ending June 30, 1886, the mills crushed 19,784 tons of ore, producing a yield in bullion of assay of \$796,689, equal to \$40.27 per ton; but the actual realized value of the bullion amounted to only \$674,648, giving an average of \$34.10 net yield. This difference of \$122,043, or 15.30 per cent, is accounted for by the heavy depreciation of silver and the loss in realization of concentrates. The last half year's run shows not only increase in total amount over same period last year, but a considerably higher value per ton.

The company now owns the whole or part of several adjoining locations. Mr. H. Bratnober, the superintendent, reports that in the last half year the total number of feet run in lateral

has been large, but is all for permanent improvement. The principal additions to the reduction works have been: 1. The introduction of 20 Frue vanners, and of 10 electro-silver-plated copper tables in the 50-stamp mill, for the former of which an additional building had to be erected. 2. The erection of a concentrating house, with 20 Frue vanners for treatment of the tailings. 3. The partial erection and cost of machinery for the new 60-stamp gold mill. 4. The erection of two 54-inchx16 feet boilers in the 50-stamp mill. 5. The erection of four Frue vanners, with additional building in the 10-stamp mill.

Outside of the reduction works, the requirements have necessitated a heavy outlay on machinery for the mine, in which is included the purchase of a double 10x14 inch hoisting engine, and double cage for sinking the shaft to a further depth of 500 feet. In addition to the above expenditure, the company has been called upon for heavy payments on account of the acquisition of adjoining property, represented by a one-half interest in the Empire claim, a one-fourth interest in the Last Hope claim, and the whole interest in the Nine Hour claim.

These mines are 6060 feet above sea level. The width of the lodes is great. Even in the Drumlummon (now extensively developed) the walls in the upper workings have been

into the mill wagons by means of automatic chutes. The stopes are also kept open by strong pieces of timber set so as to resist at right angles to make the passageways large and complete. Nothing is wanting to make the extraction and removal of the quartz as cheap and as quick as possible.

For the purpose of breaking and milling high and low-grade ore separately from each other, two main passes have been arranged, one toward the end of the mill and the other near the end of the south level. It is also intended to make the central shaft between the Cruse and the 400 level a main pass for the retention and discharge of low-grade ore, and to use the north and south passes for storing and delivering high-grade ore. When the high-grade ore is all extracted these passes will be used for low-grade ore. The ore in each case will gravitate from the top of passes into chutes and wagons. Subsidiary shafts will also be sunk to develop the lode below the 400 level.

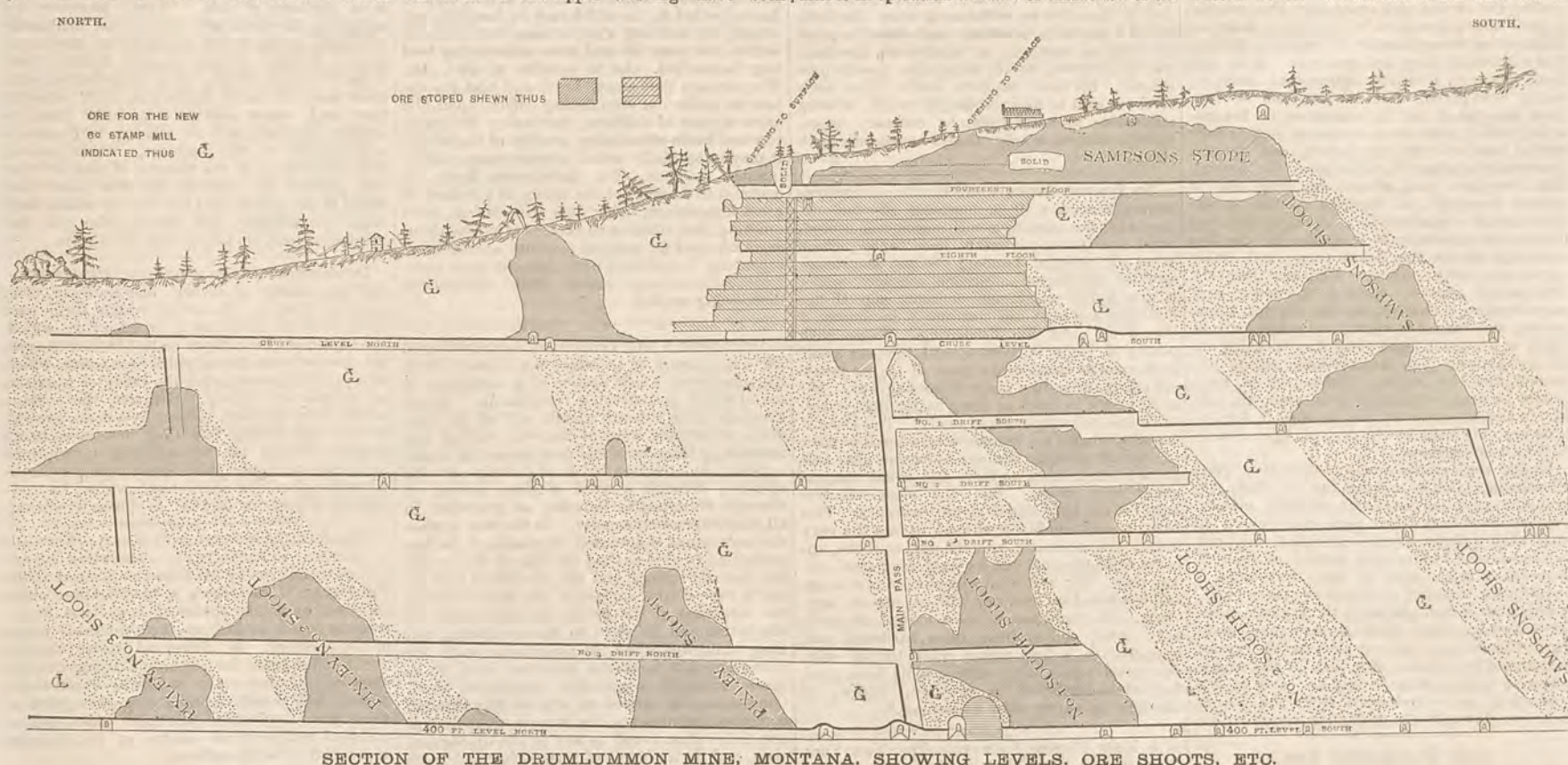
The high-grade ore is worked in the 50 and 10-stamp mills and the low in the new 60-stamp mill. There is already indication that the ore will increase in "baseness" at an increased depth.

Mr. John Darlington, in his report to the directors, states that when the new 60-stamp mill is in operation the rate of extraction of the

Ex-President Arthur.

The death of ex-President Arthur takes the country by surprise. Though it was known he had been an invalid for a year, still, as no definite account had been given of his disease, the hope was generally indulged that his unusually robust constitution would pull him through.

He was born in Fairfield, Vt., in October, 1830, and was therefore 56 years old at the time of his death. He had received the advantages of a collegiate education, went through the usual transmigration of a school-teacher to the profession of the law. His legal attainments and abilities were respectable, but he was chiefly known as a shrewd and successful politician. Nature was kind to Arthur. He possessed a fine physique, an amiable temper, and his instinctive urbanity made him many steadfast friends. He first became known to the public as quartermaster-general during the administration of Governor Morgan, where he rendered good service. He was indefatigable in efforts to enlist troops in his State and furnish them with abundant supplies during the Civil War. He occupied a seat in the New York Legislature for one session, and under the administration of President Grant won that acme of all New York politicians, the New York custom-house. We are not aware that his in-



SECTION OF THE DRUMLUMMON MINE, MONTANA, SHOWING LEVELS, ORE SHOOTS, ETC.

drifts upon the lode was 1278 feet. New cross-outs amounted to 407 feet, and the main shaft was sunk 90 feet below the 400 level. He estimates the ore reserves, exclusive of what is below the 400-foot level, at 71,817 tons of high-grade and 113,576 tons of low grade. In addition, therefore, to the extraction for milling purposes during the past six months, which amount to 23,937 tons, the reserve of high-grade ore has increased by 33,918 tons, and the low-grade reserves have decreased by 6185 tons. Of the ore taken out, 6536 tons came from drifts and 17,400 tons from stopes.

In the stopes now being worked the Pixley Nos. 2 and 3 in the No. 3 level north, are both of them holding their value and yielding large quantities of high-grade ore. They will average in width from 18 to 20 feet, and in value \$60 per ton. The Pixley Nos. 2 and 3 in the No. 2 level north, which have a varying thickness of from 12 to 30 feet, and a value of \$40 per ton; and the stope in No. 2a level south, which gives an average width of 14 feet and a value of \$40 per ton.

Beyond these workings it is not necessary to encroach upon the reserves which lie in the Sampson shoot of the 400 feet south, the Pixley No. 1 of the No. 3 north, the Sampson on the No. 2a south, the Sampson in the No. 1 south, the Pixley in the No. 2 north, the Sampson in the Cruse level south, and the Pixley Nos. 1, 2 and 3 in the Cruse level north.

The accompanying section of the mine will show the location of the points indicated, and also show the location of the ore.

pierced only at six or seven distinct points. In one place on the 400 level, the lode stuff is 165 feet wide. This lode may be reckoned at 60 to 80 feet wide; the Castletown from five to six, and the Armitage six to eight feet wide. The pay streaks in the Drum Lummum are, however, much narrower than the lode itself.

The ore is disposed in "shoots," as the sectional diagram shows, these being of considerable length and thickness. In the workings north of the main shaft, silver predominates over gold, but in the southern part of the mine, gold takes precedence over silver. The gold, in an exceedingly fine state of division, is associated with quartz, copper, and argentiferous ores, a limited, mere fractional quantity of the silver, is probably metallic, but by far the greater part is in combination with the sulphides of various metals. Neither in the constituents nor value of the ore is there any constancy. Wide variations in both of these particulars are often found to exist within the lineal distance of a few feet of ground.

The mechanical arrangements for supplying the pneumatic engines and rock drills with compressed air, and also for removing the quartz from the stopes to the mills, scarcely admit of any improvement. The air-main extending from the compressor at the mouth of the Markelyne tunnel to the main shaft at its opposite end, is of wrought iron eight inches in diameter. The small air pipes from the main to the drills are mostly two inches in diameter. Between the various levels passes or stations are formed, into which the quartz falls when blasted from the vein, which quartz is delivered

Drumlunnon lode will be about 70,000 tons of quartz per annum, but to increase the productive character and make exploratory work the company must spend from \$8000 to \$10,000 per month. We reserve for another occasion the description of the mills and reduction works. The management of the mine is under Mr. R. T. Bayliss, while Mr. Bratnaber carries out the underground work. The prospects of this great mine are, taken altogether, of a most encouraging character, and when regarded in connection with the quantity of high and low-grade ore in reserve, justify the expectation that the profits now prevailing, if not much increased, will be fully maintained. We are glad our English cousins, who have put money into many mines in this country, are doing so well in this instance.

THE Reese River *Reveille* says: "A new survey is to be made of the Pyramid lake and Walker river reservations, the old surveys being deemed inaccurate. The last-named reservation no doubt embraces some valuable mineral land in the hills adjacent to the lake, which would be thoroughly prospected if thrown open to the public. It is said that during the past few years, and particularly since the rich discoveries in the Hawthorne district, several valuable discoveries have been made and covered up again by prospectors, who realized that it would be useless to expend time and money upon ground to which they could not obtain title from the Government."

CAMAS No. 1 MINE, on the Gold Belt, Idaho, has been sold for \$45,000.

tegrity in this position was ever suspected. He was removed by President Hayes because he was indisposed to sternly apply the doctrine of civil service reform. This removal so exasperated Senator Conkling that, as a rebuke, he pressed Arthur's nomination for the Vice-Presidency at the Chicago convention in 1880.

No man ever came to the executive chair under more trying circumstances. It was well known that he was an ardent friend of Senator Conkling, had warmly espoused his quarrel with President Garfield, and was even in the conspiracy to re-elect Conkling and Platt. In a few weeks Garfield was no more. Since the tragic death of Lincoln the heart of the nation had not been so sadly stricken. Death apotheosized him, and yet such were Arthur's amiable discretion during Garfield's long sickness when the Government was practically without a head, his prudence and eminent good sense on coming into power, that he soon won the confidence and esteem of the people. His great urbanity and courtly manners were the charm of Washington society. Never were the sociabilities of the White House more brilliant. He was an ardent Republican, true and loyal to his friends, and his record is one that the nation may remember with gratitude and pleasure.

ARBOR DAY is celebrated locally November 27th, the date of this issue of the PRESS. Trees are to be planted on Goat Island and at the Presidio. An Arbor Day for the whole State has not yet been chosen.

ABOUT 70 men are employed in and about the Eureka Con. Smelting Works.



## MECHANICAL PROGRESS.

## The Structure of Metals.

There has been a great deal said about the structure of iron, and how the particles arrange themselves in the formation of steel. Iron is said to be fibrous as well as soft steel, and in the hardening process the latter has been thought to turn from a fibrous state to a granular condition. This all seemed quite sensible until the microscope lent its magnifying influence in the way of showing up the internal structure of iron and steel on a large scale. It was then observed that soft steel was composed of minute crystals. The crystals of iron are arranged in fibers, and the fibers are imbedded in layers of slag, in which they were drawn out together in the process of manufacture.

In steel another element steps in by the introduction of a material known as carbon, together with a number of other elements to be taken as impurities. They not only arrange themselves in crystals, but each crystal is composed of a number of minute cells, the iron forming the nucleus and the coating being formed by a layer of carbon. The sulphur, phosphorus and silica, which are the principal impurities, take up their abode in the interstices and cavities between the cells. The latest investigation has brought out the molecules in full view, and by the aid of the micrometer scales their exact size has been determined.

This we must admit is going rather deep into the atomic depths, yet even the atoms themselves are seen at their vibratory work in adjusting the strains and expanding the material to give themselves room to carry out their oscillatory movements under the cohesive difficulties with which they are confined. It is evident, however, from the figures that have recently been given, that the crystals of iron have been taken for the molecules of the material, and if there are a number of cells in each crystal lined up with one element and dressed down with another to make room for impurities, there is a good chance for some one to pocket a supply of theories on the atomic structure of any substance. A highly-polished flat surface can easily be magnified till the fine markings left by the finest rouge and water appear as a hairy surface. A surface brightly illuminated appears quite dark under high magnification. Besides, metals are not transparent, and cannot be shown up by transmitted light, and to get a sight of all that is going on in the hollows and intersections among the markings of this surface, the source of light should be brought directly down upon the surface in the direction we are to view it, for objects are only seen by the rays of light reflected from their surface.

Under the proper manipulation of a good microscope, minute crystals can be distinctly brought out upon a bright metallic surface. Crystals have been thus seen and figured so small that a single crystal occupied only one two-hundredth-thousandth part of an inch in diameter. It can also be seen that when a break in the material or a fracture takes place, the division is made between the crystals without disturbing their material structure, making it difficult to single out a fractured crystal to examine its cellular structure or its atomic makeup; and yet this is only one step in the descending series that leads from the fibrous structure down to its molecular combination.

## Gold Hammering Iron.

A correspondent of the *Blacksmith and Wheelwright* refers to a previous communication in that paper under the above head, where the writer remarks as follows: "This process of cold hammering iron has so removed and destroyed its tenacity as to render it capable of being broken with the slightest blow." Further on he says: "There is nothing inherently wrong in this practice of cold hammering, far otherwise," etc. "The evil rests with the applying of such cold hammered piece of forged work without having passed through the curative process, which is simply this, namely, to heat the piece of forged work in question to a dull red heat and lay it down to cool at its leisure." Then the writer says further on: "By so doing, he enhances its tenacity at least 20 times."

The second correspondent criticises the above extracts as follows: This, I must confess, is not what my education and experience has taught me, but is far otherwise. My belief is that if, by any means, iron or steel has been injured by forging so as to make it brittle or lose its tenacity, no heating will restore it, unless it can be forged and hammered after, and then the restoration will be only partial. In fact, if, by any means, iron becomes brittle and weak, I know of no other way but to put it into the scrap pile and have it made over.

In regard to working iron or steel, I don't think the hammering of iron cold (what a blacksmith would naturally do) does it any injury, and I do know it gives it a stiffness that can be imparted in no other way. If it is heated, after that the stiffness is destroyed.

In regard to forging steel. This I think is true. It is seldom that steel can be hammered at one heat. It is astonishing to witness the ignorance shown by many smiths concerning the working of iron and steel. Still it is no wonder. A man is taken from a farm and made into a "first-class blacksmith" in a very few months. You might just as well take a

blacksmith and try to make a skillful physician of him in the same time.

The making of iron is very much like doctoring a sick man. It requires just as much skill and judgment in the one case as the other. In fact I think the poor judgment in the man who handles the iron may be more harmful than in the physician's case, for while the physician may only now and then kill a man, the poor iron may get into a steam boiler or a railroad axle and kill a hundred or more in a single accident.

**THE NEW STEEL.**—The London papers contain accounts of a new process for the production of titanic steel, the castings obtained from which are said to have risen very greatly in the estimation of numerous engineering firms, in view of the remarkable properties of the metal. These castings are of all manner of shapes and thicknesses, are made in the ordinary green sand, and the surfaces are quite free from holes, flaws, or other bad places. The cast metal can be readily forged and hardened, or annealed, just like a piece of tool steel. In some cases the metal is being adopted for the working parts of small high-speed engines, as well as for some of the parts of large engines, such as the piston-rod and crosshead, in some instances these being made in one casting. For chain-work this kind of steel is commended both on account of its great toughness and strength, and mention is made of a special form of link chain for elevator purposes, which, by an ingenious arrangement, does away with the rivet connecting the separate links; the connection in this case is made by means of a round bar having a projection on one side which will only allow of insertion or withdrawal when the links are of a particular position—and when the pitch of links on one side is much worn the chain can be reversed, its life being thus greatly prolonged. Elevator buckets made from such steel are said to be exceedingly tough, it being impossible to break them by ordinary usage, though they are only about one-eighth inch thick.

**TO TEMPER STEEL VERY HARD.**—A contemporary remarks: "As hardness of steel depends on the quickness with which it is cooled, there are better materials than water, which gives an unequal temper; besides, the steam-bubbles developed interrupt contact; water is also a bad conductor of heat, and if the bubbling and heat did not put it in motion, it would be unfit for hardening. Water with plenty of ice in it gives a hard temper; small tools may be stuck into a piece of ice, as jewelers insert them in a piece of sealing wax. Oil is also used by them as being better than water, as it does not evaporate so easily. The Damascus steel blades are tempered in a small current of cold air passing through a narrow slit; this gives a much more uniform and equal temperature than water. But the most effective liquid is the only liquid metal—mercury. This being a good conductor of heat, in fact the very best liquid conductor, and the only cold one, appears to be the best one for hardening steel-cutting tools. The best steel when forged into shape and hardened in mercury will cut almost anything. We have seen articles made from ordinary steel, which have been hardened and tempered to a deep straw color, turned with comparative ease with cutting tools from good tool steel hardened in mercury. Beware of inhaling the vapor while hardening."

**A NEW PISTON PACKING.**—The New York Belting & Packing Co., New York City, has recently brought out a packing in which white rubber is used instead of the dark, as heretofore employed. As the efficiency of the packings used in steam engine cylinders, valves and stuffing-boxes is always a point of serious consideration, anything which promises to add to durability and efficiency commands attention. In this white rubber square piston packing, that part which comes in contact with the piston-rod is made of successive thicknesses of cotton duck, cemented together with an elastic lubricating compound; but a dark rubber has heretofore been used, with which, under the high temperature to which such packings are often subjected, the rubber back loses its elasticity, and fails to act as a spring to keep the packing against the piston-rod. It is claimed that this new packing will withstand a high degree of heat for a long period—a temperature of 50 degrees F. higher than the regular dark rubber piston packing, and endure 300 degrees F. for a long period.

**A NEW PROCESS OF WELDING STEEL.**—Mr. E. D. Wassell, of Pittsburg, Pa., has invented a new process of welding steel, by which steel bars of any content of carbon can be piled and welded together. He has demonstrated this by making a homogeneous weld of a pile made of bars containing 65 points of carbon. The process is not applicable to bars alone, but any miscellaneous steel straps may be put up in fagot form and welded in the same manner by the rolling process. Another feature of this method is that the carbon can be reduced to any point desired; that is to say, steel of 65 points can be reduced to 10 points in carbon while in the solid form without remelting. The process will cover the working of old rails and old steel scrap. The great usefulness of the invention consists in the fact that piles can be welded from which plates can be made as large as 10 by 4 feet, and thus, it is claimed, the method will cover the whole agricultural field and like branches of the steel industry.

## SCIENTIFIC PROGRESS.

## Brain Work.

The notion that those who work only with their brain need less food than those who labor with their hands has long been proved to be fallacious, says the *Journal of Chemistry*. Mental labor causes greater waste of tissue than muscular. According to careful estimates, three hours of hard study wear out the body more than a whole day of hard physical exertion. "Without phosphorus, no thought" is a German saying, and the consumption of that essential ingredient of the brain increases in proportion to the amount of labor which this organ is required to perform. The wear and tear of the brain are easily measured by careful examination of the salts in the liquid excretions. The importance of the brain as a working organ is shown by the amount of blood it receives, which is proportionately greater than that of any other part of the body. One-fifth of the blood goes to the brain, though its average weight is only one-fortieth of that of the body. This fact alone would be sufficient to prove that brain workers require more food, and even better food, than mechanics or farm laborers.

## Brain Action in Children.

It is remarked in a French publication that in every attempt to control brain action in children, or to aid its action, two factors are needed—nutrition and forces acting upon the brain directing that nutrition; a less co-ordinated, steady, uniform kind of action may be desired—that is, the child may be healthy, but stupid, fat and very slow, strong, but inert—in which case town life and more stimulating food may be needed. As to articles of diet, Dr. Warner says that meat, broth and beef tea appear to produce a stimulating effect upon the nerve system of children, increasing the quantity and brain-stimulating quality of the blood; it may be specially useful in some cases of dull-brained children. But farinaceous foods, in contrast to meat, offer the choice of a dietary of great importance, being less stimulating, more quieting, less suitable to excite brain evolution, more adapted for cases of nervous excitability, especially if combined with fats—in such cases hydrocarbonaceous rather than nitrogenous diets being needed.

**DISCOUNTING THE TELEPHONE.**—According to the daily papers of Chicago, Mr. James Lowth has discovered a new system of transmission of sound which is something remarkable. A few evenings since several friends met at his residence to witness some of the very curious and interesting features of his new system of transmission, by contact with the body of the speaker, through a solid medium instead of through atmospheric impulse, as practiced in all diaphragm instruments. In the new system the instrument is actuated by placing a button projecting from it against the side of the throat, the operator speaks, and the vibrations that occur in the exterior surface of the throat during the utterance of the words are conducted by the button and its stem to the electrodes, and they being disturbed, in accordance with the vibrations that form the muscular word, so to speak, transmit a perfectly articulated word. Conversation is carried on with facility through combined instruments, the tone is much louder and fuller than found in any of the diaphragm class, and its timbre is of a smoother and more solid character. One of its peculiar and very important qualities is that it is independent of all accidental sounds or disturbances which so often interfere with the good surface of the instruments of the telephone system; the speaker may be surrounded by any number of people talking loudly and only his voice will be transmitted. The loudness and clearness with which speech is transmitted with these instruments is wonderful. During the exhibition of this curious new principle the inventor applied the button to the top of his head and transmitted speech in a perfectly clear voice, only not as loud as in the usual way of holding; also to the back of the neck, various parts of the chest, and other parts of the body, all in a good, clear tone, every word well defined and intelligible. A test was made with a 10 pound weight of lead, and through this, as in all other cases, the transmission was perfect. The inventor has a line at his house in operation having a 2-mile resistance. He has taken out American and foreign patents covering this new art.

**MELTING MINERALS.**—By means of a new attachment to the microscope, the melting point of minerals is conveniently observed while under the process of examination. In this arrangement there is an adjunct to the mineralogical microscope by which the melting points of minerals may be compared or approximately determined, and their behavior watched at high temperatures, either alone or in the presence of re-agents. There is a narrow ribbon of platinum, two mm. wide, arranged to traverse the field of the microscope, this ribbon, clamped so as to be readily renewable, passing bridgewise over a little scooped-out hollow in a disk of ebony; the clamps also take wires from a battery, and an adjustable resistance being placed in circuit, the strip can be thus raised in temperature up to the melting point of platinum. The disk being placed on the stage of the microscope, the platinum strip is brought into the field of a one-inch objective, protected by a

glass slip from the radiant heat. The operator is sheltered from the intense light at high temperatures by a wedge of tinted glass, which latter can likewise be used in photometrically estimating the temperature by using it to obtain extinction of the field.

**A GEOLOGICAL RARITY.**—During a recent visit of the members of the Liverpool Science Club to the Lea Green collieries, on the west boundary of the Lancashire coal field, on descending the shaft and traveling a little way along the dip head, they came to what to the geologist was a most interesting feature, called technically by the miners a "squeeze," which consisted in this case of a mass of sandstone 64 yards wide, running through the coal seam, locally accounted for, as the name implies, by the mass of rock having been pushed up through the overlying strata. Science, however, knows nothing of such cataclysms as these, and accounts for the "squeeze" as having been the bed of a river flowing through the primeval forest of the era geologically known as the carboniferous period. In the soft clay underlying the "squeeze" numerous silicious diatoms and minute scales of ganoid fishes were found by microscopic investigation.—*English Labor Tribune*.

**A PHENOMENA EXPLAINED.**—The phenomena attending the passage of metals from the fluid to the solid state is an interesting matter of study, and the beautiful experiment of Van Riemsdijk, showing that pure gold on freezing behaved like water, that is, may be cooled below its solidifying point without becoming solid, is an instance of this. When, however, by agitation, the metal sets, it becomes brilliantly luminous, owing to the liberation of the latent heat of fusion. Passing to solid metals, Prof. Roberts-Austen refers to a forgotten experiment made by Louis Lemery in 1826, showing that lead, when cast in a peculiar form, is sharply sonorous, and he alluded to Reamur's experiments on this subject, which proved that hammering or the transfer of matter from one position to another by flow alters the shape of the grains, and the way in which they touch one another, and leaves them, in the hammered lead, no longer free to vibrate.

**INTERESTING ARCHEOLOGICAL DISCOVERY.**—An interesting discovery has recently been made in Mexico. The rocks which form part of the foundation of the promontory on which the Castle of Chapultepec rests, Mr. Batres says, are covered with hieroglyphic characters, which will prove interesting for the study of Mexican antiquities and history. Hitherto the surface of the rocks has been hidden by a dense growth of moss and shrubs, but they are now being cleared off and the hieroglyphic inscriptions have come to light. Mr. Batres has commenced to decipher the characters, which he confidently expects to be able to finish by spring.

**THE RAPID ABSORPTION OF HEAT IN IRON AT A CERTAIN TEMPERATURE.**—According to experiments on iron by M. Pionchon, iron at about 700 degrees C. undergoes a modification characterized by an absorption of heat that is extremely rapid within an inconsiderable range of temperature. M. Becquerel states that at about 600 degrees the attractive action exerted upon iron by magnets is suddenly diminished. Nickel and cobalt, from a magnetic point of view, present effects of the same order, but at different temperatures—nickel at 400 degrees and cobalt at white redness.

**PROPAGATION OF FLIES.**—Their particular office appears to be the consumption of those dead and minute animals whose decaying myriads would otherwise poison the air. It was a remark of Linnaeus that three flies would consume a dead horse sooner than a lion could. He, doubtless, included the families of the three flies. A single fly, the *Naturalist* tells us, will sometimes produce 20,000 larvae, each of which, in a few days, may be the parent of another 20,000, and thus the descendants of three flies would soon devour an animal much larger than a horse.

**A SCIENTIFIC CURIOSITY.**—One of the curiosities of light and heat is the fact that rays of the sun should pass through a cake of ice without melting it at all, as is the case when the thermometer stands a little above zero. That the rays of heat actually penetrate the ice is shown by the fact that a lens of ice may be used for setting fire to inflammable substances.

**SUNLIGHT ON THE FIRE.**—It is a mooted question whether the sunlight falling upon an ordinary wood fire retards the process of combustion. This is a popular notion, and one writer says it looks as if the fire burned more feebly when the sun shines full upon it. It is now alleged by scientific men that there may be some influence produced by the action of the sun.

**WEATHER FORECASTS.**—The forecasts of the weather bureau of France were verified last year in 90 cases out of every 100, the percentage having steadily risen from 81 in 1881 to 83 in 1882 and to 87 in 1883. Out of 189 alarm signals sent to the ports, 128 were fully verified, 24 were fairly correct, 37 were incorrect, and only two gales were not foreseen.

**FRICTION WITHOUT HEAT.**—The curious observation that friction fails to produce heat in metals under the influence of magnets is now being discussed. Metals so exposed have been turned in a lathe quite cold.



## ENGINEERING NOTES.

## A New Railroad Era in California.

There is just at this time a most unusual degree of activity in railroad building in this State. At no time since the completion of the Southern overland line has there been such an unwonted degree of activity. Railroads are being constructed in both the northern and southern sections of the State, and in the central coast portion as well. Many roads are also in active contemplation. It is estimated that during the present and next two years fully 30 per cent will be added to the total mileage of the State. These improvements will also add vastly to the value of property. The Southern Pacific is especially active in this work, not only in its own proper locality, but in the northern counties as well.

There is now a gap of only 90 miles between the Oregon and California lines of road, and a heavy force is actively engaged in closing up this space; but as the work is very heavy it is expected that about 18 months will be required to make the connection—after which time the iron horse will have full sweep from San Diego to the Columbia. In the mean time the Southern Pacific Coast line is being rapidly extended southward from Soledad via San Luis Obispo, Santa Barbara and Ventura, and thence eastward to Newhall on the present line of road. About 90 miles of this road has already been completed since work was commenced upon it in July last. This road will fork at San Miguel, the eastern branch starting from San Miguel will push its way eastward over the Coast Range into Kern county and strike the main southern road at Lerdo. Crossing that, it will pass on still further to the eastward and open up the rich agricultural country to the north and east of Bakersfield.

These roads, both north and south, will open up to convenient and rapid communication immense regions of country, which have hitherto been of little value on account of their isolated conditions. All this land will be fully or more than doubled in value by this improvement. The road from Soledad and its eastern branch will be about 360 miles in length.

Still other roads are projected in this central portion of the State—the San Joaquin valley. A road 145 miles in length will be started and probably completed during the coming year along the west side of the San Joaquin valley, from Tracy, on the main line, southward to Huron, in Fresno county, at or near which point it will again connect with the main line. This branch will develop a valuable grain country. Another road will be constructed on the east side of the main road, and paralleling the same for a distance of 30 or 40 miles. Several other feeders are in contemplation in that region running to and skirting along the foothills. It is the determination of the railroad people to open up the entire San Joaquin valley to good railroad facilities.

Other roads have also been projected and independent companies organized to construct needed railroads in Solano, Colusa and Lake counties. One of these roads will reach the timber regions of Mendocino county; Humboldt county will also soon be placed in railroad communication with the rest of the State, and Klamath, Tehama, Modoc and Lassen counties all come within the scope of projected railroads.

Los Angeles county is especially active in railroad extensions and new lines. The Atchison & Topeka road has entered upon quite an extensive line reaching from their main line at San Bernardino to the sea coast, via the San Gabriel valley and Los Angeles. The coast will be reached at the new harbor now in process of construction at La Ballona. Another road will be built in another year for Colton via Riverside, the Temescal mountains to Anaheim. The Anaheim road will be extended at an early day along the coast to San Diego. It is estimated that at least 1000 miles of new road will be built in California within the next three years. The railroad people evidently see good times ahead in the near future, for this State, and are determined to be ready to do the increased business of transportation which is sure to come. In their improvements not less than \$20,000,000 will be distributed in California alone for railroad material and labor—itsself a bonanza for the State.

ANCIENT ENGINEERING.—One of the most extensive and remarkable works of the engineers of Ancient Rome is the Cloaca Maxima, well known as the great common sewer of that city. It is of Etruscan architecture, and still serving its original purpose, is as firm as when its foundations were laid. It was built at least 2400 years ago, and is one of the few monuments of Rome whose antiquity has never been assailed.

THE SUEZ CANAL.—The passage of the Suez canal is ordinarily made in 36 to 40 hours, but vessels fitted with the electric light apparatus can go through in 16 hours.

LEAKAGE OF PETROLEUM.—Ten years ago, according to Sir Frederick Abel, the loss of petroleum spirit from leakage and evaporation was as much as 18 per cent, but it has now been reduced to eight per cent in many storehouses, and in Germany the leakage is said to be less than one per cent.

## USEFUL INFORMATION.

THE MANAGEMENT OF LAMPS.—To insure good light, the burners of petroleum lamps should be kept bright. If they are allowed to become dull the light is uncertain, and, owing to the absorption of heat by the darkened metal, smoke is the result. Once a month place the burners in a pan, covering them with cold water, to each quart of which a tablespoonful of washing soda should be added, and also a little soap. Boil slowly for one or two hours, and at the end of this time pour off the blackened water. Then pour enough boiling water into the pan to cover the burners, adding soap and soda in the same proportions as before. After boiling again a few minutes, pour off the water, rinse the burners with clear hot water, and rub dry with a soft cloth. The burners must be perfectly dry before the wicks are introduced. Should the wicks become clogged with the particles of dust floating in the oil, and new ones not be desired, they may be boiled in vinegar and water, dried thoroughly, and put back in the burners. If wicks have done duty all winter they should be replaced by new ones in the spring. Nickel burners may be boiled as well as brass ones. Time spent in the care of lamps is never wasted. A perfectly clean lamp that gives a brilliant light is a great comfort. What more cheerless or depressing than an ill-kept lamp, which gives forth an unsteady, lurid, sight-destroying flame. The paper roses, guelder roses and chrysanthemums, so popular for decorative purposes, are admirable for placing in the lamp chimneys to keep out the dust during the day, and the wicks should be turned a little below the rim of the burner to prevent exudation of the oil.—*New York Commercial.*

OIL ON THE WATER.—Another instance of the marked benefits resulting from the use of oil on troubled seas was afforded by the recent experience of the steamship *Werra*, of the North German Lloyd's Line, which was disabled in mid-ocean during her last transatlantic voyage. The steamer had been taken in tow by the *Venetian*, and all went well until the evening of August 3d, when a strong gale prevailed and heavy seas were constantly breaking over the bow of the *Werra*, endangering the tow lines and threatening the loss of the tow. The captain of the *Venetian* caused an oil bag to be hung from each side of his vessel and dragged some distance astern. The result was almost immediate, and the sea became comparatively smooth around the disabled ship. The officers of the *Werra* were for some time ignorant of the cause of their relief. At the exchange of signals on the following morning, they reported that after the oil bags had been hung out, their vessel experienced much better weather, not a drop of water breaking on board, and the ship being in all respects more comfortable.

HOW TO KEEP CIDER SWEET.—Pure sweet cider that is arrested in the process of fermentation before it becomes acetic acid or even alcohol, and with carbonic acid worked out, is a most delightful beverage. The following scientific method of treating the cider to preserve its sweetness is recommended: When the saccharine matters, by fermentation, are being converted to alcohol, if a bent tube be inserted air-tight into the bung, with the other end in a pail of water, to allow the carbonic acid evolved to pass off without admitting any air into the barrel, a beverage will be obtained that is a "fit nectar for the gods." A handy way is to fill your cask nearly up to the faucet, when the cask is rolled so that the bung is down. Get a common rubber tube and slip it over the end of the plug in the faucet, with the other end in the pail. Then turn the plug so the cider can have communication with the pail. After the water ceases to bubble, bottle or store away.

THE EFFECT OF CERTAIN ODORS.—The aroma of red cedar is fatal to house moths; the aroma of black walnut leaves is fatal to fleas. It is a matter of common observation that persons engaged in the business of making shingles from odoriferous cypress timber in malarial districts are rarely, if ever, affected by malarial diseases, and the persons engaged in gathering and distilling turpentine do not suffer from either malarial diseases or consumption. It is said that when cholera was epidemic in Memphis, Tenn., persons working in livery stables were entirely exempt from it. It is affirmed that since the destruction of the clove trees on the Island of Ternate the colony has suffered from epidemics unknown before, and in times when cholera has prevailed in London and Paris those employed in the perfumery factories have escaped its ravages.—*Boston Journal of Chemistry.*

GALVANIZED WATER TANKS.—It has been shown by French chemists that water passed through 200 yards of galvanized iron pipe takes up 4.29 grains zinc carbonate per gallon. It is on this account the Government has forbidden the use of galvanized water tanks on French men-of-war. Tanks of this kind should also be abandoned in all cases where water is used from tanks for drinking and culinary purposes.

YELLOW PINE AND BEDBUGS.—The *American Architect and Building News* says: "The southern pine seems to be the natural habitation in this country of the *cimex lectularius*, or bedbug,

which is found in immense numbers under the bark of old trees of that species. If the wood contains natural clefts the insects and their eggs remain in these after sawing, and are often carried in that way in the seams of large timbers into buildings. It is worth noticing that living trees of yellow pine sometimes keep houses near them infested with the vermin, which stray in all directions from their home."

HANDY DEVICE FOR DETECTING GAS LEAKAGE.—A handy apparatus for detecting leakage of gas from house service pipes has been devised. It consists of a small pipe bent twice at right angles, and connected with the service before and after the main cock. A small glass bulb, partly filled with a mixture of glycerine and water, is placed on the pipe. A tube dips into the liquid in the bulb, and is so arranged that any gas passing through the small pipe bubbles through the liquid. The bulb is also provided with cocks at its inlet and outlet. If these latter are opened, and the main cock closed and the burners shut off, any bubbles in the liquid show a leakage of gas in the pipes or fixtures beyond.

A NEW COFFEE TREE.—A German paper reports the discovery in West Africa of a new variety of coffee plant whose berry appears greatly to resemble that of Arabia in appearance and flavor. It grows, however, not on a shrub but on a tree nearly seven feet high, which develops rapidly and yields an abundant crop. Arrangements are already being made for introducing its cultivation in favorable localities.

CELLUVERT is a new material formed by passing paper or any fibrous form of cellulose through a bath of nitric acid. The glutinous surfaces so produced are then pressed together and washed, when they form an extremely tough and hard substance, which is well adapted for use in the industrial arts.

THE LION AND THE TIGER.—It has been shown that the strength of the lion in the forelimbs is only 69.9 per cent of that of the tiger, and the strength of his hind limbs only 55.9 per cent. Five men can easily hold down a lion, but nine men are required to control a tiger.

MOLDINESS is occasioned by the growth of minute vegetation. Ink, paste, leather and seeds most frequently suffer by it. A clove will prevent it; any essential oil will answer equally well.

SHEEP SHEARS with two blades and a spring back were used in old Rome for clipping sheep, hair and hedges.

OIL GLASSES will not get clogged up with oil if first filled with glycerine.

## GOOD HEALTH.

## To Prevent Diphtheria.

The Ohio State Board of Health have published a pamphlet, which urges the strict observance of the following rules:

1. When a child has sore throat with fever, especially when diphtheria is present in the neighborhood, it should be kept apart from others until a competent physician has determined it is not diphtheria.
2. When a person is known to be sick with diphtheria, he should immediately be separated from all others, excepting his attendants, and removed to a room which should be specially prepared for his occupancy.
3. This room should be prepared by removing from it all superfluous furniture, carpets, books, window curtains, and all similar articles not needed in the room. It should be as remote as possible from the family rooms—preferably in the upper story—and care should be taken to secure an abundance of fresh air, without exposing the patient to direct drafts.
4. No one should be admitted to the sick-room, except the necessary nurses and attendants.
5. No food or drink which has been in the sick-room should be partaken of by the well. The dishes carried in should be washed separately.
6. Under no circumstances should the bed-clothes or the patient's body linen be mixed with the other soiled clothing, or be admitted to the general wash, without being first thoroughly disinfected.
7. All persons recovering from diphtheria are dangerous, and should not be permitted to attend school, church, or public assembly, until, in the judgment of a careful physician, they are no longer a source of contagion.
8. No public funeral should be held of any person dying of diphtheria. In no case should any child be permitted to attend.

Then follow general instructions on disinfection, with rules for prevention of the disease, etc.

A HEALTH HINT FOR TEACHERS.—Dr. Holbrook, writing of memory culture in schools, says: The teacher should remember that the memory cannot be disciplined to advantage when the mind of his pupil is distracted by feelings, sensations and thoughts foreign to the subject of study. It may also be said that if a child is badly fed, insufficiently clothed, or suffering from some inward complaint; if the

lungs and circulatory system be oppressed by the foul atmosphere of a crowded schoolroom; if the nervous energy be suppressed by imperfect oxidation of the blood; if the eye be deprived of the natural stimulus of a good light, the nostrils assailed by disagreeable odors, and the ears confused with an incessant tumult of noises; if one set of muscles be kept in a state of constant tension and others in a state of abnormal relaxation by sitting in a constrained position hour after hour, a condition must be induced very unfavorable to the culture of memory.

IS THERE A TOOTHLESS TIME COMING?—The American tooth, the dentists tell us, is something fast disappearing. What is to take its place they leave to conjecture. Whether a toothless race is on its way, or whether a new animal is to be evolved from the present human creature on this continent, is perhaps an open question. Whatever it is that may come to pass, the fancy recoils before the prospect. Children of 12 years often have \$100 worth of gold in their mouths, others needing as much quite as badly, but unable to afford the outlay. Children of 16 often wear complete sets of false teeth and other children innumerable have teeth that are decayed before they penetrate the gums, and that have to be filled as soon as they are in sight, the crumbling material and thin enamel, even then, giving but little to work upon. At first it was thought all this resulted from ignorance, from candy eating, from want of care and cleanliness. But it is now understood that in most cases the fault is inherent in the quality of the tooth, and the only remedy so far suggested is a diet calculated with special reference to the making of sound bone. This is supposed to be found in the coarse grains and food of similar character, and the most confirmed beef-eater alive yields to the superiority at this point of the little kernel of grain that feeds his beef itself.—*Harper's Bazar.*

SIGNS OF THE TONGUE.—The tongue is the indicator of the system. A white-coated tongue indicates febrile disturbance; a brown, moist tongue indicates disordered digestion or overloaded *prime vie*; a brown, dry tongue indicates depressed vitality, as in typhoid conditions and blood poisoning; a red, moist tongue indicates debility, as from exhausting discharges; a red, dry tongue indicates pyrexia, or any inflammatory fever; a "strawberry" tongue, with prominent papillae, indicates scarlet fever or rotheln; a red, glazed tongue indicates debility, with want of assimilative power of digestion; a tremulous, flabby tongue indicates delirium tremens; hesitancy in protruding the tongue indicates concussion of the brain; protrusion at one side indicates paralysis of the muscles on that side.

BALE HEADS FROM A SCIENTIFIC STAND-POINT.—A writer in *Popular Science*, supporting the view that a higher civilization tends to baldness or a lessened growth of hair, cites the fact that 48 per cent of men at a Patti concert were bald, while only 12 per cent of those who attended a Sullivan prize fight were without a full head of hair. It is assumed that those who attended the concert were of a higher grade of civilization than those who went to see Sullivan, and that this alone is sufficient to account for the difference in their hair coverings. But the important fact has been overlooked that the Patti admirers had probably neglected to learn "the noble art of self-defense," in which the followers of Sullivan were adepts.

THE TREATMENT OF WHOOPING-COUGH WITH ILLUMINATING GAS.—Dr. W. T. Greene suggests an easily available improvement on the old plan of sending children on visits to gas-works. His plan is to attach a piece of rubber tubing to a burner, the tubing being long enough to reach the floor. The gas is turned on just enough to make a perceptible odor, and the child is to inhale it for a few minutes at a time as often as convenient.—*N. Y. Med. Journal.*

QUININE HAIR TONIC.—The following formula for a preparation containing quinine, to prevent falling out of the hair, is highly recommended: Quinine sulphate, 20 grains; glycerine, 1 fl. oz.; cologne, 2 fl. oz.; bay rum, 2 fl. oz.; rose water, 11 fl. oz. Rub the quinine with the glycerine, and add the other ingredients in the order named. The addition of fluid extract of jaborandi is recommended to stimulate the growth.

LINIMENT FOR EARACHE.—A most excellent liniment for earache is recommended as follows: Camphorated chloral two and a half parts, pure glycerine 16½ parts, and oil of sweet almonds 10 parts. To be well mixed, kept in a hermetically sealed bottle, applied with cotton soaked in the liniment, and placed in the ear twice a day.

EXCELLENT BITTERS.—A medical exchange publishes the following as a most excellent recipe for bitters: One pint alcohol, one ounce gentian, powdered; one ounce cardamom seeds, one ounce orange peel, powdered. Shake up and let stand three days, then draw off for use.

STOPPING HICCUGH.—A Brazilian physician states that refrigeration of the lobe of the ear will stop hiccough, whatever its cause may be. Very slight refrigeration will answer, the application of cold water, or even saliva, being sufficient.



## MINING SUMMARY.

The following is mostly condensed from journals, published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**STRIKE.**—*Sentinel*, Nov. 17: We understand that a strike of richness has been made in the Valparaiso mine, near town. P. N. Peck thinks his chances for a fine winter's run on his gravel claim at Volcano are remarkably good. We have heard it confidently stated that the Moore mine would in the near future employ as many men as does any mine around here. We hope it will. The prospects of the Downs mine, Volcano, are not considered very bright. The \$15,000 put up by the company with which to prospect has been expended, but pay ore has not been found. That such has turned out to be the case is to be regretted. The Volcano Tunnel Co. intend opening up a large open cut, 30 feet deep and 100 long, back of the town, which is thought will throw open a large deposit of pay gravel. An engine is on its way for the purpose of furnishing the motive power to lift the rock.

**KENNEDY.**—*Ledger*, Nov. 20: The Kennedy hoisting works are running by steam, the pipe across the Oneida valley being too small to carry sufficient water to operate both mine and mill. A large wooden tank is being constructed just below the hoisting works. This is intended to store water from the hoisting works for the purpose of using it again for the batteries. This will effect a saving of about 20 inches. The mine continues to look well, and the universal opinion is that it is destined to a long career of activity. They have made one cleanup at the mill, but how the rock yielded we are unable to state.

**MINE SOLD.**—*Len.* Harmon has sold his one-half interest in a quartz claim in Pioneer district to Chas. Garter for the sum of \$2000; \$500 down, balance on time. The claim is said to be a very promising one, and is located near Mace's mill. It was discovered last summer, and two small crushings have been made, realizing in the neighborhood of \$1000. The other owner is Erick Enslie.

**MISCELLANEOUS.**—M. C. Randolph is about to erect a three-stamp mill on the Olive mine at Drytown, which has been idle for many years. The stamps are to be 850 pounds each. The five-stamp mill for S. G. Spagnoli, erected on a claim near Clinton, was completed last week. There remains about 300 feet of pipe to be placed in position. The mill will probably be in motion inside of two weeks.

**SUTTER CREEK.**—Ten additional stamps will be started at the Mahoney mill to-morrow, making in all 30 stamps. They feel confident that they can keep this number running regularly, with the possibility of being able to run the full number of stamps (40) before the end of the winter. Enough rock has been crushed to satisfy the owners that it will pay very well, and there is no danger of coming to a standstill on that score. On account of the severe frosts experienced lately, the water in the canal has decreased considerably. The Canal company are taking advantage of low water, and have a force of men at work cleaning out the ditch between here and Amador City.

**A NEW QUARTZ MILL.**—*Amador Dispatch*, Nov. 20: The Spagnoli brothers have just completed a new 5-stamp quartz mill on their claim at Clinton. The mill is to be used in prospecting and developing the mine.

## Calaveras.

**GOLD CLIFF.**—*Mountain Echo*, Nov. 17: The Gold Cliff mine will resume operations immediately after the next rain. Everything is now being got in order for the winter's run. Messrs. McCreight & Hardy, after years of faithful toil in their mine near Albany Flat, have at last developed an immensely rich body of ore. They certainly merit their good fortune. Mr. Dockstetter arrived in Angels, from San Francisco, last Wednesday evening. Mr. Dockstetter came up for the purpose of pumping out the Jones mine, to admit of its inspection by a company desirous of purchasing it. The Jones mine is situated at the mouth of Carson creek, and about three miles from Angels. The Jones mine is considered by competent judges to be a valuable property. We were recently shown some very rich specimens of rock from the Clark & Maltman mine, situated three miles from Angels, adjoining the Graham & Whittle mine, and about one mile south of Albany Flat. The shaft is now 33 feet in depth, at which point the ledge is three feet in width, bearing free gold in large quantities. This ledge is in the slate and gouge formation. The rock is of the "ribbon" character, so famous for its gold-bearing properties, and is the best we have seen for some time.

**SHEEP RANCH.**—*Calaveras Citizen*, Nov. 20: The Golden Eagle quartz mine has again resumed operations. A contract has recently been let to Lewis & Savage to run 25 feet on each side of the shaft. This is the mine which, a year ago, caused much excitement in mining circles here. The crushing made from it at that time yielded excellently, but the company was not then prepared for extensive development. The only means of hoisting was by a windlass and no great depth could consequently be attained. Old miners believe there may yet be something in store for the owners as work progresses.

## El Dorado.

**QUARTZ.**—*El Dorado Republican*, Nov. 18: Some very rich quartz has been taken from the Adams' Gulch mine, about one and one-half miles northeast of Nashville. It is now owned by Drs. Smith and Duncan, of Plymouth, and J. C. Heald, of Nashville. At 70 feet in depth they have a ledge two feet wide and it is believed that the rock so far taken out will average nearly \$100 per ton. Two and one-fourth tons were worked in an arastra and yielded \$1350. They have now about 75 tons of quartz on the dump, which they consider to be worth \$6000.

**ACTIVE.**—*Georgetown Gazette*, Nov. 20: This fall has been one of unusual activity in this vicinity. Probably no less than \$200,000 has already been paid out by the Walker Bros. in mining development here, while several thousand dollars are being paid out by the California Water Co. in enlarging their main canal and building flumes.

## Fresno.

**THE MINERAL BELT.**—*Fresno Expositor*, Nov.

19: There is much interest being manifested in Fresno county mines. There are hundreds of men now at work prospecting for new mines and developing the older discoveries, and the flattering prospects encourage them to believe that a district equal if not greater in richness and number of mines exists in Fresno county, on the north side of the San Joaquin river, than any ever before found on the coast. The mineral belt, however, extends clear through the county, splendid developments having been made between Kings and the San Joaquin rivers and also on the south side of Kings river in Sampson Flat district. Capital is now interested in the mines north of the river, and therefore the mines are being worked systematically, and machinery for the proper working of ores has been constructed. In these mines the developments have been very encouraging to the owners, and we look to see a heavy output of bullion from a number of these mines next season. In fact, already, a fine yield of precious metals is being obtained from several mines, giving to their owners handsome dividends. Fresno county mines, like Fresno county raisins, wine, wheat, wool and other products, are at the head, and will aid in adding to its wealth and permanent prosperity.

## Inyo.

**KEYNOT MINE.**—*Inyo Independent*, Nov. 20: Last Thursday John Anton and Mike Lasky came into Lone Pine from Keynot. They brought along the proceeds from 106 tons of ore just crushed. The yield was 273 ounces of retorted gold, worth at least \$14.50 per ounce; total value, \$3958.50; average value of ore per ton, \$37.34. The mine is very high up in the Inyo mountains, and no more milling will be done this winter. Eight men will be kept at work till next spring; the mine is now reported to be looking better than at any other time since it was opened.

**DARWIN MINES.**—Eddy & Wilson are putting up a mill at Coso. The work is pushed along as rapidly as possible, under the direction of Billy Smith. The Mariposa mine will be opened up again. New hoisting works are being got ready and men are at work clearing up the mine. When the hoisting works are ready, a full force of miners will be put to work in the mine. Jim Carney is in charge of the work. Manton & Bush are taking out fine ore from the Liberty mine, one mile distant from the mill. In the Defiance mine, eight men are at work. They are taking out fine ore from the lower levels. Arthur Smith is working a fine gold prospect in Slate Range. The camp and surrounding country are prosperous and have a good outlook.

## Mono.

**BODIE.**—*Bodie Miner*, Nov. 22: South drift, on 800, is extended 14 feet. Upraise from south drift, on 800, is extended 25 feet. Stopped winze below 700, and started upraise from 800, which is now extended 25 feet; crushing about 25 tons of ore per day.

**STANDARD CON.**—South drift, 300 level, advanced 16 feet; west drift, same level, advanced 12 feet; upraise, same level, advanced 13 feet; north upraise, same level, advanced 15 feet. South drift, 1000 level, advanced 15 feet. Ore shipped to mill, 370 tons.

**MONO.**—Working rich ore above the 700.

**BULWER CON.**—North drift, 75-foot level on the Stonewall vein, is extended six feet; vein shows about 14 inches of ore. North drift, east ledge, 100-foot level, is extended ten feet face in fair ore. Started a west crosscut during the week from the Homestake south drift, 100-foot level, to cut Stonewall vein 40 feet south of Bulwer main shaft. Crosscut advanced 12 feet. South drift Homestake vein, 100 foot level, has been run 15 feet—ten inches high-grade ore in the face. We shipped to the mill 416 tons of ore, average pulp assay, \$19.35. We shipped to San Francisco on the 16th instant, \$9120.08.

## Napa.

**MINING IN KING CANYON.**—*Calistogan*, Nov. 17: Gov. Alger, of Michigan, is, we are pleased to know, now interested in the Red Cloud mining claim in King canyon, and work has again been commenced there, the cash necessary to defray expenses being sent here. The Governor several months ago sent money to the coast for the purpose of prospecting the claim referred to, but unfortunately for all interested, very little of it reached Calistoga. There will hereafter be no delay on account of the failure to receive money from the Governor, and the claim will now be prospected. It will not, however, require a great deal more labor to prove whether there is anything in it or not. Being an extension of the Grisby & Johnson mine, which is a very fine property, it should be valuable ground. We hope it will prove to be such, as the discovery of ore in another claim in the canyon would live up matters a little here in the line of mining. It would further assist in proving what we have claimed for the past nine years that Calistoga mining district will yet be of much importance among mining men of the State, and greatly assist in building up Calistoga.

**GREAT WESTERN.**—Though the prospects at the Great Western Quicksilver mine are better now than at any previous time during four years or more past, several of the miners, for certain reasons, have not lately been given work. However, they remain at the mine, we judge, as none of them have come this way. The fact that all miners there have not been given work has been the foundation for a rumor that business at the mine has been entirely suspended.

## Nevada.

**TUNNEL COMPLETED.**—*Nevada Herald*, Nov. 16: The new piece of tunnel run by the South Yuba Canal Co., to connect with the tunnel that passes through the ridge above the Manzanita mine, has been completed and water is now running through it. The object in constructing this branch tunnel was to cut out a bad piece of ground that gave much trouble from the caving during the wet season.

**MINING CONSOLIDATION.**—*Foothill Tidings*, Nov. 18: The Lone Jack and Omaha quartz mining companies have consolidated, and operations will be immediately commenced. San Francisco and Sacramento capitalists are the principal movers in the enterprise, and they intend to fully test the merits of the mines.

**THE PEABODY MINE.**—*Foothill Tidings*, Nov. 22: This morning a *Tidings* reporter took a look at some ore from the Peabody mine. The ore is of good quality, showing bright, free gold, backed up

with good-looking sulphurets. The reporter walked around to the mine and found that the miners had just begun stoping, and had on the dump about two tons of ore which will mill well. There has been a good deal of work done of late at the Peabody. About 300 feet of drifts have been run ahead of the stoping, and this gives about 70 feet of backs, the ledge averaging from six inches to one foot in thickness. Where the ore is now coming from is 185 feet from the surface, and soon a crushing of from 50 to 60 loads of quartz will be had. The mine is in good shape for working, and it is calculated that about 60 loads of ore per month will be taken out for milling purposes with the small force of men now working there. Of course this amount of ore will be greatly increased when further developments are made. Water power is used at the Peabody.

**RICH QUARTZ.**—*Grass Valley Union*, Nov. 20: Rich quartz is becoming a very common thing in Grass Valley. It is so common in fact, that it hardly attracts attention. Of course a man will stop, take a look at a fine piece of ore filled with the bright and shining metal, remarks that it "looks well," and move on. If the same kind of ore were exhibited, and it was said that it came from the banks of the river Nile, way in the heart of Africa, or if it came from any other way-off place, it would cause an excitement, and people would flock to that out-of-the-way country by the thousands taking a great deal of capital with them for investment. There is no better field in the world to-day for the capitalist to invest in mining than right here. The gold is known to exist here; the old mines are all paying handsomely; the prospects are showing up finely; mines that were abandoned years ago as worthless have proved to be rich when reopened, and there are hundreds of ledges in the district which will prove as good as those now being worked and which pay so well, if they are only brought to light with powder, pick and shovel. The mining business of this district is in its infancy as yet; but time will bring about the necessary labor, and capital will not long hold back in coming to find profitable investment in this great gold mining region.

## Sierra.

**HORSE-SHOE.**—*Mountain Messenger*, Nov. 13: The owners of the Horse-shoe mine have got everything snug for the winter, and will keep at least four men at work all winter. The upper Extension tunnel, Bassler Bros., contractors, was, at last accounts, in over 50 feet, and all in blue-colored gravel, believed to contain gold. A dump will be put in soon. E. D. Ayers, superintendent of the Gold Valley quartz mine, was in town this week. He reported all the winter freight had been received at his mining district, and that the quartz mines, ere spring, will be well developed, insuring a speedy construction of a good wagon road from the county-seat to Gold Valley.

**PILGRIM MINE.**—*Tribune*, Nov. 19: Information has been received at Forest City that this mine will soon resume work. It is said that the mine is about to be sold, and that the purchasers will resume payment of all the outstanding debts and liabilities of the old company. Dr. H. S. Sanders, the superintendent, is in Nevada City.

**RISEING SUN GRAVEL MINE.**—At this mine, in sinking a shaft for the purpose of striking bedrock, so much water was encountered at a depth of eight feet, that further work had to be suspended. Operations will be commenced anew next spring with the aid of an air-pump.

**MINING PROFITS.**—Who dare assert that mining is unprofitable in view of the following figures? The Sierra Buttes mine, of Sierra City, has paid to its stockholders dividends over \$1,475,000 since 1872. The Plumas Eureka has paid over \$1,900,000 in dividends since its purchase by its present owners. Both of these mines are owned by the same company. These mines will some day rival in richness the world-renowned Potosi mining district, South America, the products of which, from the time of its discovery in the year 1544 up to 1872, amounted to \$50,000,000, and from 1872 to 1877, \$34,000,000.

**THE YOUNG AMERICA.**—The Young America mine has laid off 25 men. They will be allowed to resume when rains set in. Only 10 stamps are running on account of lack of water. The water supply there which is had from the upper and Sardine lake is becoming very meager as the cold weather continues. Unless rain soon sets in it is thought that the mine will have to close down.

**LATER.**—Since writing the above we are informed that the company has concluded to shut down altogether, until the water supply increases.

**SIERRA CITY'S OUTLOOK.**—Before many months Sierra county will be entitled to be ranked as the banner quartz-mining county of the State. Capitalists are fairly alive to the fact that chances for profitable investment in this locality are second to none in the Sierras. Ever since the rich strikes at the Phoenix and Young America mines, they have shown marked eagerness to invest their capital in our midst. The spring of 1887 will be the commencement of an immense boom for Sierra City.

**FIRE IN THE IDAHO MINE.**—A fire broke out in an old shaft at the 400-foot level in the Idaho mine, Grass Valley, last Friday, and continued burning until Saturday afternoon. It is supposed to have originated by one of the miners putting a candle too near the dry timbers. The men went to work as usual on Monday, but the mill did not start until Tuesday, on account of scarcity of rock caused by the fire. The damage done amounted to between \$2000 and \$3000.

**COLUMBO MINE.**—M. Mooney and Wm. Peneluma, who have in hand the contract to run 100 feet in the upper tunnel, met with a large volume of water at a distance of 25 feet. This is considered a good indication that the ledge will soon be reached. Rich pay ore has been taken from this level.

**CELINAS AND MERCER MINE.**—The prospects at this well-known mine are said to be very bright; 400 feet of tunnel has been run to date. The ledge is now 4 feet in width and contains rock which will readily mill \$40 per ton. We shall say more of this mine shortly.

**FOREST CITY.**—*Mountain Messenger*, Nov. 20: For various reasons the Extension Co. has laid off part of its force. The freezing of their water supply cut off air from the main tunnel, and operations ceased. The Ruby men are having a lay-off for the same reason. The new discovery (old North Fork) have struck solid ground which prospects well.

## Tuolumne.

**QUARTZ MINING.**—*Tuolumne Independent*, Nov. 20: There is no doubt that an impetus will soon be given to the quartz mining in this county by the investment of outside capital. Rumors on the street repeat—as we have before noticed—that the Buchanan is about changing to a heavy English company. The Buchanan has a 20-stamp mill in full operation, and gives employment to about 60 men. The ore runs from \$25 to \$30 per ton. The 500-foot level, the deepest attained, looks better than any other part of the mine, having a 10-foot vein showing free gold. The Confidence group of mines will also change hands to an English company of large capital in the near future. The re-opening of the Confidence will give new life to that important section of the county. The motive power will be water, thereby reducing the expense of raising and crushing ore to a minimum. The mine has only been worked to a vertical depth of 275 feet, which is really only a surface mine, and from what we know there are large reserves of low-grade ore, as well as rich chutes which are known to extend downward in this mine. We hear that work will be started on the Rawhide next month by a party of capitalists, and, in all probability, many of the adjacent mines will be thrown into the same company. Rawhide, No. 2, belonging to Alvinzar, Hayward and Hobert, is being opened. They have a four-foot vein, which looks very well, and Richard Chute is doing some work on his Rappahannock and O. K. mines. Tuolumne county has always had so many set-backs on account of want of capital, that we are pleased to know that men of means are now coming to the front to boom our mines into well-merited notice.

**SOULSBYVILLE.**—*Union-Democrat*, Nov. 20: The parties who have the Basin Slope mine bonded have finished cleaning out the drifts that were caved and find the veins as represented by the owners. The parties are expected up shortly and probably will purchase the mine, which is no doubt far superior to any in the county. Messrs. Clark & Brown are having rock hauled from the Pennsylvania mine to their mill, and will commence crushing this week. I am informed that they have quit work on the Pennsylvania for the present, there being too much water for a windlass. It is said they have a good-sized vein and that the rock is rich, but a hoisting works will be required to work it in a proper manner. It is no doubt a good property.

## NEVADA.

## Washoe District.

**CONSOLIDATED CALIFORNIA AND VIRGINIA.**—*Enterprise*, Nov. 20: 1300 level—The drift running north from the Consolidated Virginia shaft has been extended 51 feet; total length, 307 feet. 1500 level—The drift running north from the Consolidated Virginia shaft has been extended 52 feet; total length, 160 feet. 1600 level—The drift running south from the north end of the mine has been extended 36 feet; total length, 353 feet. 1435 level—The east crosscut has been extended a distance of 30 feet to the east clay of the ore body, from which point a station is being cut out, preparatory to sinking a winze to the 1550 level. The ore which is being extracted from the different levels of the new development is averaging higher in value than during the previous week. 1650—The drift running southwest from the C. and C. shaft has been extended 16 feet; total length, 563 feet. The upraise which is being carried up from the east crosscut on this level, directly under the ore development on the levels above, continues to show a good quality of ore. Shipped to Morgan mill 1043 tons and 1670 pounds of ore, and to Eureka mill 1711 tons and 820 pounds. The average value of the ore worked at these two mills during the week, according to assays of the samples from the batteries was \$44.22 per ton. Bullion shipped to office in San Francisco—assay value, \$100,889.32.

**BEST AND BELCHER.**—600 level—East crosscut No. 1 has been extended 46 feet; total length, 588 feet. The east drift from east crosscut No. 1 has been extended 39 feet; total length, 167 feet. This drift has passed through the clay, and is now in a porphyry formation. 800 level—The north lateral drift has been cleaned out and retimbered 94 feet; total length, 694 feet. The face of this drift has reached the northern boundary of this company's ground.

**OPHIR.**—1065—Are continuing cutting out a shaft station on this level. Hoisted through this shaft 181 tons of waste for Ophir, 183 for the Mexican and Union, 510 for the Consolidated California and Virginia, and 263 tons of ore for the Consolidated California and Virginia.

**OCCIDENTAL.**—Upper tunnel—At a point in the north incline winze connecting the upper and lower tunnels, 48 feet on the slope below the track floor of the upper tunnel, a south drift has been advanced six feet.

**MEXICAN.**—1300 level—The joint Mexican and Union drift running north from the Ophir shaft has been extended 20 feet; total length, 106 feet.

**UTAH.**—472 level—The west drift has been extended 55 feet; total length, 375 feet. This drift continues in a clay and porphyry formation.

**GOULD AND CURRY.**—425 level—The north drift from the main west drift has been cleaned out and repaired 50 feet; total length, 203 feet.

**SIERRA NEVADA.**—520 level—West crosscut No. 5 extended 47 feet; total length, 187 feet. This crosscut is in quartz giving low assays.

**UNION CON.**—(Report same as that of Mexican. —*Rep.*)

## Cherry Creek District.

**DULL.**—White Pine *News*, Nov. 20: A Cherry creek correspondent writes that times are very dull there. The Exchequer mine has shut down and the mill is running on ore from the dump.

## Como District.

**SUSPENDED FOR WINTER.**—*Virginia Enterprise*, Nov. 20: All the mines and prospecting locations in Como mining district, some ten miles southeast of Dayton, and 18 miles from this city, have suspended operations for the winter, except the Como-Eureka. A "crushing" of ore, shipped from it recently, consisted of 40 tons hauled to the Bossell mill, in Sixmile canyon, and 47 tons to Briggs' mill, below Silver City. Owing to the freezing weather impeding operations, that at the Bossell mill is not



quite reduced, but it goes about \$30 per ton. The 47 tons at Briggs' mill yielded a bar of bullion worth \$1200. The bullion contains a large proportion of gold, being worth \$5.44 per ounce. This ore all came from the 140 level, and being taken out without selection or assorting, it practically shows the correct milling average merit of the mine. The Symons brothers, Bennett and Harry, have been working and exploring the mine for the last four or five years, in connection with Col. M. N. Stone and Judge Belknap, and have paid their way thus far from the proceeds of the mine, not owing a cent at the present time, and with a prosperous future before them, having plenty more ore of the same sort in their mine. They have leased the old Welter mill of five stamps, which is being overhauled and repaired, and will be ready to start up on the first of next month. Meanwhile the steam-hoisting machinery at the mine is also being repaired and straightened up, and they will be able to keep the mill well supplied when it starts operations.

#### Cottonwood District.

CLOSED DOWN.—*Silver State*, Nov. 17: News has been received here of the closing down of the Nickel and Cobalt mines at Cottonwood. It appears that the English Co., which bonded the mines, did not make the last payment in the time specified, and the mine was closed. It is greatly to be hoped that arrangements will yet be made by which work will be resumed. The mines are said to be rich, and if such is the case, they ought not to remain closed.

#### Jackrabbit District.

ORE SHIPMENT.—*Pioche Record*, Nov. 16: The Onondaga mine made another shipment of ore on Tuesday. Last reports say that the mine looks fine, but there is no telling what a day may bring forth. Big expectations are looked for at this prospect. It has paid its way thus far. Few prospects pay their way from the first jump.

#### Mount Rose District.

PARADISE VALLEY M. CO.—*Silver State*, Nov. 22: Wild Goose drift shows no change except more water in face than usual. No. 4 tunnel, face, shows less favorable indications than at date of last report. The engine shaft is in harder ground, and all the indications confirm the opinion that the vein has pitched to the west and crossed the shaft. We have been following a seam of quartz in No. 5 tunnel, which we find has diverged to the west of the main ledge. We have discontinued following it and have gone back to the point where the vein split, and are now running on the other strata.

#### Taylor District.

DRAFT OF MEN.—*White Pine News*, Nov. 20: A draft of 20 men was made from the Monitor mine last Sunday, leaving the working force only 12 men. It is not likely it will be increased before spring.

#### White Pine District.

BULLION.—*White Pine News*, Nov. 20: The Eberhardt-Monitor Mining Co. shipped this week, through Wells, Fargo & Co.'s Express, three bars of bullion, valued at \$2300.

#### Secret Canyon District.

VARIOUS MINES.—*Eureka Sentinel*, Nov. 18: Orders have been received to ship the machinery and rock-breaker from the Geddes mill to Montana. The tributaries in the Geddes are taking out lots of ore. Barney McKory and Doc Hamilton have left Secret canyon and taken a lease of the California mine in New York canyon. The Oswego mine is for lease, with good ore to start on. It is the property of H. K. Mitchell, Esq. Sam Delmore is getting some very rich ore from the Basey mine. M. H. Joseph, who has been working alone in the Water Jacket mine, is about to quit it and go back to the Golden Rule series before the winter sets in. A lease will be given on the Water Jacket mine in a few days. This is a good chance for chlorides. There is rich ore to start on in four places in the mine.

#### ARIZONA.

AT WORK.—*Prescott Courier*, Nov. 19: Owners of the Buckeye and adjoining claims, on the Tiger lode, Bradshaw district, are systematically at work, prospecting said claims, by tunnel. They think they have good properties and are not afraid to test the truth or falsity of their opinion. Two of our best miners, Jack Lawler and B. T. Riggs, have a contract for running ever so many hundred feet of tunnels. Mr. John Hutchins, of Groom creek, was here yesterday and gave us to understand that the Nevada mine continues to give up plenty of gold rock that will pay well to mill. Gentlemen who are hunting for gold properties would do well to visit Big Bug, Black canyon, Cherry, Bradshaw and some other districts around Prescott, where good-sized veins of gold-bearing quartz exist. One trouble with our mines appears to be that they are not sufficiently developed to satisfy some experts. Our miners are told to sink, but, as many mine-owners are not in a fix to sink deep, they are, we presume, willing to give up interests in good veins to men who will develop them. Taking everything into consideration, many mine-owners have done good, faithful work in their mines and cannot be blamed for not having pierced them deeper. It takes capital to do that. Could poor mine-owners sell their ores on the dump for fair prices, they would, we opine, keep on developing; but as they can neither sell nor eat their ores, many of them are compelled to work for wages, occasionally, in order to save something to purchase food, tools, etc., for assessment and other work on their own property. It is such people who cry for the right kind of reduction works with different management from that which prevailed at Howell, where miners say they were never properly treated. Perhaps, when the railroad reaches Prescott, ores and concentrations can be shipped much cheaper than at present. If so, more mining will be done in several districts, and the output may induce some strong company to start and run the right kind of reduction works here. Until this happens, we will have to ship our richest ores, mill and concentrate poorer ones.

A PROMISING GROUP.—*Silver Belt*, Nov. 16: The very encouraging results recently obtained in prospecting the Stonewall mine and other adjacent mining claims, all of which are located within two miles southeast of the town of Globe (not to be confounded with the Stonewall Jackson at McMillen),

give sufficient reason to predict a splendid future for that particular locality, as an important mining camp. The hills on which these different claims are located are easy of access, and the geological formation is very favorable for rich and permanent ore deposits. There seem to be quite a number of veins, most of which are found at the contact between igneous rocks and quartzite, while smaller stringers are running through these rocks. Granite, porphyry, quartzite and diorite, in regular belts, are the prevailing formations, with but a small body of dolomitic limestone in one place, and chloritic slate in another. The veins themselves vary much in their character; some contain the secondary products of decomposed silver—copper glance and other combinations of silver ores, which have percolated through the fissures of quartzose gangue as a ledge matter, and the silver now appears in the shape of a greenish chloride; these ores are strictly free-milling ores. Other veins contain argentiferous lead ore partly as carbonate, partly as galena, and some of these are very rich. Of the mines more or less extensively worked, the Stonewall is the most important. Quite a large quantity of low-grade, free-milling ore was extracted several years since, but it is seen now that the former work hardly touched the real ore deposit on the vein, and that which had been mined was merely an impregnated mass of talcose matter, the production of decomposed talcose diorite. The workings in the Stonewall include one shaft 250 feet deep and several smaller ones, together with many drifts and crosscuts, but none of sufficient extent. Another mine quite extensively prospected is the McCormick, said to be the oldest claim in Globe district, and where most excellent ore has been found. It is claimed that in that mine, too, the work was erroneously done, and that the vein had been lost.

#### COLORADO.

WORKING.—*Idaho Springs Gazette*, Nov. 16: Bill Brooks and others are working the Victor, just above the German, Virginia canyon. A number of properties at the head of Virginia canyon are being developed. Mike Graeff made a new discovery on this side of the Mayflower mine and took out a fair quality of mineral. The Bald Eagle mine, Virginia canyon, looks well. A fine body of ore has been encountered, which shows well in gray copper. A few leasers are at work on the Champion, property of the English Co. Their 50-stamp mill has been running on custom ore from different mines. The production of the Freeland for the month of October was: Gold, \$118,778.18; silver, \$3721.58; copper, \$56.05; total, \$22,555.81. The production of the Plutus for the month of October was: Gold, \$3330.70; silver, \$2624.84; copper, \$100.41; total, \$6055.95. The Quota lode, Chicago creek, is being profitably worked by driving drifts, etc. The 10-stamp mill, under charge of Mr. W. B. Tarr, treats the ore from this mine. After amalgamating the free gold, the tailings, which are jigged, are sold at the smelters and bring a good price. J. M. Ireland and Andrew Phening have been rewarded for their persistence in driving the level of the Fairmount mine. The drift opened out into a body of fine ore, the mill-dirt being from two to three feet wide, and running well under stamps. The tailings are sold to the smelters. The German mine, at the head of Virginia canyon, after producing thousands of dollars in years past, has stood idle for a long time. But recently a party of leasers took hold of the property, and after taking the water out commenced sinking, and, we are pleased to note, have been rewarded by striking ore worth \$125 per ton. There are other mines in the county that only need development to show up as big as the German.

#### IDAHO.

CLAYTON SMELTER.—*Ketchum Keystone*, Nov. 16: The Clayton smelter has had a successful run of about five months, shipping some 25 carloads of bullion and several carloads of matte, besides shipping 200 tons of first-class ore from the Skylark mine. Some high-grade ore has also been taken from the Ella mine, belonging to the Co., and the indications are favorable for a large product from that mine in the future. Many strikes are reported this season from the various camps in the vicinity, insuring a permanent supply of ore. The only drawback to the camp is the limited supply of lead ore. It is expected that arrangements will be made the coming season to treat a part of the ores by leaching or milling, which will greatly increase the output of bullion.

SHEEP MOUNTAIN DISTRICT is destined soon to become one of the most prominent mining camps in the Territory, if the recent discoveries in that vicinity prove to be permanent deposits. Several parties have been working placer claims in a small way on Salmon river, a few miles above Clayton, and several hundred dollars' worth of dust has been taken out this summer.

BOULDER DISTRICT.—We hear some good reports from the Ophir and Yankee Blade at the head of Boulder creek. In the Ophir a 350-foot tunnel has been started below the ore chute. The ore taken from this mine has been of very high grade, and has yielded a handsome income to its owners. The last of the winter supplies have been taken up sufficient for 10 men during the winter. The Yankee Blade, situated above the Ophir, is under lease to Geo. James, George Kemp and Peter Gilstrap. A tunnel has been run below the old works encountering the vein, showing splendid ore.

Add Nevada Co.

BOSS.—*North San Juan Times*, Nov. 20: Work in the Boss mine is being pushed ahead quite vigorously at present. The company is now crosscutting and is taking out some very good rock. The hoisting is done with horse-power. The mill is now idle, all the rock having been crushed. The company proposes to mine about 500 tons of rock before the mill is started again. That amount of rock will run the mill about a month. A rich strike was made in the Delhi mine on Thursday of last week. We are informed that rock taken out of the pay chute assays \$75 per ton, and that there is plenty of it.

MINING NOTES.—James McCormick will work his claim, the Onondaga, on Boyle mountain this winter. C. F. Goering and A. G. Davis have leased the Idahoan and Wood River mines, on Boyle mountain. A. R. Dean and Walt Gooding have leased a property in Bassett gulch. The outlook generally for the winter's work is good. Six men

will be kept at work all winter in the Dollarhide mine, on Smoky. The King of the West will also be steadily improved and developed this winter. The Silver Star, of Smoky district, will work 10 or 12 men during the winter. The Carrie Leonard will work seven or eight men during the winter, mostly on dead-work. The Catharina, on Warm Spring creek, the Gillette, Culp and others, bid fair to become the most valuable mines in the district. At the bottom of the shaft the ledge gives signs of a rapid increase in width. The Mattie mine, on Trail creek, the property of J. B. Reiff and Geo. M. Snow, is showing well for this fall's work. The ledge is 17 inches in width, with seven inches of gray copper ore. Parties just returned from the Falls City mine, who have been doing the assessment work, report having made a rich strike. There is a ledge from six inches to a foot in width, with good prospects for rapidly increasing in size. The ledge is solid galena of high grade. The outlook for the mines in Wood River mining district is brighter now than it has been for some time. Every day we hear of fresh discoveries.

#### MONTANA.

MINING NOTES.—*Helena Independent*, Nov. 19: The Helena Concentrating Co., at the town named in its honor, is at the Cosmopolitan. He says the company is now handling more ore than ever before, and the output will be considerably increased with the completion of the railway to the town. Next spring will witness the beginning of shipment from seven or eight additional mines in that vicinity, besides a large increase in the capacity and output of the Helena works. Some idea of the extent to which the Helena Co. is now handling concentrates may be gained from the fact that the wear and tear on ore sacks per month is now about \$1000. The Lexington, of Butte, makes an official announcement that its net profits for the first six months of this year were \$80,000.

GRANITE.—*Helena Independent*, Nov. 19: The Granite Mountain Company estimate that upon the completion of their new mill, their average monthly output will be 240,000 ounces of silver and \$2500 in gold, besides the product of the extra high-grade ores which are shipped. By the methods employed by this company the average cost of mining and handling a ton of ore is \$18.44, and the average value of ore handled is nearly 177 ounces of silver. After the new mill is put in operation, however, the average value is expected to be reduced to about 125 ounces, as more second-class ore will be stoped.

A MINING PURCHASE.—Guy H. Brown and Barney Kelly have sold to Frank L. Sizer, superintendent of the Empire mine, the Puritan lode claim, adjoining the Empire on the south. The price paid was \$5000. It is to be presumed that Mr. Sizer buys in the interest of his company.

MINING NOTES.—Al Wilkinson has come down out of the mountains and says he has struck it rich in his location on the Little Jennie lode in the Red Mountain country. He says he has 14 inches of black sulphurets of silver assaying very rich. He has sunk a prospect shaft of 30 feet on the property. The tunnel on the North Granite at Phillipsburg is in about 50 feet, and is being pushed as fast as possible. West Granite is now regularly reported on 'change in St. Louis. It is selling actively at \$1.60.

#### NEW MEXICO.

THE GOLD CAMP.—*Cor. Idaho Statesman*, Nov. 18: After a period of some four years of inactivity, this mining region (Golden) is beginning to assume some appearance of its former life and excitement. The recent rich discoveries of gold and the valuable and easily worked placers, together with the mild climatic conditions which prevail, are proving effective inducements in attracting the mining population here. Many miners and experts are arriving almost daily from Colorado and the north, and express themselves in enthusiastic terms over the rich indications of gold everywhere apparent in this vicinity. Several representatives of Eastern banking firms are here with the idea of investing and developing promising claims. I can state on authority that financial parties in Boston, Chicago, and New York are much pleased over the indications here of gold deposits and are making interesting inquiries by mail and otherwise. One gentleman here from the East made the prediction that this region would receive an investment of capital and development within the next 18 months hitherto unknown in its history.

#### OREGON.

QUARTZ AND PLACER.—*Democratic Times*, Nov. 10: Miners are anxiously awaiting rain, the season proving quite unfavorable so far. Many quartz ledges are being prospected at present, and a rich strike may be expected at any time. C. W. Triplett, an experienced miner, will run S. Geer's placer claim on Grave creek during the coming season. T. H. Berryman is still at work in his drifting diggings on Applegate and taking out a considerable amount of dust. The miners of Grave, Wolf and Coyote creeks are ready for business, and will make a good report if the season is favorable. Blalock Bros. have their claim on Pleasant creek rigged up with hydraulic pipe and will make a good showing this season. Smith & Lynch have their placer diggings on Wagner creek ready for business. Alexander Watts' claim, on Josephine creek, is being fitted up with hydraulic pipe, and will be worked on scientific principles hereafter. J. Wimer & Sons have built a huge reservoir at the head of Butcher gulch, where they already have one giant at work and another in position. Work is still progressing at the tunnels of the Jacksonville Milling & Mining Co., and C. C. Beekman, in the Jackson creek district, with excellent prospects. Everything is in readiness at the Sterling mine for an extensive run, and a large amount of gold dust will no doubt be taken out there, as operations will take place in good ground. J. G. Birdsey and S. Mathis are busily engaged in getting their claims on Birdsey creek in running order. They have hydraulic pipe and a giant and propose working on an extensive scale. Brown & Co.'s mill, located near the Swinden ledge, has not got fairly under way as yet, some of the machinery not having been properly adjusted. In a few days it will be in good order, having commenced work yesterday. Operations have been suspended on the Hope ledge in the Wagner creek district, the ore not being of high enough

grade to pay for working it with the small mill in use. There is no doubt but what the mine would prove remunerative if a mill of sufficient capacity was employed. A cleanup was made at Klippel, Bauble & Co.'s mill on Shively gulch. We have not learned the exact result, but those interested seem to be satisfied with it. No doubt the mill can be kept supplied with quartz from that vicinity, in which event we think there can be no doubt of the success of the enterprise, as the ore seems to contain more or less gold and the mill seems to deal with it in a satisfactory manner. A subscriber of the *Times*, writing of the great strike in the Cow creek mining district, says that Rube Jones recently struck one of the finest pockets of quartz in his tunnel on the Green mountain ledge that has ever been found in this part of the country. At one single blast he blew out not less than \$5000 of the pure stuff. Rube went to Portland with 12 pounds of the rock, in which was not less than \$1500 and contained more than three-fourths (in weight) solid gold. There is no telling how much there is in the find. The tunnel has been locked up and guarded by two men. In the bottom of the hole where the blast was put in a vein of gold could be seen one and three-fourths inches wide and nine inches long, in the solid rock.

BIG SALE OF MINES.—*Bedrock Democrat*, Nov. 17: Last Tuesday Mr. C. C. Davidson purchased all the mines, with the exception of two in the Bonanza basin, about two miles west of Cornucopia. They were the Red Boy, Mountain Chief, Green Horn, Stella, Allie Walker, Queen of the West and Golden Chest; consideration, \$100,000. Mr. Davidson left this city Friday for Denver, Colorado, where he goes to secure two Burleigh drills and other machinery to be used in piercing the mountain and crosscutting all the veins in the basin. The mill-site formerly owned by Mr. G. W. Wilson was also included in the purchase. Mr. D. intends working this winter, and now has a force of men at work making a good winter road from Cornucopia to the mines. The future prosperity of Pine Creek is assured beyond a doubt, and next spring will find lively times in that vicinity.

#### UTAH.

REVIEW.—*Salt Lake Tribune*, Nov. 19: The week has been rather a dull one in mining circles, a dullness to which the snows and storms have largely contributed. The receipts of bullion and ore in this city for the week ending the 17th, inclusive, were as follows: Bullion, \$74,873.31; ore, \$88,497.44; total, \$163,364.75. For the week previous the receipts were \$126,280.73, of which \$71,054.16 was bullion, and \$55,226.57 in ore. The output of the Ontario for the week was 15,639.71 fine ounces, and \$23,810.24 for ore sales, three lots; an approximate total of \$39,449.95. The daily product for the week was 9635 ounces of fine bullion. Base bullion receipts during the week were \$16,500; fine bars, \$28,316.31. The Hanauer smelter produced during the week \$17,867 in bullion. Sprucemount bullion to the value of \$2600 came in on the 15th. Stormont silver bars came up from Silver Reef on the 15th, valued at \$2980. Ore receipts here for the week were \$23,970 by Wells, Fargo & Co.; \$17,380 by McCormick & Co., including \$5250 from the Crescent and \$3180 from the Queen of the Hills; and \$47,241.44 by T. R. Jones & Co.

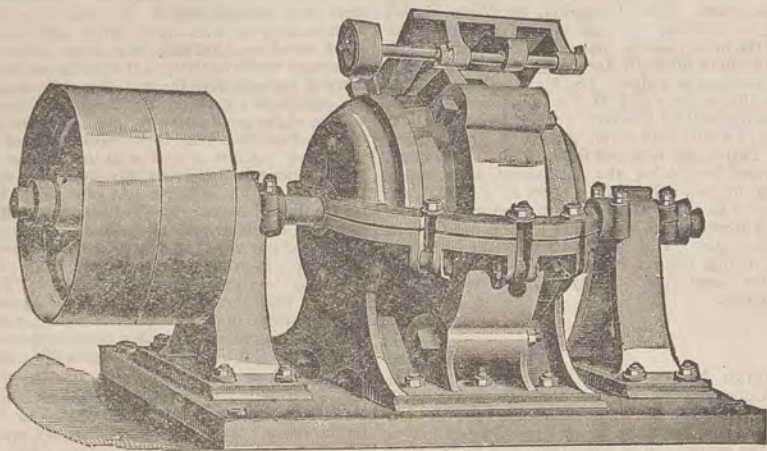
SANDSTONE NOTES.—*Southern Utah Times*, Nov. 16: Thorne & Aurley shipped about 11 tons from Vanderbilt mine to River mill. Henry Holland shipped last week five tons of ore from Silver Gate mine to River mill. The Baily, Nesbit & Co., Leachers, made a good-sized shipment of sulphides last week. The Washington mine, owned by Huntley & Pendray, is to have a shaft sunk to tap the ledge. The Johns Barbee segregated ground on the Bonanza mine is turning out considerable fair-grade ore. At the Emma, 225 feet down, two crosscuts have been commenced, running north and south on the vein. The mine is looking very favorable. John Kimple has been driving a tunnel to connect with an old stope on the Leeds. Considerable low-grade ore was found, which is suitable for the Leachers but not for shipment. The Stormont Co.'s average shipment of ore from Buckeye and Thompson to River mill, for past week, was 37 tons per diem, and bullion shipment for last month was about 11,000 ounces. There is but little change to note in either mine; about 40 miners are employed, and the stopes continue to furnish about the same amount of ore. The mill is working steadily and the supply of ore is sufficient for her full capacity.

SANDSTONE NOTES.—*Southern Utah Times*, Nov. 8: The material for the Bayles & Holland leachers is being shipped to the mine. The mill companies are receiving very little chloride ore, the principal portion going to the leachers. It would be advantageous to capitalists if they would come here and invest some of their surplus capital in aiding those who are not in a position to push ahead with good claims. The Banner mine is looking very promising for the amount of work done. The shaft is down about 30 feet, no dead-work is being done, and but little waste is removed, as the width of the ore body is sufficiently large for working purposes. The Stormont Company's mill, which was closed down for a few days to make some repairs, has again dropped her stamps and is running to her full capacity. There is nothing new to report from the Buckeye and Thompson; the output for last week is similar to the previous week.

THE MOUNTAIN BELLE CLAIM.—*Salt Lake Tribune*, Nov. 20: S. W. Scott is down from Logan to spend a few days in the city. He is one of the pioneers of Paradise district, lying east of Brigham City, and 20 miles south of Logan. He has been engaged with his associates, J. E. Trehwala, T. S. Snarr and J. R. Edwards, in work on their Mountain Belle claim for about one year. Two shifts have been at work nearly all the time, and thus over \$4000 has been expended on development. The lower adit tunnel is in 286 feet, and when driven 40 or 50 feet farther is expected to tap the ledge at a depth of 170 feet. Their upper tunnel tapped the ledge 45 feet below the surface. In driving these tunnels they cut small stringers and have some ore on the dump. On the surface the ledge has been opened in three places. The upper tunnel crosscut the ledge 17 feet through ore and ledge matter, which assays from 15 to 65 ounces silver per ton. Mr. Scott says the ore is free milling, and that they will soon ship 10 tons to test it, and, if satisfactory, we may look for important improvements there. He looks upon the district as being very promising.



## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied.  
At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.  
All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.  
Certificates as to performance of the Mills, and any information required, furnished on application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 & 106 Washington St., NEW YORK.  
OR PACIFIC IRON WORKS, SAN FRANCISCO.



HERCULES SLAYING THE GIANTS.

## HERCULES POWDER

Derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

**No. 1 (XX) is the Strongest Explosive Known.**

**No. 2 is superior to any powder of that grade.**

PATENTED IN THE UNITED STATES PATENT OFFICE

## THE CALIFORNIA POWDER WORKS,

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES Powder.  
ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street, - - - San Francisco Cal



## H. P. GREGORY & CO.

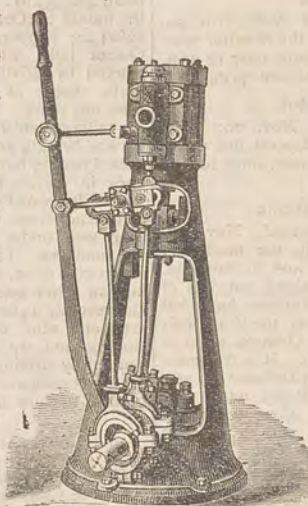
Nos. 2 and 4 California St., - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

## MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING MACHINERY.  
FRANK & CO.'S WOODWORKING MACHINERY.  
NEW HAVEN MANUF'G CO.'S MACHINISTS' TOOLS.  
BEMENT & SON'S MACHINISTS TOOLS.  
BICKFORD'S POWER DRILLS.  
BLAKE'S IMPROVED STEAM PUMPS.  
WEBBER CENTRIFUGAL PUMPS.  
PERIN BAND SAW BLADES.  
STURTEVANT BLOWERS AND EXHAUSTS.  
SHIMER MATCHER HEADS.  
BRANARD MILLING MACHINES.  
TURBINE WATER WHEELS.  
BRADLEY CUSHIONED HAMMERS  
MASSEY'S STEAM HAMMERS.  
SCHLENKER'S BOLT CUTTERS.  
HOLLOWAY FIRE EXTINGUISHERS.



WILLIAMSON BROS' HOISTING ENGINES.  
ATLAS ENGINE WORKS ENGINES AND BOILERS.  
PAYNE'S VERTICAL AND HORIZONTAL ENGINES.  
OTTO SILENT GAS ENGINES.  
EMPIRE LAUNDRY MACHINERY.  
PICKERING ENGINE GOVERNORS  
JUDSON ENGINE GOVERNORS.  
TANITE CO.'S EMERY WHEELS AND MACHINERY.  
NATHAN AND DREYFUS OILERS.  
KORTING INJECTORS AND EJECTORS.  
DISSTON'S CIRCULAR SAWS.  
NEW YORK BELTING AND PACKING CO.'S RUBBER GOODS.  
LANE AND BODLEY SAW MILLS.  
H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

YACHT ENGINES.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

## CINCINNATI CORRUGATING COMPANY.

JOHN F. HAZEN, Prest.

JAMES HICKS, Treas.

J. G. BATTELLE, Sec'y.

## Over 1500 Tons Iron in Stock!

FOUR WIDTHS OF CORRUGATIONS MADE!  
**STANDING SEAM PLAIN ROOFING!**  
**All Paint Re-ground in Pure Linseed Oil!**

## COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

## AUGUST LUTZ, METAL SPINNER,

10 Stevenson St., 3d floor, S. F.

The only custom work spinner in the city. Personal attention given to all work. Orders respectfully solicited.

Dewey & Co. { 252 Market St. } Patent Ag'ts



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



Huntington Centrifugal

QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,

JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

DENVER OFFICE:

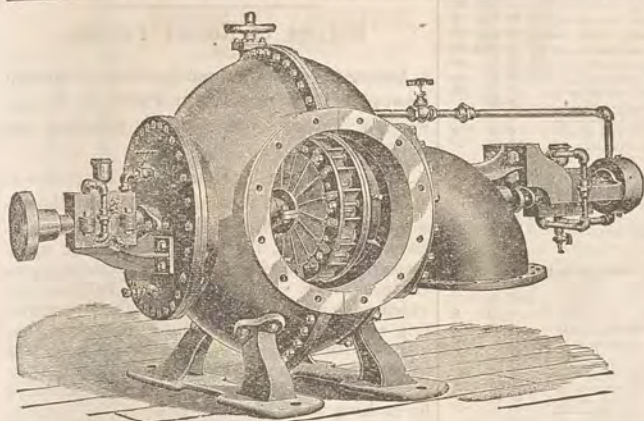
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

UTAH OFFICE—SALT LAKE CITY, UTAH.

## JAMES LEFFEL'S Mining Turbine Water Wheel.



These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.  
Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.  
Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,

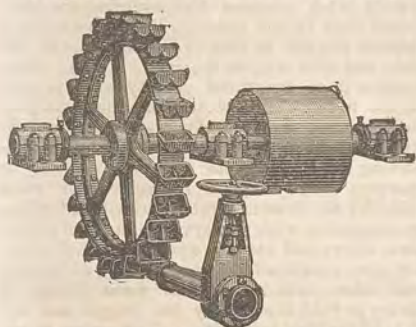
Springfield, Ohio,

or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents,  
Chicago, Ill., and Denver, Col.

PARKE & LACY, General Agents, San Francisco, Cal.

### PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.



UNCLE Sam has found it at last! A sure remedy for Torpid Liver, Sick Headache, Habitual Constipation, Chills and Fever, and all affections of the Kidneys and Liver. This is a New Compound, and one trial will convince you that it is the Cheapest and Best Remedy in the Market for Diseases of Kidneys, Liver and Stomach. If you want a pure vegetable compound, that is positively guaranteed to contain no mercury, go to your Druggist, and get a Bottle of the Arkansaw Liver and Kidney Remedy. Price, \$1.00 per Bottle.

For Sale by all Druggists.

INVENTORS, TAKE NOTICE

L. PETERSON, MODEL MAKER,

258 Market St., N. E. cor. Front (upstairs), San Francisco.  
Experimental machinery and all kinds of metal, tin, copper and brass.

### THE CONSUMERS' COMPANY.

## VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.

218 California Street, San Francisco, Cal.

## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO..

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

## THOMAS PRICE'S ASSAY OFFICE,

CHEMICAL LABORATORY,

BULLION ROOMS and ORE FLOORS,

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

## Metallurgy and Ores.

SELBY

SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY  
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

....MANUFACTURERS OF....

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,  
Under Chamberlin Patent.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

### Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt, )

Mining Engineers and Metallurgists.

J. KUSTEL.

H. KUSTEL.



METALLURGICAL WORKS,

313 Pine St. (Basement,

Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

C. H. AARON,

ASSAYER AND METALLURGIST,

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

514 Kearny Street,

SAN FRANCISCO, - - CALIFORNIA

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

W. A. GOODYEAR,

Civil and Mining Engineer

MINING EXPERT and GEOLOGIST.

Address care of DEWEY & Co., 252 Market Street, San Francisco, Cal.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.



## Let the Mineral Land be Preserved for the Miners.

EDITORS PRESS:—Your admirable article in issue of November 12th, with the above heading, is quite to the point, and should be followed up for the good of the people; but your earnest advice is not all that is needed. It requires more united action of the miners, that these lands shall be preserved. During the past summer I have traveled about all over the mining sections of Southern, Middle and Northern California, and, from one place to another, the mineral lands are being surveyed, claimed, and held and sworn to as being agricultural, and in some instances, where the individuals have made their oath, got their lands secured, have sold the same to be mined, and in others mined themselves. Such perjury as is being carried on as respects the mineral lands calls for some action on the part of the mining communities.

It seems to me that the "snap" has about oozed out of the miners of this State, or they would not stand this robbery of these mineral lands. As you, Mr. Editor, are aware, I have pressed attention of the miner for organization, by which all this wholesale grabbing of the mineral lands can be stopped. A quartz miner is allowed 1500 feet by 600 as his rights, but an agriculturist can grab 20 mines possibly in one 160-acre tract. Now, I do not see how some make their title stick, but some do, while others do not, and I would like to understand how this is. I know I am not alone in this loss of comprehension; and further, you could do no greater service to the miner than in following up this matter and enlightening him on the laws of this legitimate grabbing of the mineral lands. So much for that. As winter is at hand and the "old man" is to rest more, he is going to give you a scrap now and then.

OLD MAN OF THE MOUNTAINS,  
Angels Camp, Calaveras Co., Nov., 1886.

### Mining Share Market.

Mining stocks continue to "boom," the average business being very large at advancing prices. Mining stock circles received an additional source of excitement this week, in the news that Baldwin Gardiner, president of the Pacific Stock Exchange, had absconded with about \$100,000 of other people's money.

All the interest centers on Comstock shares, some of which have advanced very greatly in price. The shipment of \$100,000 from the Consolidated California and Virginia last week is an indication to many that these famous mines will again be profitable investments. In speaking of the ore on the 1435 and 1650 levels, the Virginia Chronicle says: By glancing at the back files of the Chronicle it is ascertained that the ore development in the north end of the mine, so far as explored, is over 350 feet in length and 450 in depth. The width disclosed by the crosscuts sent in, if definitely ascertained by the management, has not been made public. Information gathered from fairly reliable sources credit it with a breadth of eight sets of timbers on the 1300. This represents a total width of over 50 feet on that level.

The official report of an increase in the quality of ore on the 1435, developed by the sending in of an east crosscut on that level, indicates that the vein widens rapidly in its downward course, while the advance of the upraise above the 1650 level denotes an improvement in the grade of the ore at that depth over the levels above.

### Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Con. Virginia and California, Nov. 20, \$100,000; Lexington, 17, \$21,824; Silver Bow, 17, \$28,528; Alice, 17, \$55,480; Moulton, 17, \$17,600; Young America (for October), \$34,000; Hanauer, 16, \$4345; Sprucemont, 16, \$2600; Bannock, 16, \$6600; Stormont, 16, \$2900; Hanauer, 19, \$2290; Alice, 20, \$24,315; Hanauer, 21, \$2250; Bannock, 21, \$3500; Queen of the Hills, 17, \$1070; Wells, Fargo & Co. received at Salt Lake last week, \$58,680; McCormick & Co., \$47,437; and T. R. Jones & Co., \$47,241; a total of \$103,364. Last week's mineral shipments from Salt Lake were 18 cars bullion, 465,945 lbs; 11 cars ore, 332,350; 57 cars copper ore, 210,510; total, 36 cars, 1,008,805 lbs.

### New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

PHENIX CON. M. CO., Nov. 20. Capital stock \$3,500,000. Directors, Charles Webb Howard, A. Borel, Charles Mayne, George E. Herrick, R. S. Moore, Francis G. Newlands and W. H. Lawrence.

EAST BEST AND BELCHER M. CO. Nov. 20. Location, Nevada. Capital stock \$10,000,000. Directors, H. G. Sieberst, C. W. Beach, B. F. Dahl, C. H. Mason and J. J. E. Hawkins.

MIDDLE BAR G. M. CO., Nov. 23. Capital stock \$400,000 in 200,000 shares. Directors, Martin Jones, S. L. Theller, T. E. Jewell, W. B. Murdock and F. E. Luty.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.		LOCATION, No. AMT. LEVIED. DELINQ'T. SALE.		SECRETARY.		PLACE OF BUSINESS.	
Acme M & M Co.	California, 9.	21. Oct 25. Nov 29. Dec	20. J. M. Buffington	309 California St			
Aultman M & M Co.	California, 3.	21. Oct 26. Nov 29. Dec	20. J. M. Buffington	309 California St			
Alta S M Co.	Nevada, 34.	25. Oct 16. Nov 20. Dec	10. W. H. Watson	302 Montgomery St			
Benton Con M Co.	California, 16.	10. Oct 27. Dec 1. Dec	21. V. H. Watson	302 Montgomery St			
Centennial Gravel M Co.	Nevada, 27.	02. Oct 26. Nov 29. Dec	6. J. P. Flannagan	309 California St			
Columbus Con M Co.	Nevada, 4.	50. Oct 27. Nov 29. Dec	20. J. M. Buffington	309 California St			
Chollar M Co.	Nevada, 22.	50. Nov 16. Dec 21. Jan	13. C. E. Elliott	309 Montgomery St			
Diana M Co.	California, 6.	25. Oct 12. Nov 24. Dec	13. P. J. Flannagan	318 Pine St			
Exchequer M Co.	Nevada, 23.	20. Oct 18. Nov 24. Dec	15. C. E. Elliott	306 Montgomery St			
East Mt Diablo M Co.	Nevada, 4.	10. Oct 30. Dec 4. Dec	30. G. W. Fisher	318 Pine St			
Golden Fleece G M Co.	California, 7.	10. Oct 22. Dec 27. Jan	15. V. J. Gleason	310 Pine St			
Independence M Co.	California, 15.	12. Oct 12. Nov 16. Dec	8. J. V. Pow	328 Montgomery St			
Maydower Gravel M Co.	California, 35.	25. Nov 19. Dec 22. Jan	17. J. Morizio	328 Montgomery St			
Mountain Tunnel M Co.	California, 2.	10. Oct 27. Nov 29. Dec	20. A. B. Paul	328 Montgomery St			
North Banner Con M Co.	California, 15.	10. Oct 2. Nov 6. Nov	27. T. J. Mitchell	Grass Valley			
Pneumatic M Co.	California, 1.	12. Oct 5. Nov 11. Dec	9. H. Pictoir	320 Sansome St			
Peerless M Co.	Arizona, 9.	10. Nov 16. Dec 23. Jan	17. A. Waterman	309 Montgomery St			
Peer M Co.	Arizona, 6.	10. Nov 12. Dec 23. Jan	7. A. Waterman	309 Montgomery St			
Potosi M Co.	Nevada, 30.	10. Nov 10. Dec 14. Jan	4. C. E. Elliott	304 Montgomery St			
Polar Star M Co.	New Mexico, 1.	07. Nov 17. Dec 31. Jan	15. J. C. Stump	339 Montgomery St			
Rocky Bar M Co.	California, 9.	50. Oct 15. Nov 20. Dec	7. G. W. Hill	Grass Valley			
Renton Coal M Co.	Wash Ter., 7.	2.00. Oct 20. Dec 6. Jan	5. J. H. H. Anderson	24 Sansome St			
Spring Valley G M Co.	California, 1.	25. Oct 19. Dec 3. Jan	3. H. Pictoir	320 Sansome St			
Santa Anita M & M Co.	California, 10.	11. Oct 25. Nov 29. Dec	20. J. M. Buffington	309 California St			
Sierra Iron Co.	California, 5.	2.60. Nov 15. Dec 22. Jan	18. H. P. Bush	431 California St			
Scorpion M Co.	Nevada, 29.	10. Nov 11. Dec 17. Jan	7. G. R. Spinn	318 California St			
Tyrolense M Co.	Idaho, 1.	15. Oct 23. Nov 30. Dec	28. F. Frankenthal	121 Battery St			
Tallulah M Co.	Calif. Ind., 21.	30. Oct 30. Dec 8. Dec	29. G. A. Hill	634 Mark t St			
Union Con M Co.	Nevada, 34.	25. Nov 3. Nov 24. Dec	7. J. M. Buffington	309 California St			
Utah S M Co.	Nevada, 54.	50. Nov 20. Dec 24. Jan	19. A. H. Fish	399 Montgomery St			

### MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE
Eintracht Gravel M Co.	California.	H. Kunz.	239 Sacramento St.	Annual.	Dec 4
Mexican G M Co.	Nevada.	C. E. Elliott.	304 Montgomery St.	Annual.	Dec 4
Sabine M Co.	Tyson.		619 Kearny St.	Annual.	Nov 26
Tolo M Co.	Tyson.		619 Kearny St.	Annual.	Nov 26

### LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Martin White M Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	30.	Oct 11
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	20.	Sept 30
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Aug 16
Young America M Co.	California.			40.	May 20

### Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING NOV. 4.	WEEK ENDING NOV. 11.	WEEK ENDING NOV. 18.	WEEK ENDING NOV. 24.
Alpha.	.70 .85 .95	1.80 1.75 2.85	1.25 1.75	
Alta.	.75 1.85 1.00	1.10 1.05 2.60	1.40 2.10	
Andes.	.35 .45 .35	.70 .70 1.25	.70 .95	
Argenta.	1.25 1.35	1.40 1.50 3.00	1.35 2.40	
Belcher.	1.45 2.35 2.40	4.30 4.20 6.87	4.55 5.12	
Belding.	.55 .65 .65	1.10 1.00 1.85	.80 1.35	
Bonanza King.	.35 .45 .25	.40 .35 .40	.30 .40	
Bodie.	2.40 2.50 2.30	2.45 2.30 5.00	2.55 3.40	
Benton.	.15 .20 .15	.20 .35 .45	.20 .35	
Bodie Tunnel.	1.35 1.85 1.55	1.70 1.60 2.50	1.65 2.00	
Bulwer.	6.00 8.25 8.75	12.00 11.62 20.	17.8 18	
California.	.25 .35 .55	.65 1.20 .35	.95	
Challenge.	1.45 1.50 1.50	2.00 1.60 6.62	4.40 5.50	
Chollar.	2.30 2.90 2.90	5.4 5.37 7.00	3.00 5.75	
Confidence.	.30 .40 .15	.50 .40 .50	.50 .90	
Con. Imperial.	6.00 8.25 8.75	12.00 11.62 20.	17.8 18	
Con. Virginia.	.10 .10 .10	.10 .10 .10	.10 .20	
Con. Pacific.	1.00 1.25 1.20	1.25 2.50 3.10	2.00 2.50	
Crown Point.	5.00 4.00 4.25	4.25 4.25 4.50		
Eureka.	1.50 1.50 .30	.15 .55 .85		
Eureka Tunnel.	.80 1.50 50	2.00 1.90 5.00	2.65 3.55	
Exchequer.	1.00 1.15 .95	1.80 1.70 3.95	2.25 3.40	
Grand Prize.	1.10 2.25 2.50	2.50 2.50 2.25	2.25	
Gould & Curry.	.20 .25 .25	.05 .35 .35		
Goodshaw.	.65 .70 .65	.70 1.90 .95	1.70	
Hale & Norcross.	1.00 1.15 .95	1.80 1.70 3.95	2.25 3.40	
Holmes.	1.10 2.25 2.50	2.50 2.50 2.25	2.25	
Independence.	.20 .25 .25	.05 .35 .35		
Julia.	.15 .15 .20	.60 .30 .45		
Justice.	.65 .70 .65	.70 1.90 .95	1.70	
Martin White.	2.45 2.50 2.30	3.50 2.30 2.35	2.35 2.65	
Mono.	1.05 1.25 1.40	2.80 2.45 6.35	3.35 4.80	
Mexican.	2.25 .25 .25	2.50 2.50 3.00		
Mt. Diablo.	.95 1.00 .80	.85 .80 .95	.85 .90	
Northern Belle.	5.37 8.50 6.87	8.00 6.75 7.00	6.25 6.87	
Navajo.	1.25 1.30 .30	1.30 1.20 1.20	1.20 1.20	
North Belle Isle.	2.80 4.00 3.50	5.87 10.00 7.50	8.50	
Occidental.	.40 .60 .80	1.20 .60 1.50	.65 1.75	
Ophir.	.80 .85 .90	.90 4.25 3.00	3.60	
Overman.	2.65 2.90 2.70	3.25 2.85 8.25	7.00 8.50	
Pinal Con.	1.10 1.70 1.30	1.70 .15 .38	2.45 3.50	
Sage.	.15 .10 .15	.15 .50 .50	.30	
Seg. Belcher.	.10 .10 .15	.15 .50 .30	.55	
Sierra Nevada.	.10 .10 .15	.15 .50 .30	.55	
Silver Hill.	.10 .10 .15	.15 .50 .30	.55	
Silver King.	.10 .10 .15	.15 .50 .30	.55	
Scorpion.	.10 .10 .15	.15 .50 .30	.55	
Syndicate.	.10 .10 .15	.15 .50 .30	.55	
Toga.	.70 .80 .80	1.50 1.50 3.50	1.90 3.10	
Union Con.	1.05 1.15 1.45	1.80 1.70 4.80	2.00 3.80	
Utah.	1.50 1.70 1.75	2.15 2.40 3.75	2.50 4.00	
Yellow Jacket.	1.50 1.70 1.75	2.15 2.40 3.75	2.50 4.00	

### Sales at San Francisco Stock Exchange.

WEDNESDAY NOV. 24.	1150	Hale & Nor.	3.00@3.10
450 Alta.	2.25	250 Independence.	.35
1500 Andes.	70@80c	290 Justice.	1.10@1.25
250 Alpha.	2.10@2.25	50 Julia.	.50c
210 Argenta.	.15c	100 Lady Wash.	.40c
2140 B. & Belcher.	5.50@6.00	645 Mexican.	4.10@4.40
1170 Bullion.	1.15@1.25	200 Mono.	2.75@2.81
400 Belle Isle.	30@35c	750 N. Belle Is.	6.25@6.37
60 Bodie Con.	3.10@3.20	100 Navajo.	.91@.93
580 Bulwer.	1.70@1.75	530 Ophir.	.91@.93
1500 Benton Con.	.35c	100 Overman.	1.10
500 Belcher.	2.20@2.25	100 Occidental.	1.90@2.00
200 Con. Imperial.	.80c	100 Peerless.	.25c
700 Chollar.	4.40	1540 Potosi.	4.60@4.75
300 Con. Va.	13.75	700 Savage.	6.00@6.75
150 Confidence.	5.50	200 Scorpion.	2.00
200 Crown Point.	2.25@2.30	100 Syndicate.	.20c
250 Challenge.	1.20@1.05	1145 Sierra Nevada.	3.25@3.31
920 Exchequer.	.85@90c	780 Union Con.	2.50@2.60
50 Gould & Curry.	.35	50 Utah.	3.50
50 Grand Pr ze.	.60c	430 Yellow Jacket.	3.30@3.41

### Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

THE project of the Santa Rosa & Benicia R. R. is being pushed with vigor. A meeting in its behalf, held at Santa Rosa on Monday, is reported large and enthusiastic. Forty-five thousand dollars had been subscribed in one week. Other meetings are announced elsewhere.

SMELTING WORKS for reducing ore are to be put up at Lower or Reading Springs, Shasta county.

## List of U. S. Patents for Pacific Coast Inventors.

From the official report of U. S. Patents in Drury & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING NOVEMBER 16, 1886.

- 352,849.—FLOW—John A. Ball, Grass Valley, Cal.
- 352,674.—REIN-GUARD—C. L. Bard, San Buenaventura, Cal.
- 352,675.—VEHICLE SPRING—E. Bowman, Santa Cruz, Cal.
- 352,732.—HYDRAULIC NOZZLE—J. H. Byrne, Nevada City, Cal.
- 352,527.—SIGNAL BUOY—T. Duffy, S. F.
- 352,744.—CAR COUPLING—S. J. Ford, Placerville, Cal.
- 352,685.—JOURNAL BEARING—Frank & Wicks, Pinal, A. T.
- 352,686.—BALING-PRESS—J. L. Gilbert, Lebanon, Ogn.
- 352,825.—STEAM BOILER—C. N. Hitchcock, Stockton, Cal.
- 352,695.—APPARATUS FOR TRANSFERRING LIQUIDS—Kenworthy, Sexton & Thompson, Colton, Cal.
- 352,544.—PROTECTING FRAMEWORK FOR LEVERS, ETC.—J. Kernaghan, S. F.
- 352,761.—CAR AXLE—E. E. Krengle, Buena Vista, Ogn.
- 352,891.—SKIRT-HOLDER AND RACK—F. M. Reynolds, Pinacate, Cal.
- 352,574.—STEAM ROAD-ROLLER—J. Scheerer, S. F.
- 352,578.—ORE CONCENTRATOR—S. W. Shaw, S. F.
- 352,719.—WINDOW-SASH HOLDER—H. W. R. Strong, Oakland, Cal.
- 352,896.—WATER HEATER—Swager & Fercher, Astoria, Or.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible, by mail or telegraphic order. American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

APPARATUS FOR TRANSFERRING LIQUIDS.—J. T. Kenworthy, D. Sexton and Albert Thompson, Colton, San Bernardino county. No. 352,695. Dated Nov. 16, 1886. This is an apparatus for transferring liquids from one receptacle to another. It consists in a bellows provided with inlet and outlet ports and controlling valves, separate passages or tubes connected with the ports and separate pipe or hose connections from said tubes to the liquid in receptacles. The apparatus is mainly intended for racking wines or other liquors.

CAR-COUPLING.—Simeon J. Ford, Placerville. No. 352,744. Dated Nov. 16, 1886. This is one of that class of couplings in which a pivoted gravity-latch sustains the coupling-pin until forced back by the entering link, whereupon it releases the pin, so that it drops through the link, and thus couples the cars. The invention consists in an apertured gravity-latch pivoted in the upper front portion of the drawhead chamber and hanging down at a backward inclination within said chamber, said plate supporting the coupling-pin upon the edge of its aperture and adapted to relieve it when raised by the entering link. It consists, further, in connection with the gravity-latch, of a loose plate above and resting upon the latch-plate, and also apertured for the passage of the pin, said loose plate serving to more effectively clamp or bind the pin by its weight, and also to hold the link horizontal. This makes an automatic coupling.

WINDOW-SASH HOLDER.—Harriet W. R. Strong, Oakland. No. 352,719. Dated Nov. 16, 1886. This consists in opposing plates and an intervening thumb plate for expanding them, whereby they are caused to bind against the adjacent stiles of the two sashes and force said sashes to bind against the inner and outer beads. It further consists in the novel arrangement of the plates, in the construction and shape of the inner one, which is provided with a catch or lip on its lower end for engaging the under side of the meeting rail of the sash, and in an adjustable plate on said lip to secure the main plates to the sash when desired. The main object is to provide a fastening or holder for windows that will lock the two sashes when one or both are open for ventilation and will hold the window in that position. This is easily applied and is wholly independent of the sashes. It may be carried about by the owner when traveling or moving from place to place.

### Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

THE Plymouth quartz mine of Amador county has yielded \$447,547.30 for the nine months of the current year.

### San Francisco Metal Market.

[WHOLESALE.]		WEDSDAY, Nov. 24, 1886.	
ANTIMONY—French Star.....	9 1/2 @	—	—
BORAX—San Bernardino.....	— @	8	—
Armago.....	— @	6 1/2	—
IRON—Glenarnock ton.....	— @	23 00	—
Eglinton, ton.....	— @	22 00	—
American Soft, No. 1, ton.....	23 00	24 00	—
Oregon Pig, ton.....	21 00	23 00	—
Clipper Gap, Nos. 1 & 4.....	22 00	23 50	—
Clay Lane White.....	21 50	@	—
Steel.....	23	@	—
STEEL—English, lb.....	18	25	—
Black Diamond, ordinary sizes.....	10	@	—
Plow.....	4	@	5
Machinery.....	5	@	6
Sanderson Bros.....	10	@	—
COPPER—			
Bolt.....	18 1/2 @	—	—
Sheathing.....	19	@	—
Ingot.....	12	@	13
LEAD—Pig.....	4 75	@	—
Bar.....	5 25 @	5 50	—
Pipe.....	8	@	—
Sheet.....	8	@	—
Shot, discount 10% on 500 bag Drop, # bag.....	1 65	@	—
Buck, # bag.....	1 85	@	—
Chilled, do.....	2 05	@	—
ZINC—German.....	8	@	9
Sheet, 7x3 ft, 7 to 10 lb, less the cask.....	6 1/2	@	—
QUICKSILVER—By the flask.....	38 50	@ 39	30
Flask.....	1 50	@	—
Flasks, old.....	85	@	—
TIN PLATE—Coke.....	5 00	@	—
Charcoal.....	6 50	@	—



## Testing and Working Silver Ores

An illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroechnko's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

Price, post free, \$2.00. Sold by Dewey & Co., Publishers, 252 Market St.

## CALIFORNIA HAND ROCK DRILL,

—FOR—  
TUNNELING, DRIFTING,  
and SINKING.

Buy the best and latest improved Hand Rock Drill; can be run by hand, steam, compressed air, or water power. Machine made entirely of crucible steel; light, compact and durable. Strikes 250 blows per minute with 7-lb. hammer. A perfect reproduction of hand drilling; will drill one inch per minute in the hardest rock, using one-quarter the number of drills required by hand labor.

Machines on exhibition at No. 32 First St., San Francisco.

Send for circulars.

GEO. T. EMERY, General Agent.

L. C. MARSHUTZ.

T. G. CANTRELL.

## NATIONAL IRON WORKS

N. W. Corner Main and Howard Sts., San Francisco,

—MANUFACTURERS OF—

Stationary and Compound Engines, Flour, Sugar, Saw and Quartz Mill Machinery.

AMALGAMATING MACHINES. CASTINGS AND FORGINGS Of Every Description.

ALL WORK TESTED AND GUARANTEED.

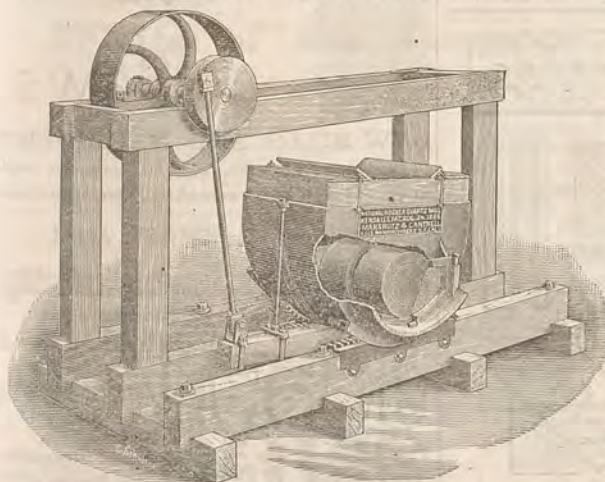
IMPROVED PORTABLE HOISTING ENGINES.

## NATIONAL ROCKER QUARTZ MILL.

KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY, 12 Tons in 24 Hours. 8 H. P.

MARSHUTZ & CANTRELL, Sole Manufacturers.



Send for Circulars and Price List.

MARSHUTZ & CANTRELL.

The Patentee and Manufacturers cordially invite miners to critically examine and pass judgment upon this improved system of milling and amalgamating ores in the following particulars:

1. The cost is less than one-half of stamps of same capacity.
2. The freight to mine is less than one-half of stamps.
3. The cost of erecting is less than one-fourth of stamps.
4. The power to drive it is less than one-half of stamps.
5. The wear is less than one-quarter of stamps.
6. There is no wear except on shoes and dies.
7. In point of amalgamation it is superior to any other machine in use.
8. In its simplicity of construction.

We challenge competition with Stamps, Ball Pulverizers or any other ore crushing machines now before the public.

## Assessment Notices.

**Tallulah Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Sierra Mining District, Humboldt county, Nevada.

NOTICE is hereby given, that at a meeting of the Directors, held on the 30th day of October, 1886, an assessment (No. 21) of thirty cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 634 Market street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 31st day of December, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Wednesday, the 29th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

GEORGE A. HILL, Secretary.  
OFFICE—With Estate of Samuel Hill, 634 Market St., San Francisco, Cal.

**Acme Mill and Mining Company.**—Location of principal place of business, San Francisco, Cal. Location of works, Volcano Mining District, Amador County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 25th day of October, 1886, an assessment (No. 9) of two and one-half cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 29th day of November, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 20th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Sec'y.

OFFICE—Room 4, 309 California St., San Francisco, Cal.

**Aultman Mill and Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Georgetown Mining District, El Dorado County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 26th day of October, 1886, an assessment (No. 3) of two and one-half cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 29th day of November, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 20th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Sec'y.

OFFICE—Room 4, 309 California St., San Francisco, Cal.

**Santa Annita Mill and Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Nevada County, Cal.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 26th day of October, 1886, an assessment (No. 10) of one and one-half cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 29th day of November, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 20th day of December, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Secretary.

OFFICE—Room 4, 309 California St., San Francisco, Cal.

WM. H. TAYLOR, Pres't.

R. S. MOORE, Supt.

L. R. MEAD, Sec'y

## RISDON IRON &amp; LOCOMOTIVE WORKS.

LOCATION OF WORKS:

S. E. Cor. BEALE and HOWARD STS., SAN FRANCISCO.

Manufacturers and Sole Agents for the Pacific Coast for

## HEINE SAFETY WATER TUBE BOILER.

HAS THE FOLLOWING ADVANTAGES:

SAFETY,  
DURABILITY,  
ECONOMY,  
AND

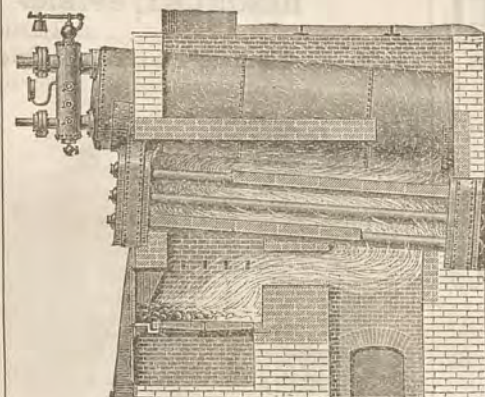
Facility of Inspection and Repairs.

60,000

HORSE POWER NOW IN USE.

Boilers can be seen working in San Francisco at Palace Hotel, Spring Valley Water Works, Hueter Bros. & Co., California Jute Mills, and other places.

GUARANTEED MORE EFFICIENT than any other Boiler made.



HEINE SAFETY WATER TUBE BOILER.

Also Manufacturers and Sole Agents for the Pacific Coast for

## MACBETH'S PATENT PULLEYS.

STEEL RIMS,

WROUGHT IRON ARMS,

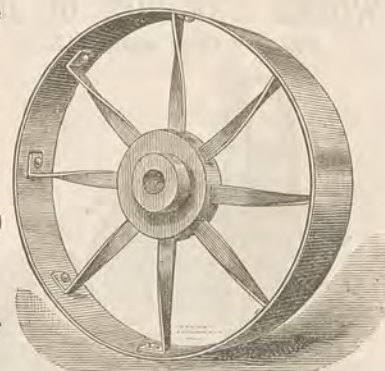
LIGHTEST, STRONGEST AND

BEST PULLEY IN THE MARKET.

HALF THE WEIGHT OF CAST-IRON.

Accurately Balanced.

Cannot be Broken in Transportation.



MACBETH'S PATENT PULLEY.

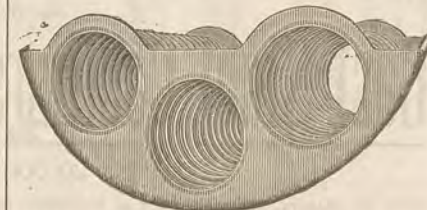
Sole Agents Pacific Coast for

## FOX'S CORRUGATED FURNACE FLUES,

For BOTH LAND & MARINE BOILERS.

Rapidly Replacing Old Style.

Over 10,000 now in use. Have just fitted 12 furnaces in Oceanic S. S. Co.'s Steamer Zealandia. Send for Circular of comparative tests.



FOX'S CORRUGATED BOILER FLUES.

## BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch pipe of 1-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.

Send for Circular and Price Lists.

## Practical Treatise on Hydraulic Mining.

By AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by Dewey & Co., Publishers, 252 Market St., San Francisco.



**RUPTURE!**  
A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort and safety. Gives universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDBER, (Druggist) 701 Market Street, cor. Third, San Francisco.

**HEALD'S BUSINESS COLLEGE,**  
24 Post St. S. F.  
Send for Circular.

## Books on Working Ores.

By GUIDO KUSTEL, M. E.

ROASTING OF GOLD AND SILVER ORES (Second Edition) and the Extraction of their Respective Metals without Quicksilver. By GUIDO KUSTEL, M. E. 1880.

This rare book on the treatment of gold and silver ore without quicksilver is liberally illustrated and crammed full of facts. It gives short and concise descriptions of various processes and apparatus employed in this country and in Europe, and the why and wherefore. It contains 156 pages, embracing illustrations of furnaces, supplements and working apparatus. It is a work of great merit, by an author whose reputation is unsurpassed in his specialty. Price, \$3, coin, postage free. Sold by Dewey & Co., Publishers, 252 Market St., San Francisco, Cal.

By C. H. AARON.

AARON'S LEACHING GOLD AND SILVER ORES, the most complete hand-book on the subject extant; 164 pages octavo. Illustrated by 12 lithographic engravings and four wood cuts. Fully indexed. Plainly written for practical men. In cloth, \$3. Sold by Dewey & Co., S. F.

**DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY** is the oldest established and most successful on the Pacific Coast. No. 252 Market St. Elevator 12 Front St., S. F.



**NOTICE TO  
MINING MEN,  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.**

**Engineers' Tables of Progress**

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, Etc. address:

**INGERSOLL ROCK DRILL CO.,**

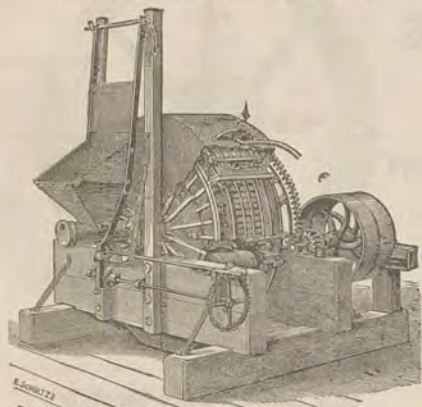
REPRESENTED BY

**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

**Tustin's Pulverizer  
WORKS ORE WET OR DRY**  
FULTON IRON WORKS, S. F.



MANUFACTURED BY  
**HINCKLEY, SPIERS & HAYES,  
MACHINISTS, ATTENTION!**

AN OUTFIT FOR A MACHINIST.

Good Tools, Patterns and an Es-  
tablished Business

FOR SALE AT A BARGAIN,  
If applied for immediately.

Address, B. A. W.,  
Care of this Paper.

**American Exchange Hotel,  
SANSOME STREET.**

Opposite Wells, Fargo & Co.'s Express, one door from  
Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion  
of the city. The traveling public will find this to be the  
most convenient as well as the most comfortable and  
respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50  
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging  
white labor employed. Free Coach to and from  
the Hotel.

MONTGOMERY BROS., Proprietors.



The California  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

**FLOUR AND OTHER MILLS.**

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold  
in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co.  
(Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting  
that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,  
Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded  
to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quanti-  
ties to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**  
316 California St., San Francisco.

## FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure  
or Compound, Stern or Side-wheel En-  
gines.

MINING MACHINERY—Hoisting En-  
gines and Works, Cages, Ore Buckets,  
Ore Cars, Pumping Engines and Pumps,  
Water Buckets, Pump Columns, Air Com-  
pressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for  
Dry or Wet Crushing, Amalgamating  
Pans, Settlers, Furnaces, Rotors, Con-  
centrators, Ore Feeders, Rock Breakers,  
Furnaces for Reducing Ores, Water Jack-  
ets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MA-  
CHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines  
and Boilers, Dredging Machinery, Pow-  
der Mill Machinery, Water Wheels.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

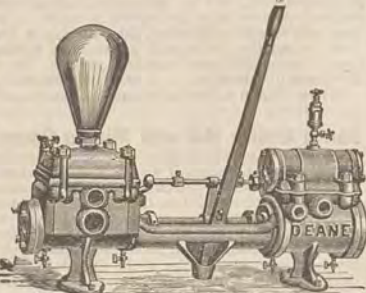
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.

— ALSO —

## HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

## FRASER & CHALMERS.

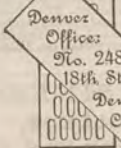


CHICAGO, ILL.  
U. S. A.

General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

PERFORATED METALS FOR  
REVOLVING and SHAKING-SCREENS,

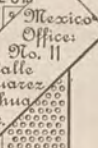
JIGS & STAMP-BATTERIES.



Denver  
Office:  
No. 248  
18th Street,  
Denver,  
Colo.



NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.



Mexico  
Office:  
No. 11  
Calle  
de Duquesne  
de Huachuca  
Mex.

UTAH OFFICE—SALT LAKE CITY, UTAH.

## Iron and Machine Works.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

— BUILDER OF —

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines  
Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. **ESTD ORDERS SOLICITED.**

### UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

Steam Engines, Boilers,

AND ALL KINDS OF

MACHINERY FOR MINING PURPOSES.

Flouring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front St., bet. N & O Sts., Sacramento, Cal.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON

THORNTON THOMPSON

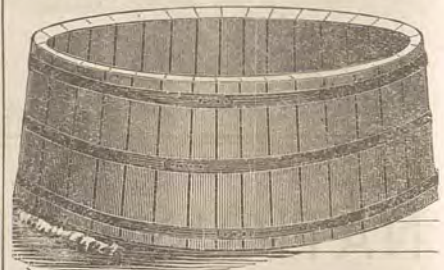
THOMPSON BROTHERS,

**EUREKA FOUNDRY,**

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

## Mining Vats and Tanks.



LEACHING VATS with FALSE BOTTOMS.

PRECIPITATING VATS,

SOLUTION and WATER TANKS

For Mining Purposes.

WELLS, RUSSELL & CO.,

Mechanics' Mills San Francisco.

## N. W. SPAULDING SAW COMPANY



Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

**Saws.**

SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Cata-  
logue. 17 and 19 Fremont St., San Francisco.

RICHARD C. REMMEY, Agent,

Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of  
all kinds of  
Chemical Stoneware

— FOR —  
Manufacturing  
Chemists.

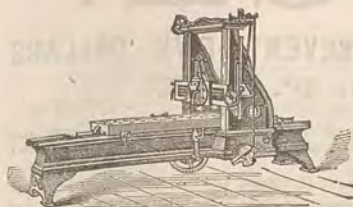
Also Chemicals Brick  
for Glover Tower.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



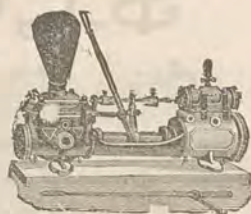
Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

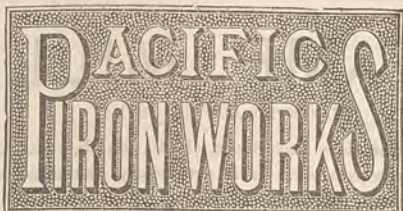
Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.



Knowles Steam Pump  
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.



1850. 1885.  
**RANKIN, BRAYTON & CO.,**  
BUILDERS OF....  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

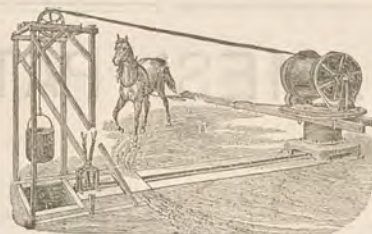
### WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



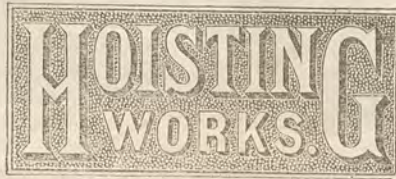
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH of the YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES THE BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



### BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700 pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE of CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



## NOTICE TO GOLD MINERS! SILVER-PLATED AMALGAMATED PLATES For SAVING GOLD!

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER FULL WEIGHT OF SILVER AND BEST QUALITY OF WORK GUARANTEED.

GET OUR PRICES BEFORE ORDERING ELSEWHERE. SAMPLES FURNISHED ON APPLICATION.

**SAN FRANCISCO NOVELTY AND PLATING WORKS,**  
No. 108 FIRST STREET.

NOTICE.—All our plates are guaranteed to have the full weight of silver agreed upon, and are tested before leaving our works, thereby avoiding the complaints about light weight, made so often before we started in this branch of industry.

**JUSTINIAN CAIRE, Agent,**  
521 & 523 Market St., San Francisco,

Assayers' and Mining Material.

BATTERY SCREENS AND WIRE CLOTH.

Agent for HOSKINS' HYDRO-CARBON ASSAY FURNACES.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.  
J. C. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

### STEAM, AIR, AND HYDRAULIC MACHINERY.

**Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

### UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

### THE RUSSELL PROCESS COMP'Y.

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

### San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice  
TUBBS & CO.  
611 and 613 Front St., San Francisco



Chicago Prices Beaten!

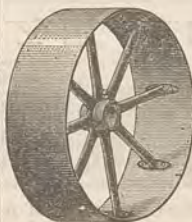
ESTABLISHED 1860.

**S. F. PIONEER SCREEN WORKS,**

221 & 223 First St., cor. Tehama, S. F.

**J. W. QUICK, Prop'r.**

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chases, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).  
Orders Promptly Executed



## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

**CLOT & MEISE,**

Sole Licensed Manufacturers of the

**Medart Patent Wrought Rim Pulley**

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

PAT. OCT. 25, 1881.

**SHAFTING, HANGERS AND APPURTENANCES.**

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 & 131 Fremont Street,

San Francisco, Cal.

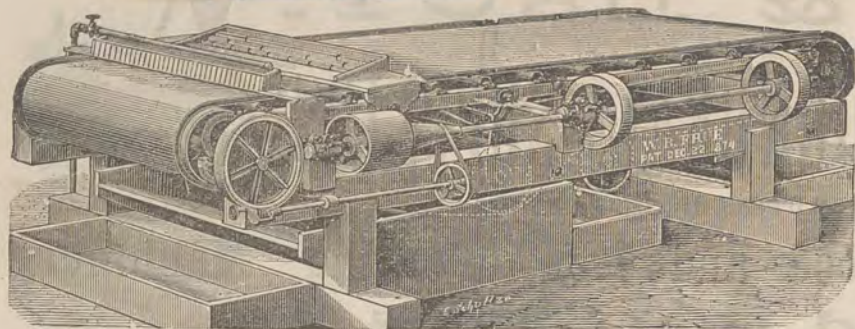
### SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.



**\$1** 1887  
Cooper Union Institute  
January 1 '85  
10744

# CHALLENGE!



**THE FRUE ORE CONCENTRATOR**  
OR VANNING MACHINE.

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS**  
(\$575.00) F. O. B.

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,  
Room 7, No. 109 California Street, SAN FRANCISCO, CAL.

## JAMES' PATENT RECIPROCATING STAMP MILL.

(PATENTED AUG. 16, 1881.)

Weight of Boss and Shoes (1200 pounds) acts on each Shoe separately. It is practically the same as the regular Stamp Mill.

Capacity, 6 Tons in 24 Hours. 4 H. P.

Parties wishing to test the Mill with any ore they may bring, will find one in operation at our works in this city.

### PRICES:

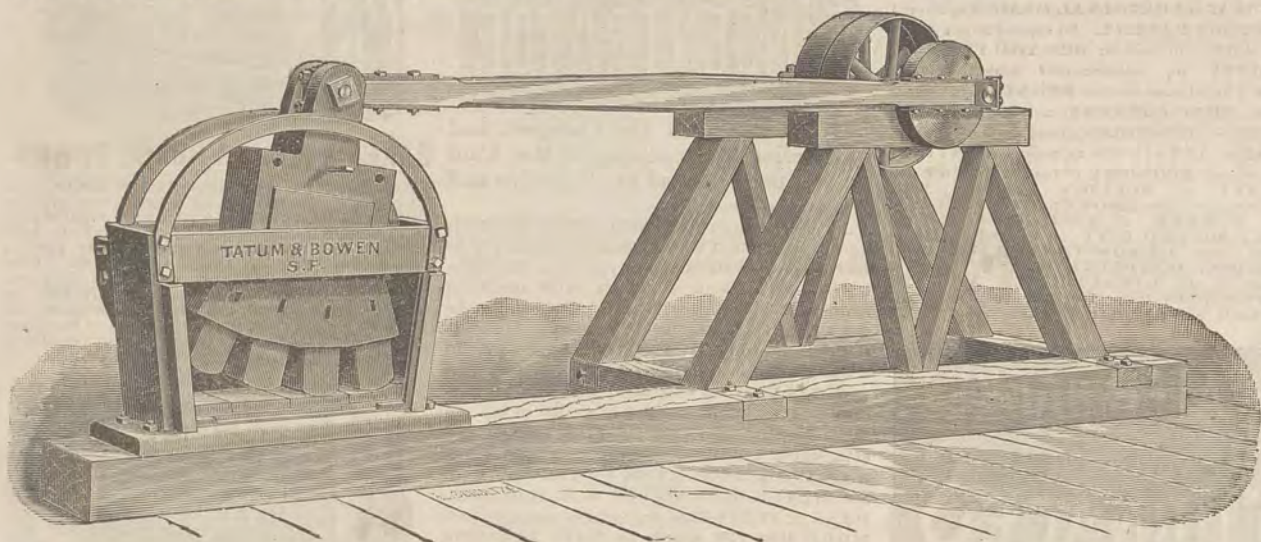
Reciprocating Stamp Mill,	\$350 00
Rock Breaker, - - -	100 00
Automatic Ore Feeder, -	50 00
Single Track Ore Car, - -	40 00

SEND FOR CIRCULAR.

**TATUM & BOWEN,**

34 & 36 Fremont St., San Francisco.

91 & 93 Front St., Portland, Oregon.



## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

**BEST SOFT LAKE SUPERIOR COPPER USED.**

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER AND NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.**

**E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these rock plates cost.



SEND FOR CIRCULAR.

## F. A. HUNTINGTON,

MANUFACTURER OF

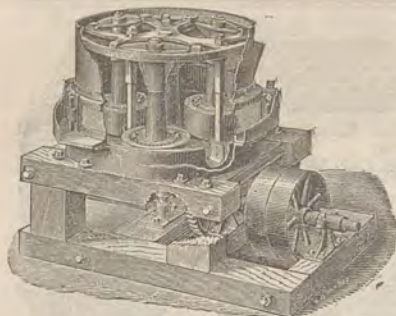
### Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS.

Mining Machinery of Every Description,

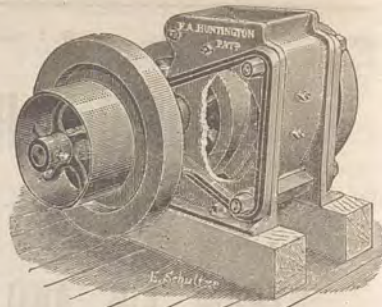
**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



Centrifugal Roller Quartz Mill.



ORE CRUSHER.

NATIONAL ASSURANCE CO.,  
OF IRELAND.

ATLAS ASSURANCE COMPY,  
OF LONDON.

BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.

H. M. NEWHALL & CO.,  
GENERAL AGENTS,  
309 & 311 Sansome St., San Francisco, Cal.

### A CHANCE FOR MINING MEN.

FOR SALE—Assay Office Outfit, cost \$1000, for \$600,  
with practical course in assaying gratis.

C. R. WILSON,

Care P. R. Schmidt, Architect,  
Post St. near Kearny, San Francisco.

## DEWEY & CO.'S

Scientific Press



Patent Agency.

Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

A. T. DEWEY.

W. B. EWER.

GEO. H. STRONG.

## SPENCERIAN STEEL PENS

Are The Best

Established 1860.

**USED BY THE BEST PENMEN**

Noted for Superiority of Metal,

Uniformity, and Durability.

20 Samples for trial, post-paid, 10 Cents.

IVISON, BLAKEMAN, TAYLOR, & CO.,

753 and 755 Broadway, New York.

BACK FILES of the MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$5. Inserted in Dewey's patent binder, 50 cents additional per volume.

**Engraving.** Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, DECEMBER 4, 1886.

VOLUME LIII.  
Number 23.

## Mining at Benton, Mono County.

A Chicago company, which now owns the Silver Bell mine, at Benton, Mono county, is about to do some important work on that mine. The mine is on Blind Spring Hill, three miles east of Benton, between the Kerrick mine and the Little Emily Company's ground, the latter now owned by John B. Farwell and his friends, of Chicago. The Kerrick mine has yielded, it is stated, \$1,500,000. At one place the Silver Bell has a large "blow-out" on the croppings 150 feet wide, caused by a cross winze from the famous Comanche lode, out of which the miners took \$6,000,000.

The last-named lode runs parallel with the Diana and Kerrick lodes, and the Comanche shaft is down 750 feet, running into the Diana and Kerrick lodes, midway in the Silver Bell's ground, which causes the large "blow-out." The Comanche ore is of the same character as the Diana, Kerrick and Silver Bell's, assaying from \$50 to \$1500 per ton. They used to pay \$100 per ton to ship it to San Francisco.

The object of the Silver Bell Mining Company is to run a tunnel in 300 feet under the "blow-out" to tap the lode 300 feet below the croppings. That will save cutting a new wagon road a mile to get to the works, and save 50 cents per ton in transportation of the ore to the railroad or to the mill. The expense of cutting a new road is great, and the saving of 50 cents per ton of the ore for transportation will, it is thought, soon pay for running the tunnel, and the tunnel will save the distance in carting the ore fully one mile. They have ore in several places along the lode on the surface, and this tunnel will take it all out of the high hill to advantage.

The Little Emily (Farwell's mine), of 3000 feet in length, joins on to the north of the Silver Bell, on the same lode as the former mines, and has yielded \$2,000,000. They are taking out ore now two-thirds of the way north of the ground from their south boundary line that joins on to the Silver Bell property. Those mines are 800 feet deep, worked by tunnel and worked cheap, consisting of the same character of ore as the Diana, Kerrick, Comanche and our Silver Bell.

The cost of hauling to railroad is \$3.50 per ton; freight charges to Reno, Nev., \$6 per ton. At Reno the ore can be reduced for \$14 per ton. W. H. Russell is now superintendent of the Little Emily, and it is from a report by him to the secretary of the company in Chicago, Henry Meiselbar, that we glean these points.

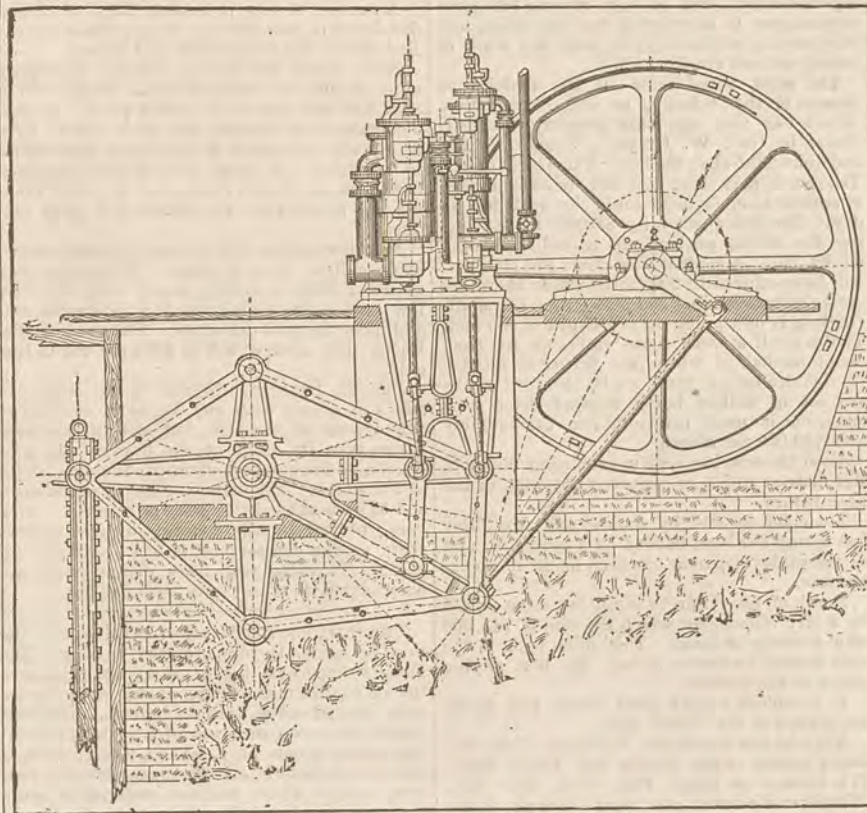
A DISPATCH from Benson, Arizona, says: Several prospectors have arrived in this territory, and are looking around with a view of working some of our valuable mines. Indian trouble being at an end, capitalists are coming here to plant their surplus capital. A large number of cars from Fairbank have reached Benson loaded with ore and concentrators destined to Vallejo Junction, California. Copper matte has passed here from points on the New Mexico & Arizona railroad consigned to Liverpool, England.

The average assays of the ore sent to the mills from the Consolidated California and Virginia mine for the three weeks ending on Nov. 27th were \$36.67, \$44.22 and \$42.17 per ton, respectively. The mills are handling about 2800 tons per week.

## Gold-Saving Appliances.

Mr. Bryan Tyson, formerly of this city but now of Washington, D. C., has improved his gold-saving and concentrating appliances materially since leaving California. When here he took out some \$3000 in gold at claims where it had passed by the approved works of the day, but at that time his invention lacked much of meeting the requirements. He now has ten patents, with six pending at the Patent Department.

Mr. Tyson writes us that he has engaged a body of tailings near Sheridan, Montana, that



UNDER-BEAM COMPOUND PUMPING ENGINE.

aggregate about 15,000 tons. The ore was originally worked by the copper-plate process only. He thinks these tailings will average \$20 per ton in gold, and his combined amalgamator and concentrator will work from 40 to 50 tons per day. It is his opinion that, after paying royalty, a profit of \$75,000 will be made in two years. The plant to work them will cost only about \$2500, on Mr. Tyson's plan, and he is now endeavoring to procure assistance to construct it.

Mr. Tyson places his gold-saving appliances a short distance down the sluice, below the amalgamating plates. The grooved riffles in connection with silvered plates take up but little space and can be readily locked up. The double-acting concentrator is cheaply made and of large capacity.

THE coal discovered last season on Queen Charlotte islands by Robertson and Shields is said to be the best yet found on the Pacific Coast. A seam 18 feet thick has been developed sufficiently to convince the owners that it is practically inexhaustible.

THE Salt Lake Tribune says the finding of coking coal in Colorado has practically stopped the smelting of ores in Omaha.

## Germanium.

Some months ago the discovery of a new element, named Germanium, was announced, a preliminary notice of which has already appeared in the PRESS. The discoverer, Dr. Winkler, has since been able to make a more systematic examination of the subject, and he now describes in detail the preparation and properties of the new element and also of a number of its compounds.

The new element occurs in the recently-discovered mineral, argyrodite.

Its isolation is, however, difficult, especially

## An Under-Beam Compound Pumping Engine.

There are many forms of pumping engines for working on the Cornish pumping system. The single and double-gear engines are very common. The direct-acting engines are also made in a variety of ways, and connect directly to the main bob through which the line of rods actuate the pumps. The engraving on this page shows a direct-acting compound pumping engine, with O'Neill's rotative valve-motion and cut-off. This style of under-beam engine is made by the Union Iron Works of this city.

In this design, the cylinders are placed side by side, on a heavy bed-plate, and to the bottom of this is bolted the guide-plates for the cross-heads. The cross-heads are made of wrought-iron. The steam-chests are cast separate, and bolted to the cylinders. The connecting-rods of each engine are connected directly to one end of the beam. The initial engine, being on the outside, has a longer stroke and greater piston speed than the expansion engine, which is placed nearer the center of the beam. The beam is made of cast-iron, of design shown in engraving, and is securely "tied" together with wrought-iron straps and keys. The angle arm is made forked, to admit of the main connecting-rod working in the center, and on a heavy steel pin placed in the beam, the main pump-rod is attached, as shown. The main connecting-rod connects from the angle arm of the beam to a wrought-iron crank and shaft. On this shaft is placed the fly-wheel. By this arrangement, uniformity of speed and length of stroke are obtained. The valve motion is derived from a shaft running at right angles to the crank-shaft and operated by a miter-gear placed thereon. On this shaft is placed the main and cut-off eccentrics, and they, in turn, by rods, rock-shafts and levers, give the proper motion to the valve-gearing. This engine is fitted with jet condenser, and independent bucket-plunger air-pump. Several sizes of this form of engine are made by the Union Works.

PATENTS FOR MINING CLAIMS.—Secretary Lamar has written a letter to Commissioner Sparks, of the General Land Office, that will reverse the practice of that bureau in issuing patents for mining claims. It has been the practice of the department, in granting patents covering lode mining claims that interfere with townsite claims, to give the surface improvements and betterments to the townsite claimants. In the case of Deffenback vs. Hawk, the Supreme Court decided that the fee simple to the ground was indivisible, and included the surface as well as subterranean possessions. On October 25th Commissioner Sparks addressed a letter to Secretary Lamar stating the practice of the department, citing the decision of the court and asking for instructions. The secretary replies that the decision of the court must be followed and conveyances made accordingly in lode claims, including surface improvements.

THE Sierra County Tribune says: Who dare assert that mining is unprofitable in view of the following figures? Sierra Buttes mine, of Sierra City, has paid to its stockholders dividends of over \$2,475,000 since 1872. The Plumas Eureka has paid over \$1,900,000 in dividends since its purchase by its present owners. Both of these mines are owned by the same company.

W. J. CHAPPELLE, who was in Leadville, Colorado, recently, speaks of it as one of the liveliest places in America, owing to the recent new and immensely rich discovery of extensive deposits of carbonate ores. Its present prosperity exceeds its past.

THE total lead bullion product of the State of Colorado from January 1 to July 1 1886, was about 30,000 tons.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

## Nogales, Arizona.

EDITORS PRESS:—Your mention of my name in connection with the statement that business has not improved here since the capture of Geronimo, or the publication of the statement, was rather unfortunate. My letter was not intended for publication; the "business" spoken of was my own business of assaying, which, to the surprise of everybody, in the month of October actually fell below the average of the preceding year.

Several of our citizens tell me that they note a distinct improvement since the removal of the hostiles; it is certain that many prospectors are out, and a gentleman recently from Hermosillo tells me that city is full of Americans looking for mining investments in Sonora. The prosperity of Sonora means prosperity in Nogales.

My mention of Geronimo was half in jest, as I have more than once proposed, in jest, to petition for his restoration. Far be it from me to disparage the efforts or the success of Gen. Miles and his officers; it is too soon, as yet, to look for complete recovery from the effects of that blighting incubus from which those able soldiers have so effectually relieved us, but recovery will come, is coming, and our gratitude will not be lessened by the fact that many of us at one time doubted the ability of the army to cope with the wily savage on his own ground, with our arms in his hands. I do not write this because I am myself a resident and property-owner in this village; my individual interests are comparatively unimportant, and I do not indulge in the very rose-colored view of our future entertained by some. I write in justice to others, and to correct a false impression, which might be produced by the previously published statement, motives which, I am convinced, will insure a suitable response on your part.

C. H. AARON.

Nogales, Nov. 23, 1886.

## Sierra City Mines.

EDITORS PRESS:—The Bocant quartz mine is situated in Ladies' canyon, one mile south of the famous Primrose, and in the Sierra Batte belt or range. Two men have been doing the work in sinking a prospect shaft on the Bocant for the last month. The lode crops out boldly the entire length of 1500 feet, and prospects fine gold in the mortar all along. The rock in the shaft shows free gold wherever tested, some of the quartz being quite rich, and even the dirt will pay for working in a mill. There is timber in abundance, and water sufficient for a mill of any capacity. This property is owned by D. P. Stewart and others.

The Ilda Bell joins the Bocant on the south, and is owned by D. P. Stewart and Wm. Glidden. This is a well-defined lode for 1200 feet, the full length of the claim. A small shaft is being sunk, the quartz in which prospects well in free gold. The mine has the same advantages for working as those of the other one mentioned. Parties are trying to get a bond on these claims with the view of opening them up to good-paying properties.

E.

Sierra City, Sierra Co., Nov. 26.

A BAD PRACTICE.—One or two experts and several miners have complained of persons said to be in Prescott who make it their business to lie concerning the merits of mining properties which they (the liars) have not the "control" of. A gentleman called at this office Saturday last and told us of an instance where, he said, blackmailers prevented capitalists from investing in mines and working them. He was an operative miner. Yesterday an expert called and astonished us by stating that but for these blackmailers he would now be working a group of mines on the Hassayampa and putting up two mills. He says he has control of good, large gold-bearing veins. Some one, who failed to get his fists in, wrote lying letters about the mines. The investors got scared, and Arizona's development is retarded by the so-called blackmailers, who ought not to be permitted to remain among us and keep those who can do something from doing it.—*Prescott (Arizona) Courier*.

A PRACTICAL LESSON IN METALLURGY.—Says the *Virginia Chronicle* of last Tuesday: The senior class of the Virginia High School, accompanied by Principal Bray, visited the Con. Virginia assay office this afternoon on an invitation of Mr. Frank Fielding, chief assayer. The class witnessed the melting of three bars of bullion, valued at about \$5000 each, and had the process of refining crude bullion carefully explained and illustrated for them—also the process of humid and fire assays. Mr. Fielding also explained to the class the operations of his electrical clock alarm and blow-pipe apparatus. In all of these matters the pupils showed great interest, and no doubt learned more in an hour and a half than they could have learned by study in several days. Mr. Fielding was obliging and courteous throughout, and received the warm thanks of the principal and class for his kindness.

## Fresno County Mines.

## A Rich Mineral Section Long Neglected.

For many years it has been known to a limited number of prospectors that Fresno county contains rich veins of gold-bearing quartz. The miners who have followed their avocation in this county have until late years devoted all their energies to washing the precious metal from the gravel in the beds of the streams, or in the mountain gulches where the winter rains afforded sufficient water for placer mining during a few months of each year.

Placer mining, says the *Fresno Republican*, saw its palmiest days in this county about 20 years ago, although it has since been and is yet carried on to a considerable extent along the San Joaquin and its numerous small tributaries. This branch of mining is almost wholly monopolized by the Chinese at present, however. Lying north of the San Joaquin, and extending through the foothills of the Sierra Nevada Range to the northern line of the county, is a section of country richly studded with veins of gold and silver bearing quartz, some of which have been sufficiently developed to prove their great richness, while others have been found with most promising surface indications, but they are as yet wholly undeveloped. Some mines are being worked extensively and with the best results. Several very lively mining camps are in existence, and new districts are being organized with a frequency that indicates a very heavy influx of miners and prospectors.

About 20 miles north of this city is the Long Gold mining district, in which are situated some of the best developed mines in Fresno county. The Hildreth mine is one of the oldest properties, but on account of the death of the owner it has been shut down for some time. This mine has been bonded by a party of San Francisco capitalists, who have organized with a capital stock of \$10,000,000. John Sevenoaks has been given the responsible position of superintendent, and is now making extensive preparations to thoroughly test the claim, and this proving satisfactory, to push the work of taking out and crushing ore.

The most noted mine in the district at present is the McNally, or Old Abbey mine. About one year ago this property was purchased by Geo. W. Grayson, Joseph Pfeiffer and John McNally, the latter a thorough miner. The price paid was \$23,000, or about one-twentieth as much as it could be sold for today. The firm spent fully \$80,000 in developing the claim, putting up a mill, hoisting works, etc. A shaft is now down 550 feet, and will be continued to 600 feet, while there are cross drifts extending 300 feet from the shaft. Drifting is now going on at a depth of 500 feet. The pay-roll at this mine embraces 54 men, about one-half of whom are practical miners. No definite information can be obtained of the amount of bullion being shipped from this mine, but it must certainly run considerably over \$10,000 per month.

Jesse Morrow has a very promising claim in this district which he expects to develop in the near future.

The claim located by James and McGinley last spring has been bonded by a company, and sufficient development has been made to insure the sale.

North of the Hildreth camp is a mine owned by a Mr. Wilson, for which the sum of \$15,000 was recently refused. This mine will, in the near future, be known among the best paying mines in the county.

F. Knoblock owns a good claim just to the northward of the Wilson mine.

Next in line comes the Mountain View, formerly known as the Harris and Hoxie mine. It is located on upper Fine Gold, near Mrs. Waggoner's hotel, and eight miles above the McNally mine. This mine was worked quite extensively some years ago, but was shut down on account of some disagreement among the owners. In June last, P. B. Donahoo bonded the mine for a sum understood to be between \$25,000 and \$30,000. He associated with him M. J. Donahoo and Thos. R. Brown, and recently Mr. Brown disposed of one-half of his interest to his partner in the hotel business, J. N. Albin. P. B. Donahoo has had personal supervision of the mine, and has kept five or six men at work continuously. His family has been at the mine with him, and from the way in which Pete gave our reporter the slip we are satisfied he has a bonanza. From one of his men we learn that they have a shaft down 150 feet, have a four-foot ledge, and are confident that they have the boss gold mine of the State.

Wm. Robertson owns a claim adjoining the Mountain View mine, which he has bonded to "Bony" Appling.

Next comes the American Flag mine, owned by George Lawson, P. LeBlanc, Tex. Baker and H. Ranscher. The first-named gentleman furnished the means for the latter two to do the prospecting, and the four are now equal partners in what promises to be a mine of more than ordinary richness. They have a shaft down 120 feet, developing a good ledge of ore. The White Rock, or Old Hampton mine, has been bonded from Wash Chapman by Grayson and Pfeiffer. The latter gentlemen have up hoisting works and are taking out some very fine sulphuret ore.

McKenzie and Rule are working the Last Chance mine, one of the best-paying properties in the county. They have a 10-stamp mill which they keep running night and day upon

ore milling about \$60 per ton. A drift has been run in on the ledge nearly 400 feet, no shafting being necessary. The vein of quartz is six feet in width and is rich in free gold.

The Quartz Mountain Mining Company has resumed work after a season of several months' idleness. The main shaft has been freed of water and will be sunk deeper at once, and crosscuts will be driven at different depths for the purpose of learning the extent of the ore body, which appears to be a massive body instead of a well-defined vein. French capitalists are working this mine, and have the most extensive plant of any company now operating in this section.

Adjoining the Last Chance is the Nat Harbert mine, which the McDonald Brothers have bonded and are developing with satisfactory results.

In Coarse Gold district the Texas Flat mine is now being worked extensively. Geo. Hearst and J. B. Haggin bought this mine some months ago and are developing it regardless of expense. They will never lose any money upon their investment, however.

Lang's mine is next in line, and is worthy of special mention. Lang & McClellan have a five-stamp mill running on ore taken from this mine, which, in addition to carrying free gold in amounts ranging from \$20 to \$40 per ton, also yields sulphurets worth from \$400 to \$600 per ton.

P. B. Donahoo and Thos. R. Brown have a claim adjoining the Lang mine which they have partially prospected.

The Butterfly mine lies further to the northwest, and is good property. It is under bond to A. W. Poole, ex-United States Marshal for California.

The McDonald mine, recently sold to Col. Ewing for \$60,000, comes next. Systematic work is going on here with paying results. The mine is equipped with a 10-stamp mill, hoisting works, etc., complete.

Near the McDonald mine is the Gambetta, also equipped with a quartz mill, etc.

A number of very promising claims are being developed in this vicinity, among which are the Red Rover, the King Gulch and others.

Next comes the famous Fresno Enterprise mine, which once changed hands for the sum of \$250,000, and was cheap at that price. Several moderate-sized fortunes have been taken from it already, and there is yet a very large future to hear from. A large force is now employed here, and the Fresno Enterprise is nobly keeping up its old time reputation as a gold producer.

Near here is also the Lucky Bill mine, owned by Oxendine, Crane & Baker. Whenever they desire a little spending money they dig out a few tons of ore, haul it to the Enterprise mill and have the gold extracted. The ore from the Lucky Bill mills at \$80 to \$100 per ton in free gold.

The Mt. Raymond district is too remote to admit of a visit with any degree of comfort at this season of the year, but will in the near future take its place at the head of the procession as the greatest silver-producing district of the world. The metal is there in abundance, and as soon as the little game of freeze-out, now being played by the wealthy owners against their poorer companions, is over, activity will begin. To those who have claims there we only advise them to "stay with the pot."

THE OUTLOOK FOR MINING.—We believe the tide is again turning toward mining. The Eastern papers no longer make stale jokes to the effect that men offering mining property are being kicked out of business houses. Railroad stocks have not paid much of late; in the farming regions people only make a living; there is much depression in all the manufacturing centers, except where railroad material is being prepared, and through all, men see the steady flow of bullion from the West and begin to realize that there must be something to mining, after all. Then, too, all the Eastern men who have bought mining properties legitimately; who have used the same care and taken the same precautions that men do in making ordinary investments, have done well—better than their neighbors have, who have clung to the usual channels of business; while some who have invested merely as a lark or gamble have made more money in 18 months than they had before through 40 years of patient exertion. Their neighbors, who were too cautious to invest, feel in their hearts a little self-reproach which they would fain satisfy by finding something to invest in which held a promise of a reward behind it. There never were so many men making inquiries for mines as there are right now. And never were there so many men anxious for developed properties. This ought to be a hint to miners. If they have not money to erect machinery, and if their ores are not of a kind or are not in the right place to dispose of to advantage, they ought to develop them with all their might and have them ready for inspection when experts come around.—*Salt Lake Tribune*.

CAOUTCHOUC FROM A EUROPEAN HERB.—According to the *Bulletin de la Société Chimique de Paris*, a plant belonging to the lettuce tribe, scientifically known as *Soachus oleraceus*, and quite common on the wayside and among dry rubbish heaps in France, has been found to yield a very good quality of caoutchouc. The plants are steeped in carbon bisulphide, and afterward boiled in alcohol and caustic potash. About 4.3 per cent of the weight is thus obtained as caoutchouc.

## The Minting of Gold and Silver.\*

NUMBER 4.

[By ALBERT WILLIAMS, JR.]

## Assayer's Department, Carson Mint.

The assayer's department is on the second floor, at the south end of the main building, and extends from the front to the rear. It comprises five rooms—office, laboratory, fire-assay room, volumetric test-room, and charcoal store-room. The force consists of the assayer, assistant assayer, humid assayer, cupeller and dissolver, and clerk.

Assay scales.—Two fine Oertling balances, costing \$350 each, are in use. The working delicacy of these scales is 1-20 milligram, but by subdividing the beam-rider spaces a delicacy of 1-40 milligram is attainable.

Sampling.—The system of sampling the bullion in the deposit-melting room has already been described. In sampling the assay bars of mint-fine metal from the ingot-melting room, the practice is as follows: For gold, one inside chip, averaging 0.35 ounce in weight, is taken from each of the 10-ounce top and bottom assay bars (which have been stamped "1" and "2" respectively); for silver, one inside chip, averaging also 0.35 ounce, is taken from each 6 or 8-ounce assay bar.

System of assaying.—It is hardly necessary for the purposes of this chapter to enter into details familiar to most readers. The fire assay is used: a, in testing purchases and deposits; b, mint-fine gold; c, standard gold ingots; and occasionally, d, as a check upon the humid or volumetric method. The volumetric system of Gay-Lussac (precipitation by normal solution of sodium chloride) is employed with (a) mint-fine silver and (b) standard silver ingots. As applied at the Carson mint, the humid method gives 1-10 of 0.001 in fineness, and the assayer's reports are in tenths of thousandths. The readings in the volumetric test-room are compared against a black screen, which is hung in front of the window.

Apparatus and machines.—The assay plant includes: A muffle furnace in the fire-assay room. It has a soapstone front and three muffle doors. An ore-assay furnace in the same room, 13 by 13 inches, and similar to the small furnace in the deposit-melting room. This furnace holds six assay crucibles. Sand bath in the same room. A condensing apparatus, consisting of a steam-coil condenser, having a capacity of 100 gallons in eight hours. As before stated, the water supplied to the mint is very pure, being from mountain streams. It contains hardly a trace of chlorine, but has a little lime, and for ordinary purposes does not need to be distilled. The main use of the condenser is to supply water for the humid assay of silver. Two pairs of small power rolls made of chilled cast steel, one of which is used in rolling assay lead and the other for gold and silver. These are alike, and are 2½ inches in diameter and 4 inches face. A shaking machine for agitating the precipitating bottles used in the humid assay. It holds 12 precipitating bottles. The vibrations are vertical and extend 2½ inches, and the speed is 240 strokes per minute. This machine is driven by a rawhide band from a 4-horse power engine.

## Miscellaneous.

Motive Power.—Boilers.—The boiler-room is on the ground floor of the extension, in the rear of the main building. There are two horizontal, plain flue boilers, each 16 feet long and 54 inches in diameter, and having 52 flues 3½ inches in diameter. The total grate area is 38 square feet, the grate being 9 feet 6 inches across the front of the pair of boilers and 4 feet deep. The grate bars are 8 inches wide, 4 feet long, and three-quarters of an inch thick, and are stiffened with vertical ribs 6 inches deep. The bars run lengthwise with the boilers, and are perforated with holes half an inch square at the top and five-eighths of an inch square at the under surface, these openings being arranged in rows of three lines of holes half an inch apart and 2 inches between each set of three lines. The fuel is yellow pine, in 4-foot sticks, and the consumption of wood is 1½ cords per eight-hour shift. Feed-water is supplied at 180° F. The pressure averages 70 pounds. Steam is sent from these boilers to the main engine and the small engine and condensing apparatus in the assay department, and is also used in the refinery for heating the precipitating vats in the whitening and annealing rooms and for various purposes.

Engines.—The main engine is of the Gardiner slide-valve type. The cylinder is 14 inches in diameter, with 36-inch stroke. The speed is 52 strokes per minute when the presses are running, and 54 with the rolls alone. The working horse-power ranges from 45 to 75, according to the number of machines driven. The fly-wheel is 12 feet in diameter, and is in eight sections. The rim is 8 inches deep and 3½ inches wide; its total weight is 5206 pounds. The main shaft is 8 inches diameter and 8 feet long; the driving pulley 8 feet diameter and 16 inches face. The main driving belt is known as a "75-horse power." There are 14 principal counter-shafts. The small vertical engine in the assay department has a 4x8-inch cylinder, and is rated at 4 horse-power. It drives two pairs of assay rolls and the shaking machine used in

\*From the census report on the "Statistics and Technology of the Precious Metals," by S. F. Emmons and G. F. Becker, special agents. The description of the mints and the processes applies to the year 1881, at which time the mints were examined.



the humid test, and runs from three to seven hours per day.

**Loss of precious metals—Flue-dust.**—The main stack of the mint is of common brick, 80 feet high, and has a single plain flue, which is circular in cross-section and 4 feet diameter. The addition of dust-chambers would effect a saving which would undoubtedly cover their expense. At the foot of the stack is a man-way, for access in cleaning, provided with an iron door. It has been the custom to clean out the flue at the close of each fiscal year. In 1880 no such cleanup was made, as the mint had been executing comparatively little work. The stack cleanup in June, 1879, produced 2 ounces of fine gold and 80 ounces of fine silver. This was less than the average for the preceding years. The amount of gold and silver which actually escapes through the stack cannot be accurately determined.

**Loss in melting and refining.**—The greater part of the total loss occurs in these operations. Each particle of metal is melted at least three times, exclusive of the clippings, which undergo a constant cycle of manipulations, so that it is possible to conceive of certain particles being remelted indefinitely. At each melting there is a small loss by volatilization, which it is endeavored to avoid by covering the surface of the melt with powdered charcoal. The legal tolerance of wastage is  $1\frac{1}{2}$  ounces of silver in every 1000 ounces of fine metal treated and 1 ounce of gold in each 1000 ounces of fine gold handled. The actual loss in the melter and refiner's department, as compared with the legal allowance on the quantity of bullion refined, is shown in the following table, from which it appears that the working results have been kept well within the authorized limits:

LOSSES OF GOLD AND SILVER IN MELTING AND REFINING AT THE CARSON MINT.

PERIOD.	GOLD.		SILVER.	
	Legal tolerance.	Actual loss.	Legal tolerance.	Actual loss.
	Ozs.	Ozs.	Ozs.	Ozs.
Fiscal year ending June 30, 1878.....	90	18	6000	700
Fiscal year ending June 30, 1879.....	39	33	4500	830
Fiscal year ending June 30, 1880.....	35	6	1304	135

The total wastage during the fiscal year ending June 30, 1880, at this mint was as follows:

Melter and refiner's gold wastage.....	\$124 50
Coiner's gold wastage.....	45 51
Melter and refiner's silver wastage.....	157 47
Coiner's silver wastage.....	149 13
Total.....	\$476 66

#### Tempering Dies and Collars.

The dies and collars of the coining presses require a high temper, which is attained in this mint by careful heating in a special furnace and instantaneous cooling in an apparatus of peculiar construction. The furnace has a cast-iron shell lined with fire-brick, is 24 by 20 inches, and has a grate area 15 inches square. The fuel is nut-pine charcoal. Four dies or collars are heated simultaneously, the length of exposure being one hour. The quenching vat is made of 3-16 inch wrought iron, is 26½ inches long, 18 inches wide and 18 inches deep, and has a close-fitting hinged iron cover. The dies or collars are not immersed directly in water, but are placed in a brass holder, through which, after the article to be tempered has been clamped in place, a powerful stream of cold water is passed. These holders are of two sizes, one for quenching dies and a larger size for collars. They are made in two parts, with a screw-clamp for securing the die or collar, and are provided with a screw socket, which fits upon the threaded head of a water pipe. The mode of application is as follows: The heated die or collar having been clamped in the machine, the latter is screwed upon the pipe and the lid of the vat is closed, these operations being performed in a moment. The stream is then turned on and plays upon the face of the die or collar, rapidly and uniformly chilling the steel by the constant impact of fresh portions of the water. The pipe is two and one-half inches in diameter, and the head is 100 pounds per square inch. The water is allowed to run three minutes, at the expiration of which time the holder is unscrewed and the tempered die or collar is removed and dried.

#### Dressing the Rolls.

The grinding-room is in the front part of the basement. Here the rolls are ground true when their faces have become irregularly worn. This is done by means of a grinding lathe, which has a solid emery wheel 22 inches in diameter and 1½ inches face and runs at a speed of 800 revolutions per minute. The machine requires 8-horse power. A very light pressure is used. The dressing was formerly done by a grindstone, which gave equally good results, but worked very slowly. The emery wheel accomplishes, in one and a half hours, work which requires 24 hours if done by a common grindstone.

#### Chill Mills.

The mint contains two Chill mills. Of these the smaller is used by the deposit melter in grinding iron slags, broken crucibles, etc. The larger, in the sweeps room, is used to grind all the miscellaneous savings containing gold and silver, including furnace clinkers, the worn-out melting pots, and similar matter. The deposit melter's mill is in an alcove of the basement near the center of the main building. The two cast-iron grinding rollers are 18 inches in diameter and 6½ inches face. The pan is also of cast

iron, and is 28½ inches in diameter, with a rim 4 inches high. The rim is 1 inch thick at the bottom and half an inch thick at the top. The die is 1½ inches thick. The pan makes 23 or 24 revolutions per minute, and requires about 3-horse power. The larger mill is of the same pattern. Its rollers are 28 inches in diameter and 12 inches face. The pan is 4 feet 5 inches in diameter, and has a 6-inch rim, which is seven-eighths of an inch thick at the top and 1 inch thick at the bottom. The die is two inches thick. The speed is 20 revolutions per minute, requiring 12-horse power. The ground sweepings are sifted through a No. 60 screen and carefully mixed and sampled. The melter and refiner is credited with the assay value of the savings. The latter average \$200 per ton, and are sold to the Sacramento or Salt Lake smelters.

#### Scales.

Four pairs of Troemner bullion scales are in use—one in the weighing-room, where the crude bullion is received, having a capacity of 6000 ounces; one pair in the cashier's office; one in the melter and refiner's office, and one in the coiner's office—each of which has a capacity of 2000 ounces. Besides the two Oertling assay balances already mentioned there are in the mint 13 small balances, nine in the adjusting-rooms, and one each in the rolling-room, cutting-room; melter and refiner's office, and coiner's office.

#### Elevator.

An elevator runs from the floor of the basement to the second story, and is operated by a worm and screw on a counter-shaft from the line-shaft. The capacity is one ton, the heaviest load being the sulphuric acid tank, which, when full, weighs 1900 pounds.

#### PERSONNEL OF THE CARSON MINT, JUNE 30, 1880.

General department, officers, clerks and assistants.....	32
Assayer's department, officers, clerks and assistants.....	5
Melter and refiner's department, officer, clerk and assistants (three refiners included).....	9
Coiner's department, officer, clerk and assistant (nine lady adjusters included).....	20
Total.....	66

#### United States Mint at San Francisco, Cal.

This mint was visited and reported upon in May, 1881. During the fiscal year ending June 30, 1880, nearly corresponding to the census year, it had coined 10,194,950 pieces, of a value of \$36,053,000, running only one shift of eight hours per day. The chief work had been on double-eagles and silver dollars, the value of the former having been \$19,216,000, and of the latter \$7,910,000. The earnings, including seigniorage on standard dollars, were \$1,129,448.74, and the expenses \$502,578.67. The total force employed was 257. The San Francisco mint is of large capacity, and is equipped in the very best manner.

#### Melter and Refiner's Department.

**Refinery.**—The refinery includes the corroding-room, the press-room, the reducing-room, and the laboratory, and forms an L on the second floor. The regular force consists of 13 men, but had been increased to 19 at the time of the examination, owing to the change in process.

**The nitric-acid process.**—At the time of the examination of this mint, the apparatus for the nitric-acid process was being replaced by plant for treatment by the sulphuric acid process. As the former method is being universally supplanted by the better and more economical process of parting by sulphuric acid, a record of the practice at this mint may be of interest.

**Dissolving.**—The bullion was dissolved in white stoneware jars imported from Germany, of which 40 were in stock, 37 having a capacity of 25 gallons and three holding 18 gallons each. The charge of crude granulated metal averaged 100 pounds per jar, and the quantity of acid added averaged 200 pounds, varying, however, with the quality of the bullion. If the bullion contained much coppery base metal, more acid was required. The strength of the acid was 35° Baume. The jars were placed on the floors of wooden inclosures, called corroding-houses, which were filled with boiling water to a depth of 8 inches. Heat was supplied by live steam from the engine boilers through a coil of iron and copper pipes. There were four of these corroding-houses, two having space for 24 dissolving jars each, and two holding 12 jars each. The boiling required on an average six hours, though sometimes it was continued for seven hours. At the end of this period the jars were filled with distilled water and allowed to settle over night. The next morning the liquid was siphoned off, and the jars were removed from the bath and emptied of the gold, which was washed and filtered. The gold was then boiled with sulphuric acid of 62° Baume in iron kettles, washed, pressed in cloth, and dried.

**Precipitating.**—The acid solution of silver and other nitrates were placed in a precipitating tub and the silver thrown down as chloride by the addition of a strong solution of sodium chloride. The precipitating tubs, of which there were two, were of wood, ten feet in diameter and six feet deep, holding about 5000 gallons each, and had wooden false bottoms. They were provided with revolving stirrers, and resembled very closely the agitator of a silver mill. After two hours, the liquid was drawn off through faucets and filtered. The precipitated chloride of silver was washed in hot undistilled water for 18 hours or more until freed from all acid, the hot water removing also the small amount of lead present.

**Reducing.**—The clean chloride was then

placed in vats and reduced by granulated zinc. There were six of these reducing vats, each holding 6000 ounces of chloride. They were rectangular, wooden, and lined with sheet lead. The chloride was first charged into the vats, then the zinc, and water (undistilled) was added. The proportion of zinc to chloride averaged 2435 ounces of the former to 6000 ounces of the latter. The charge was stirred with wooden paddles. About six hours were occupied in reduction, or seven hours including the time required for charging, washing and changing. The zinc salt formed was a waste product, and allowed for in fixing the refining charge. The metallic silver was washed from 2½ to 3 hours with undistilled hot water in wooden filtering vats lined with lead about 3 feet in diameter. Seven of these vats were in use. The clean silver was formed into cakes by hydraulic pressure, and dried. The press was driven by a 10-horse power engine, and exerted a pressure of 40 tons. It had been in use since 1855. Nine of the pressed cakes gave 3600 ounces in bars. The drying furnace had a capacity for 120 silver cakes. The fuel was redwood, and the heat was maintained at a cherry red. The operation of drying could be finished in six hours, but it was the practice to do the drying over night. The subsequent manipulations were the same as now performed. The dried cakes were melted into mint-fine bars and turned into the melter and refiner's office, the customary sampling and assaying being done by assay bars.

**The sulphuric acid process.**—The first kettle charge by this process was made April 19, 1881. The method followed is in general the same as that already detailed in the description of the Carson mint, with, however, the following exceptions: The fire under the parting kettles is started with charcoal and coke and then fed with anthracite. The bullion is charged in the form of granulations, not in shoe-bars. This practice was adopted to avoid dispute with the patentee of a process for parting bars without granulation. The usual charge weighs 4500 ounces, but if the bullion is of good quality the kettle will safely hold 6000 ounces. The proportion of acid used is from three to four pounds per pound of bullion, according to the quality of the latter. If the bullion is very coppery, it requires correspondingly more acid, but in such cases a weaker acid than 62° is used. The first boiling occupies from five to six hours, and the charge is cooled and settled in two hours or is left over night in the kettle, according to the quality of the metal. In discharging the kettles the solution is siphoned off first, the gold being pushed to one side, to allow room for the siphon pipe. This plan has the advantage over that of first ladling out a part of the gold, as it does not subject the operator to the same exposure to the acid fumes. There are four 20-inch furnaces and four cast-iron kettles for reboiling the parted gold. Each kettle is 33 inches in width at the top and 14½ inches deep, and holds 15 gallons. Gold parted by nitric acid requires six or seven hours' reboiling, but that parted by sulphuric acid requires only two hours. The filtering tubs for gold are of wood, each 26 inches in diameter and 23½ inches deep, holding 25 gallons. One small porcelain jar is also used. The straining material is 10-4 unbleached muslin in three qualities. Drilling and blankets are also used. Three and sometimes as many as five charges of acid are generally made; washing is occasionally repeated 10 or 12 times. The sweetened gold is at this mint dried in a furnace, just as is the silver cake before melting. There are two large precipitating vats for the silver-sulphate solution. These have inclined top doors. The proper strength of the solution is reported at 18° Baume. Precipitation is completed in two days of eight hours' heating each. The copper is used in slabs 24 inches long, 10 inches wide, and 1½ inches thick, disposed upon the bottom and upright along the sides of the vats. The charge of copper is 3000 pounds. The precipitated silver is filtered, washed, pressed, and dried as usual. The bluestone formed is crystallized and recrystallized, and is sold in the San Francisco market. The floors of the press-room and the laboratory are covered with sheet-lead, and the other rooms of the refinery are floored with asphalt.

[TO BE CONTINUED.]

**CONVERTING OLD SHIPS INTO COAL BARGES.** The Boston Tow-Boat Company have recently been buying up old ships and converting them into coal barges. After these ships have their spars taken out they have their cabins turned into carrying capacity, and all the houses are built above the decks, thus enabling them to carry from 2000 to 3000 tons of coal each—more than three times as much as the ordinary coasting schooner can carry. The barges are towed to and from Philadelphia by tugboats owned in Boston by the owners of the barges. This undertaking has proved a success and is greatly interfering with the coasting schooners, for the barges are able to carry the coal at much lower rates.

**EMIGRATION TO CANADA.**—Notwithstanding the effort to boom Canada through her recently completed continental railroad, statistics show that emigration thither is falling off. The railway is probably less seductive than had been hoped.

**THE Big Bottom Mill Company** has commenced work on a private railroad from Guerneville to its mill. The road will be about three miles in length.

#### Zinc Works in Colorado.

The following letter from R. O. Old, which appears in the *Georgetown Courier*, shows that steps are being taken to erect zinc works in Colorado:

GEORGETOWN, COLO., Nov. 8, 1886.

**Prof. E. E. Burlingame, Denver, Colo.**—MY DEAR SIR: Your favor of the 4th inst. to hand. I am glad to know the Chamber of Commerce, of Denver, is moving in the matter of securing the erection of zinc works in that city, and hope no effort or influence will be wanting that, at this time, would be likely to result in their firm establishment, not only for the benefit of Denver, but for the sake of the advantage they would be in creating a market for a hitherto large non-valuable product of our mines.

You desire me to answer certain interrogatories. This I will do to the extent I am able. 1st. As to locality of mines capable of producing large amounts of zinc ore (assaying high in zinc), their nearness to railroad, and distance from Denver.

**Answer.**—If all the zinc ores (blende and calamine) of our mines (I mean of our county of Clear creek) were utilized, that go over the dumps (all the dumps, for instance, of my Mendota mine and Victoria tunnel), or are left unbroken (though exposed) in the same, because of its non-value for lack of a market, I believe the output of 100 tons per day might for a certainty be depended upon. I could supply myself readily 10 or 12 tons per day even now, and, with the inducement of a market, 20 tons.

As you are aware, there are but few of our mines in Clear creek that are not conveniently near to the numerous depots of the Colorado Central branch of the U. P. R. R. With regard to myself (as with some other mine-owners and companies) the U. P. Co. have given me a "siding," that I have built a trestle out to, over which I tram from my V. T., and dump direct into the cars of the same.

Our distances by railway from Denver vary for our different districts from 35 to 60 miles, and the freight (which is much too high) from \$3 to \$5 per ton. It should not be but from \$2 to \$4.

2d. Probable cost of mining per ton.

**Answer.**—The extra expenditure of time necessary to prepare our zinc ores for market, they being already mined, or are ready to be mined (where exposed in our workings) would vary from \$3 to \$6 per ton.

3d. Percentage of metallic zinc.

**Answer.**—The per cent of metal in our zinc ores would vary (where mined and dressed for market) from 40 to about 65 per cent. In many of our ordinary "dry ores," as sold for their silver (and sometimes both for silver and gold), the per cent of zinc will run from 2 or 3 to 43 per cent; and in our ordinary galena ores, as sold, the amount of metallic zinc will vary from almost nothing to sometimes 30 per cent. All jig screenings of zinc in the concentrating mills of our county are thrown away, that perhaps might be thought would assay 30 to 50 per cent of metal.

4th. Value per ton of our zinc ores in gold and silver.

**Answer.**—All of our ores, whatever their per cent of metallic zinc, assay silver, and sometimes gold, but not so frequently the latter as the former. I am referring only to our Clear Creek county ores. In fact ours is an argentiferous zinc ore, whether blende or calamine, and runs from a few ounces to hundreds of ounces of silver per ton. But the ores thrown over the dumps (for instance over all of my dumps) carry from 8 to 20 ounces silver per ton, averaging, perhaps, 15 or 16 ounces.

5th. The percentage of iron, lead and copper carried in our zinc ores.

**Answer.**—In what would become an ordinary zinc ore, if dressed for market, there would sometimes be carried a little lead—2 to 10 per cent, with no appreciable amount of copper (again I would say I am only speaking of the ores of our county), while of iron—sulphide of iron—there would often be a considerable amount, say sometimes, in poorer zinc ores, as high as 25 to 35 per cent.

**THE PATAGONIA GOLD FIELDS.**—Messrs. Frank Jordan and S. W. Bell are in receipt of a letter from E. L. Baker, U. S. Consul at Buenos Ayres, giving information about the recently discovered gold fields of Lower Patagonia. Very little had been accomplished at the new diggings for the reason that the Government placed a military guard over the coveted land and had driven out all who were working. Subsequently, however, several thousand claims were disposed of to about 200 different persons, but it is said that two parties, Messrs. Nield & Co. and Lezama & Co., own the best ground. As to the value of the gold fields, there was a diversity of opinion, some claiming that the reports were greatly exaggerated, and that persons who go there will be disappointed. The diggings are located at the extreme southeastern point of Patagonia, the new boundary line between the Argentine Republic and Chili running through them. The locality is inaccessible, the best route being by Liverpool and Pacific steamer to Sandy Point, thence by trail 150 miles to Cape Virgenes. Mr. Baker says: "I would not advise any one to go there yet. Indeed, if it proves that there is gold at Cape Virgenes it must be washings from the Andes mountains, and that still farther inward it must be discovered in larger quantities." Parties are prospecting the gulches nearer to the mountains.—*Ex.*





A. T. DEWEY. W. B. EWER.  
DEWEY & CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

#### Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrearages must be paid for at the rate of \$3.50 per annum.

#### Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.  
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

#### SAN FRANCISCO:

Saturday Morning, Dec. 4, 1886.

#### TABLE OF CONTENTS.

**ILLUSTRATIONS.**—Under-Beam Compound Pumping Engine, 357. Method of Setting Retorts for Gold Amalgam, 361.

**EDITORIALS.**—An Under-Beam Compound Pumping Engine; Germanium; Gold-Saving Appliances; Mining at Benton, Mono county, 357. Suggestions for the Use of the Prospector and Miner; Foundry Notes; Mining Metallurgy and Geology at the University, 360. The New Cruisers; The Late J. S. Phillips; Literary Work of University Professors; Retorting Gold Amalgam, 361.

**CORRESPONDENCE.**—Nogales, Arizona; Sierra City Mines, 358.

**MECHANICAL PROGRESS.**—The Compound Steam Engine; Hardening Steel; Improvements in Glass Manufacture; Mirrors of American Manufacture; Rivaling Imported Ones; The Light from Coal, 362.

**SCIENTIFIC PROGRESS.**—A Practical Use for Leidenfrost's Drops; The New System of Conducting Electricity; Some Remarkable Experiments; Conductivity of Rosins; The Fluid Origin of Natural Gas; Electricity in Medical Practice; Another New Element; To Detect Alcohol, 362.

**USEFUL INFORMATION.**—Blades of Pocket Knives; Clay as a Water-proofing Material; Life of Cast-iron Pipes; A New Soap; Manufacture of Celluloid; Hats from Wood-pulp; Iron in Railway Construction; An Elastic Mucilage; Mixture for Cleaning Grease Spots, 363.

**GOOD HEALTH.**—Smoking and Heart Disease; The Secret of Scarlet Fever; Loss of Memory; A New Anesthetic; Overstudy; Shade Trees Cause Sickness; A New Disinfecting Compound, 363.

**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 364-65.

**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 368.

#### Business Announcements.

Rock Breakers—Savage, Son & Co.  
Station Indicator—G. A. Bade, Austin, Nev.  
Artificial Limbs—Merzo Spring.  
Gold Mining Property for Sale—D.  
Dividend Notice—Paradise Valley Mining Co.  
Delinquent Notice—Aultman Mill & Mining Co.  
Delinquent Notice—Santa Anita M. & M. Co.  
Delinquent Notice—Acme Mill & Mining Co.  
Mining Engineer—Ross E. Browne.  
Rubber Goods—James F. Hough.

See Advertising Columns

#### Passing Events.

The mining share market, which has been advancing steadily, "broke" on Thursday, and a number of failures of brokers resulted. Those who bought shares on a margin suffered, and many lost their whole investment. At the close of the week the whole market is in a state of panic, prices having dropped materially in one day.

The partial settlement of the Anaconda dispute in Montana has resulted in the starting up of the smelting works again. Some of the men, however, still refuse to accept the reduced wages offered.

The activity in quartz mining in California continues, and many new mines are being opened. It is noted elsewhere that at the old Benton, Mono county, mines steps are being taken for some important work. The advantages of the comparative mildness of our winter months in this State enables men to work to greater advantage outdoors than in most mining regions.

It is stated that the principal hydraulic miners in Nevada county are gradually getting rid of the quicksilver heretofore held in stock for gold-saving purposes. The price is higher than when it was purchased some time since. The stoppage of this class of mining has stopped the annual production of many millions of gold, and it is to be hoped that some plan will be devised before long by which they can carry on operations once more.

#### Suggestions for the Use of the Prospector and Miner.

Having in a recent number of the PRESS assumed to advise that more of our young men betake themselves to mining as a pursuit in life, we now give some general information, accompanying the same with a few rules that may be found useful to those engaged in searching after, examining and working deposits of the precious metals, a class made up mainly of the prospector, the miner, the expert, the capitalist, the metallurgist, the machinist, the millwright, and such others as may be engaged in beneficiating the ores or otherwise providing means and appliances to that end.

The prospector is he who goes out to search after mineral deposits, of whatever kind, plying his vocation usually in new or little explored regions. He is the path-finder and *avant courier* of the business. The term is a new one, which came into use with the discovery of gold in California, having been coined for the occasion. Following, and sometimes accompanying the prospector, is the working miner, a man of less sanguine and hopeful temperament, but of more patient and stable habits. Locating claims as does also the prospector, the practical miner stays by and develops them, sometimes putting up plant and bringing them to a state of active and profitable production. The difference between these two classes of operators is not always marked by broad lines of distinction, the miner sometimes going out to hunt for new lodes or diggings and the prospector just as often remaining by and going to work on what he has found. In a large sense, the miner is supposed to know something about the geology of the country, the character and value of ores, as well as how to open up and prove a mine.

The business of the expert is to examine and determine as far as may be all the features and conditions of an ore deposit that tend to illustrate its economic value, including accessibility, facilities for working, etc. He should, therefore, be conversant with geology, mineralogy, mechanics, and in short, with everything pertaining to mining as a practical business. The duties of the several other agents and helpers mentioned being sufficiently indicated by their respective names, need not here be enlarged upon, the capitalist being he who furnishes the means for accomplishing all, save only perhaps the comparatively small expenditures made by the prospector and the miner.

Although California, which offers at present the best field for mining extant, has been pretty thoroughly explored, some portions of it still invite the labors of the professional prospector and the miner desirous of finding claims for himself, there remaining in the southern and southeastern sections of the State much nearly virgin territory.

As a general thing, neither of these parties will find it expedient to take with them more in the shape of testing apparatus than a magnifying glass, magnet, pocket-compass and batea or horn spoon. As regards the precious metals, they may be said to occur in almost every geological formation, free gold being found in the alluvions and the auriferous ores, oftenest in the slates and igneous rocks, but not generally in the limestones or the bituminous shales—never in close proximity to coal. This metal has, however, a wide distribution and may be looked for almost anywhere. As the Biblical writer remarks, "Gold is where you find it." Silver, on the other hand, is more universal in its habitat, being found often in formations where gold is rarely or never met with. But then silver does not, like gold, occur in the drift or other surface deposits. With the exception of the *plancha plateas* of Southern Arizona and Northern Mexico, no silver placers have ever been found.

Metalliferous veins and ore deposits occur sometimes wholly in a single geological formation, as in porphyry, slate or granite, and sometimes between two different formations, constituting what are denominated contact veins, a style of deposit that is apt to prove powerful, fruitful and permanent. Most of the masterly veins of the world are of this character. The Comstock, the mother lode of California, and the *Veta Madre* of Mexico, belong to the contact school of veins.

In exploring for, locating and opening up gold and silver bearing lodes, the following general rules may be found useful to the prospector and

miner, more especially if new to the business. Bearing in mind what has already been said, the site of mineral veins where their presence is not made manifest by their outcrop, may often be fixed by observing the drift or float rock found below them, and tracing the same up to a point where such float ceases and at which the vein, by digging, will generally be found not far below the surface. The work of prospecting for blind ledge is best done by running slight trenches or plowing furrows at right angles with their supposed strike, this work being performed by means of water where there are facilities for so doing it.

The vein having been found and traced, its course or strike, being the direction in which it runs, is determined by compass, being established in accordance with the magnetic variation. By the clinometer its dip is next measured, that is, its declination from the horizontal. If a north and south vein dip to the east, then its inclination would be toward the west. As mineral veins are apt to widen out in some places and contract in others, cross measurements must be made at different points with a view to ascertaining their average thickness. As soon as practicable the quantity and quality of the ore must be determined; the character of the country rock must be noted; also whether or not there exists a clay lining between the vein matter and the walls of the vein. Examine the walls to see whether or not they are striated or scratched. Facilities for exploiting the mine by tunneling, timber and water supply, climate, proximity to farming and grazing lands, cost of labor and transportation, are all to be carefully considered, since unfavorable conditions in any of these particulars might greatly hinder and even defeat a mining enterprise that might otherwise have resulted in success.

Everything considered, there is hardly a doubt but the mineral regions of California offer better inducements to all who may contemplate engaging in the business of mining for the precious metals, prospectors included, than any other country in the world. The climate here is unrivaled, both as regards equability, comfort and health. Most of the districts are well timbered and watered, besides containing a considerable proportion of good grazing and farming land. Fruits of the finest quality can be grown everywhere. Excellent wagon-roads traverse all the districts, into many of which railroads have already been extended. Transportation is therefore cheap, rendering the cost of living, as well as the supplying of the mines with plant, very moderate. We strongly advise all who think of turning their attention to mining, that they visit and carefully canvass the advantages of our California gold fields before going elsewhere in search of a theater of labor.

#### Foundry Notes.

At the Pacific Rolling Mills they are building an extension to the steel works, 40x50, where it is stated that a new furnace will be put up.

The Union Iron Works have put up a large building in the shipyard for their wood-working machinery, this being a more convenient place than where it was before.

The Dow Pump Works are building a number of pumps of various patterns, all of the Dow patent.

The bar-iron mill is now the busiest portion of the Pacific rolling mill plant.

The Union Iron Works Company has been awarded the contract for building another deck on the steamship *San Pablo*, of the Occidental and Oriental line. The accommodations for passengers on this steamer are very limited, but the intention of the company is to make her fully the equal of the other steamers on this line. The improvements will be made on her return from Hongkong, and it is thought she will be laid up for about three months.

Fresno is anxious for some one to come to that town and start a foundry.

George G. Allan, of the Nevada foundry (Nevada Co.), has just delivered seven Pelton water wheels for the new North Star quartz mill. The wheels are of different sizes, according to the different uses that will be required by the mill. Mr. Allan has the exclusive right for the manufacture of the Pelton wheel. About 100 of these wheels have been built by this foundry during the year.

#### Mining, Metallurgy and Geology at the University.

The President of the University of California, E. S. Holden, in his report just issued, states that in order to equip the mining laboratory a legislative appropriation of \$5000 for the next two years will be needed. This, with what has been expended before, will supply the necessary machines, apparatus, etc., for these two important departments, which, by the way, now return \$250 a year to the University on account of fees paid by students. It is recommended that the salary of Professor Christy be raised from \$200 to \$250 per month.

In the department of mineralogy, petrography and economic geology, under charge of A. W. Jackson, the president recommends an assistant to prepare rock sections for study and to assist in the care of the collection, as well as for beginning the much-needed mineralogical survey of the State. He also recommends that Mr. Jackson's salary be raised from \$2400 to \$3000 per annum.

The museum of the department of mineralogy does not grow because there is no fund available for making exchanges of specimens with other colleges. The president states that a museum of technical geology to illustrate the building stones, the artificial stones, clays, brick, limes, mortars, cements, mineral paints, etc., should be formed for the use of this department jointly with that of civil engineering. A sum of \$200 a year is required in order to transport such specimens as will be presented from the place of their origin to the University. Beside these annual expenses, a sum of \$1000 should be set apart for the commencement of the museum of technical geology by the purchase of the more important and expensive specimens, and a sum of \$1000 should be appropriated for a collection of crystal models and for miscellaneous physical and chemical apparatus required in the work of the department.

The museum of petrography has been increased by the purchase of a small collection of American rocks, and a portion of a collection of European rocks, from the last legislative appropriation for the department of geology. The rest of the European collection could not be obtained for lack of time before the end of the fiscal year in 1887. An appropriation of \$850 is needed to complete the collection of European type-rocks.

The museum of economic geology, which should contain a suite of specimens illustrating the mineralogical composition, wall-rocks, and geological peculiarities of every important mine in the United States, and of the leading mines of Europe, has been hardly more than projected. It contains collections from a few California mines, obtained personally by the professor in charge, and from a few other mines, donated by friends of the institution. The collection is one of the most important, both from educational and scientific points of view, that the University should make, and at least \$5000 should be appropriated for obtaining by purchase the material that cannot be personally collected by the professor. Such a collection would find its most important use in immediate connection with the instruction of the mining students in the special branch of mining geology.

It is evident that Prof. Holden recognizes the importance of these departments, and it is to be hoped that the Legislature will grant the requests made, and put them on a better basis than they now stand. California holds first rank as a gold producer in the Union, and second rank in total product of precious metals. She has also within her borders many mineral and metallic substances but partly developed into paying industries, but which should be fostered. The University can do a great deal toward our mineral development, and it should, as well as the State Mining Bureau, receive full encouragement from the people of the State.

THE total coinage for November at the San Francisco Mint was as follows: Half-eagles, \$880,000; eagles, \$300,000; dollars, \$300,000; dimes, \$16,652.40; total, \$1,496,652.40.

At Mountain House, Douglas county, Nevada, a two-stamp mill, operated by horsepower, produced gold bullion, valued at \$2000, during the month of October.

LEADVILLE has yielded over \$100,000,000 since the carbonate discoveries in 1876.



## The New Cruisers.

One of Them to be Built in San Francisco.

It is a cause of rejoicing to San Francisco and to the whole State that one of the new cruisers will be built in this city by the Union Iron Works. This means the beginning of an era of ship-building on this coast. From the fact that we have built no large iron steamers here, few suppose that we had the facilities for constructing a modern war-ship. The Union Iron Works, however, have a complete plant for ship-building purposes, and as good vessels can be built here as anywhere in the United States. The bids on the cruisers, opened in Washington a few days ago, were as follows:

Cruiser No. 1—4000 tons, complete. The Harlan & Hollingsworth Company, Wilmington, Del., \$1,224,900; Union Iron Works, San Francisco, \$1,132,000; Cramp & Sons, of Philadelphia, under a special bid providing for the use of engines of their own design, \$1,198,000.

Cruiser No. 2—Complete, according to the Department's designs. Cramp & Sons, \$1,065,000; Union Iron Works, \$1,017,500. Special bids providing for the construction of engines according to their own designs were put in by the Harlan & Hollingsworth Company at \$1,100,040, and by Cramp & Sons at \$1,510,000.

Cruiser No. 3—Complete according to the Department's specifications. Cramp & Sons, \$1,325,000; Union Iron Works, \$1,348,000; the Harlan & Hollingsworth Company, under special bid, using their own engine designs, \$1,452,000.

It will be seen that the bid of the Union Iron Works on Cruiser No. 2 was \$47,500 less than that of Cramp & Sons, the latter firm putting in a bid of \$1,065,000; the Union Iron Works, \$1,017,500.

The Union Iron Works also bid lowest on Cruiser No. 1, but the Secretary of the Navy refused to accept the bid because it was higher than the maximum amount fixed in the appropriation. He will doubtless bring this to the attention of Congress, and perhaps we will get two cruisers to build on this coast instead of one. How the Charleston and Newark will compare with each other may best be seen from the following comparison:

	Newark.	Charleston.
Length on load line.....	310	320
Extreme beam.....	49:1½	46
Mean draught.....	18:9	18:6
Load displacement—tons.....	4000	3750
Natural draught, horse-power.....	6000	.....
Forced draught, horse-power.....	8500	7650
Screws.....	twin	twin
Speed—estimated, knots.....	18	18:3
Coal capacity—tons.....	850	800
Number of men, including officers.....	300	325
Main battery—breech-loaders.....	12 6-in. (210-in.)	6 6-in.
Secondary battery—Newark, 11 small guns; Charleston, 14 small guns.		

Messrs. Irving M. Scott and Geo. W. Dickie, representatives of the Union Works, are now in Washington, and the latter telegraphs that the contract for Cruiser No. 2 will be awarded to them. Mr. Geo. W. Prescott, the president of the company, says: "The competition for these contracts was very keen. The Eastern firms were determined not to allow the contracts to come to this coast if they could possibly help. We would have taken one of them at the actual cost price of the work, for the vessel would have proved the best advertisement we could have made. Our equipment is as complete as any in the country, and better than Cramp's. Work will commence on the cruiser the moment the contract is signed, and will, roughly speaking, employ at least 1000 men for 18 months. The bids are all really less than the work is worth. The bids on the 4000-ton cruiser all exceed the limits of the appropriation, and Congress will in all probability either increase the appropriation or authorize the secretary to advertise again for bids. I think the Government fully recognizes the necessity of having on this coast some establishment where work of this character can be rapidly and efficiently executed.

"As to making heavy guns, there is no foundry in the country which can do such work as is done abroad. For instance, the plant necessary

for turning out a 100-ton steel ingot would cost \$1,000,000, and as private individuals have no use for such weapons, the only customer is, of course, the Government. In France and England the Government subsidizes certain establishments, and in that way enables them to erect the expensive plant necessary for making guns of huge caliber, and the Government also guarantees a certain amount of work. Congress has a Gun Foundry Committee, which has investigated this subject, and will in all probability recommend that three or four establishments be subsidized for the purpose of maintaining a gun-making plant. If such action is taken, this coast will, of course, receive recognition."

## The Late J. S. Phillips.

The many friends and acquaintances of J. S. Phillips, formerly of this city, will regret to learn of his death, at Sydney, Australia, from apoplexy. Mr. Phillips was the author of "The Explorers, Miners and Metallurgists' Companion," a work published while he was a resident of this State. He was also inventor of the "Wee Pet" assaying apparatus, a portable appliance for carrying on prospecting trips, but adapted also for office use, with tools for all kinds of discrimination and apparatus. Two editions of the Explorers' Companion were published, and were well received by the press.

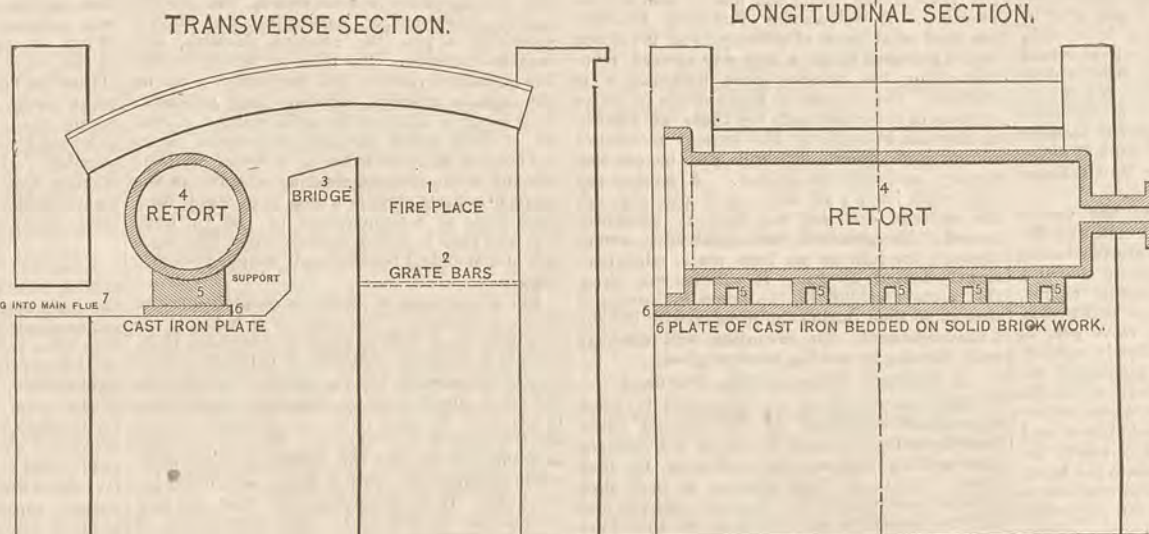
Mr. Phillips especially prided himself on his practical knowledge, and the practical charac-

and many of them own from two to three houses and all are well satisfied with their lot. The rules of the Bricklayers' Union permit of the employment of only two apprentices at a time upon any building, and only that number is allowed with a gang. No boy over 17 is allowed to become an apprentice.

## Retorting Gold Amalgam.

In treating amalgam obtained in the process of gravel mining, the quicksilver and amalgam are well stirred in buckets, and the coarse sand, nails and other foreign substances which float on the surface are skimmed off. This residue (which holds considerable amalgam) is concentrated by washing in pans or rockers, and the concentration ground in iron mortars, and treated with more quicksilver. Any base material which floats on the surface of the bath is melted by itself to a base bullion. The remainder is added to the fine amalgam. The amalgam is strained from the quicksilver through drilling, and the dry amalgam is re-retorted in iron retorts.

Where the amount of amalgam obtained is small, the hand retort is used; but at large gravel mines the cast-iron retorts are made stationary, similar to those used at gold and silver quartz mills, only that they are smaller. Where large quantities of amalgam are retorted, and the furnaces when fired are left unattended, as is frequently the case, the retort, which is set immediately above the fire, becomes over-



METHOD OF SETTING RETORTS FOR GOLD AMALGAM.

ter of his work. He was very much opposed to all "jobbing" in mining and kept for himself a clear record in this respect as a mining engineer. He clung somewhat tenaciously to those things he learned early in life in Cornwall, a circumstance that tended to retard his advancement in his profession on this coast. In his book, however, are many truths specially applicable to the new regions on this side of the continent.

Mr. Phillips always impressed all who came in contact with him with his earnestness of purpose and his integrity. He could have made more money had he been less conservative; but he could seldom see mining properties that came up to his ideal, so that his reports were most frequently opposed to the interests of sellers.

For many years Mr. Phillips kept an assay office in San Francisco, where he also taught assaying. Some years since he went to New York to practice his profession, and about a year ago left for Australia, where he died. In many respects he was a peculiar man, and some of his geological theories, advanced in his book, were entirely opposed to those commonly accepted. Although he had abundant confidence in himself, he was of a retiring disposition and mingled but slightly with others, preferring to work at his office and desk by himself. His writing was carefully done, most of his work being rewritten several times before it satisfied him.

THE condition of the bricklayers' laborers or hodmen, in San Francisco, is far above that of their fellow-laborers in the East. In no other city in the Union can it be said that so many hodcarriers own the houses in which they live. One hodcarrier in this city owns several buildings, which he erected out of his savings,

heated. The weight of the metal which it contains then causes the retort to "belly," which ruins it. To overcome this difficulty, the retort should be set with supports and arranged with the fire to one side that the heat may be evenly distributed over it. Retorts thus set work well in practice. The figures on this page, from Bowie on Hydraulic Mining in California, from which book we take these facts, show the method of setting retorts.

The amalgam should be carefully introduced and evenly spread. The iron pipe which connects the back end of the retort with the condenser must be clear of all obstructions, and under no circumstances should the amalgam be spread so that the pipe can possibly become choked, as in that case an explosion would probably ensue.

To avoid any danger arising from this source, after the cover has been put on, luted with either clay or a mixture of clay and wood-ashes and securely clamped, the fire is lighted and the heat gradually raised, a dark-red heat being all that is necessary to thoroughly volatilize the quicksilver. Toward the end of the operation the heat is raised to a cherry-red color, at which it is kept until distillation ceases. The retort is allowed to gradually cool, and when cool is opened.

During the operation the condensing coil at the back of the retort should be kept cool by a continuous supply of fresh water entering from the lower end of the box which contains it, while the discharge of warm water is effected above. The retorted bullion is cut or broken in pieces and melted in a well-annealed black-lead crucible and the gold cast into bars.

ARRANGEMENTS are being made for the resumption of work in idle mines on the Comstock.

## Literary Work of University Professors.

In the biennial report of the President of the University of California, on behalf of the Board of Regents, to the Governor of the State, is given the academic history of each member of the teaching force of the University. It is the intention to compile a complete bibliography of all the published writings of professors and instructors. A compartment of the library has been set apart for the accommodation of all writings of members of the Academic Senate. In the list is given the name, birth-place, name of college where the individual graduated, degree taken, names of learned societies of which they are members, etc.

In looking over this list we are pleased to notice how many of the faculty have contributed more or less to the columns of the MINING AND SCIENTIFIC PRESS from time to time. Among these contributions have been the following: H. H. Behr, professor of botany in College of Pharmacy, paper On Insecticides, and other contributions of a scientific nature. S. B. Christy, professor of mining and metallurgy—"Ocean Placers of San Francisco," "The Mines and Works of Almaden, Spain," "Lowe Water Gas," "Quicksilver Reduction at Almaden," and numerous shorter articles. Frederic G. Hesse, professor of mechanical engineering—"On the Instantaneous Reduction of Ores to Powder by Concussion, and On a System of Automatic Sizing," "On a Continuous Ore Amalgamation," "On a New Fluid Pressure Gauge for Laboratory Use," etc.

Prof. E. W. Hilgard enumerates so many standard writings that he does not mention minor articles or transient publications, but he is a constant contributor to the press, setting an example that other professors might follow, on popularizing the work of the university. A. W. Jackson, instructor in mineralogy, has contributed to the Press, "The Study of Rock Genesis," "Occurrence of Silver in Sedimentary Rocks," "Lecture on Minerals," "On Rocks," "On the Structure and Genesis of the Bassick Ore Deposit." Prof. John Le Conte has contributed, "Igneous Meteors," "Origin and Distribution of Lakes," "Meteorology of the Pacific Coast," and other articles. Albin Putzker, "The Scientific Study of Languages." Wm. B. Rising, professor of chemistry, "Occurrence of Quicksilver at Sulphur Bank."

It seems apparent that President Holden, both by precept and example, is encouraging the other members of the faculty to give the benefit of their knowledge and research to the public. Some of them have done a great deal of the "outside work" and others very little. It is to be hoped that all of them will in the future be more frequent contributors to the public press and the local learned societies. By so doing the various departments of the university will be brought into more prominent notice, and the public better appreciate the work that is being done.

GEN. J. R. BAYLER has brought into Galveston some fine specimens of gold-bearing quartz from the Nueces canyon, Uvalde county, Texas. He claims that prospectors have discovered valuable deposits of quartz in that locality.

THE attempt to bring out Hungarian miners to work the mines on the Northwest Territories has failed. A number employed on the Saskatchewan mines proved worthless, and Scotch and English miners had to be sent for.

THE Santa Cruz Sentinel says: At the asphaltum beds, near this city, an average of 25 tons per day have been mined and shipped during the past summer. At present about 30 tons a day will be mined and shipped.

IT is stated that gold deposits have been found in Indian Territory.

A MOVEMENT is on foot to establish sampling works at Boise, Idaho.



## MECHANICAL PROGRESS.

## The Compound Steam Engine.

Mr. J. Richardson, in his paper on "The Compound Steam Engine," read at the recent meeting of the British Association, stated that, though there is no theoretical limit to the economy to be obtained by extremely high degrees of expansion, yet there are practical limits which are soon reached for non-condensing engines. In these the steam must not be expanded below the atmospheric pressure, or back pressure and waste of power are the result. To prevent this, a very high initial pressure must be used, and, as with 140-pound boiler pressure or 155-pound absolute, steam expanded ten times leaves only one-half pound pressure in the exhaust, this is fixed upon as practically the most useful degree in non-condensing engines. Reference was made to the use of steam at much higher pressures—500 pounds and upward—and used in three or more cylinders, yet the difficulties attending the production of steam at these high pressures and temperatures, and the maintenance of the working parts of the steam cylinders, were stated to be such as more than counterbalance the advantages to be obtained from their use. While it could be shown that expansion could be carried to such an extent that while the efficiency of the steam, considered merely as steam, would continue to be increased, yet a point would be reached when it would be barely able to move the piston it was intended to propel, and when, therefore, the engine in which it worked would be practically useless. A comparison was instituted between the single-cylinder expansive engine and the various classes of compound, namely, those which have the low-pressure cylinder parallel with the high, as in the Woolf engine, on the same center line, as in the tandem, and those with cranks at right angles, the advantages and disadvantages of each type being pointed out. The proportions to be maintained between the cylinders were next considered, and the advantage of the intermediate receiver and heater were referred to; the advantage of expansion gear to the low-pressure cylinder, not merely for the purpose of securing greater economy, but also for the sake of securing uniform distribution of the load between the two cylinders, was pointed out.

Illustrations and diagrams of the earlier types of engines were given, and indicator diagrams showing different methods of distributing steam, together with large diagrams showing modern tandem compound horizontal engine, coupled compound with locomotive boiler combined, as well as details of the valve gear of each, and the method of automatically regulating the supply of steam. The compound engine as now constructed was claimed to be the most perfect form of steam motor, comparatively small engines under 100-horse power and without condensation giving a horse-power for somewhat under 20 pounds of steam per hour, while large engines when fitted with condensers have been shown to use no more than 12 pounds of steam per horse-power per hour. At the same time the construction of compound engines has been so simplified that they have no more parts, and are no more difficult to manage than ordinary double-cylinder high-pressure engines.

## Hardening Steel.

We have given several paragraphs in these columns, of late, in regard to various methods employed by different mechanics in hardening steel. A writer in the *Boston Journal of Commerce* furnishes that paper with some criticisms on these methods which possess considerable interest, especially as the writer is evidently a thoroughly practical mechanic. We copy as follows: "To temper steel very hard," and in "Mercury for hardening steel," there is food for reflection on the part of those who, like the writer, have been wrestling with the apparently inanimate cussedness of steel for many years. So we have finally found out why we have had so much trouble in hardening steel, have we? "Water gives an unequal temper, and only for the circulation produced by bubbling and heat it would be unfit for hardening in." Yes. But who of us that use water depend upon such circulation? Don't we have all sorts of rigs for forcing a strong current of water against the heated piece we wish to cool? From above or below, or both, from one side or another, or all sides, we set the cold water in motion with a force which precludes any possibility of steam bubbles enveloping the heated steel, thereby preventing the heat from escaping. Not always? No. But if we don't, we souse the piece that we wish to cool up and down and sidewise. We even take a long stick and stir the water up in the bosh, turning it into a miniature whirlpool, before we dip the hot steel into it.

"Sealing wax for jewelers!" and "cold air for Damascus blades!" looks well in print, but we practical fellows want means to temper—that is not the word—harden, all sorts of pieces from those as small as the tools of jewelers up to hundreds of pounds in weight, needing to be handled with a crane, and we do it in water. Mercury to harden a graver, hand-tool, chisel, screw-driver, or small tool in is all right, perhaps; but if we had a cast-steel roll or a big die of 500 pounds to harden, perhaps the mercury man will tell us how much mercury would be wanted, in what kind of receptacle, and how

the circulation, just as necessary as in water, would be kept up. "Mercury-hardened steel will cut almost anything," will it? So will cold-water hardened steel, and "steel hardened and tempered to a straw color" is being turned daily with tools hardened in clear cold water. "Oil is used." Why? Because at the same heat it does not make steel brittle. Because for uses requiring great toughness and not an extreme degree of hardness, notably for springs, oil is believed to give better results. Heated steel cools in oil more slowly than in water. Steel is usually heated for hardening hotter than is necessary or good for it. Cooling in oil being less sudden lets the steel assume more nearly its normal condition than if cooled in water at such high heat, but with the heat lower in proportion to the more sudden cooling by dipping in water even better results can be had from water hardening than from hardening in oil.

From the time when as a little boy, nearly 50 years ago, I heated bits of steel and made a "siss" by plunging in water, and then brightened them by rubbing in the scales on the old smithy floor, or on a brick in the forge chimney, and heated them up to watch the beautiful colors as I had seen father do, I have been hearing of some special methods for hardening, and still in all my practice, and so far as my observation extends, water stands at the head as a bath in which to quench heated steel for hardening. Yes, that's right. "Quick cooling" does the business, and water judiciously used cools quickly.

## Improvements in Glass Manufacture.

Thirty-five years ago a man named William Clarke went to Pittsburgh and attempted to make window glass by rolling it in reversible rolls, such as were used to roll iron and steel. The attempt was a dismal failure, the glass cooling so fast as it passed through the rolls that it became too brittle for use. Now natural gas comes to the rescue and makes the scheme practical. A well-known Pittsburgh inventor has filed an affidavit of priority to an invention which promises to go a long way toward revolutionizing the window-glass business, it is claimed. He proposes to make sheets or plates of glass in reversible rolls ten times as rapidly as they can be made by the present method of rolling plate glass. The rolls will be set stationary and will be hollow. A natural-gas pipe, with jets on all sides, will run through the center of each roll and keep it constantly heated. The glass will be caught as it comes through the rolls on an iron plate, also constantly heated by gas. It will be run along this plate straight to the annealing oven, so that at no time during the process will it have a chance to cool. The invention will dispense with blowing in making window glass.

## A Siemens Glass-melting Furnace.

Glass manufacturers are interested in some experiments conducted by the Chicago Glass Manufacturing Company in the use of a Siemens glass-melting furnace, with open pots, for flint glass. This is the first attempt to melt flint glass in open pots for the Siemens furnace, and only the second to use open pots for this kind of glass. The first attempt was made by Berger Brothers, of Philadelphia, but they ultimately returned to closed pots. It is claimed that the new process will melt glass in 7 hours and 45 minutes, while the old-fashioned furnaces take from 15 to 24 hours. Thus a great saving of fuel is effected.

## Compressed Air for Glass Blowing.

Another scheme has come to the surface, says a Pittsburgh paper, accompanied by the moss-covered chestnut that "it will revolutionize the glass industry." The scheme referred to has been thoroughly tested by E. C. Long, of Pittsburgh. When asked the nature of it he said: "It is a combination to blow window glass by compressed air, invented by Dr. Willmet G. Bailey, of Burgettstown. We are now making some machines. A patent has been applied for, and some of the machines may be introduced next fall. The air is stored anywhere convenient, and is conducted by a hose to the machine. The glass is prepared the same as in the old way. Then the pipe is inserted in the machine and the air is let on by touching an electric button. We claim that five times as much glass can be made by the use of these machines as the old way. It will dispense with the services of a number of blowers, but more gatherers will be needed."

MIRRORS OF AMERICAN MANUFACTURE RIVAL IMPORTED ONES.—Up to the present all mirrors manufactured in the United States have been from imported glass. The quality of the glass to retain the silvering and give a perfect production of the object must be of the best. This quality Pittsburgh had never been able to produce until natural gas came into use. Now, by its aid, the fineness of the glass produced rivals that of the imported article. The entire absence of impurity, the perfect fusing of the ingredients, the rapidity of the melting and the pure, intense flame for reheating or working, are the principal advantages.

THE LIGHT FROM COAL.—One pound of coal, according to recent Franklin Institute tests, will yield an amount of light averaging 150 candles with the electric arc light (about 60 per cent of this if glass shades are used), 20 candles with incandescent lamps, and 14 to 17 candles with gas. In this estimate it is assumed that steam coal is burned under a good boiler for the electric lights, and that the gas is obtained from a bituminous coal.

## SCIENTIFIC PROGRESS.

## A Practical Use for Leidenfrost's Drops.

Water placed upon a red-hot metallic plate springs into the form of a drop, and evaporates without coming in contact with the plate, as is known to all. It is equally well known that by using a concave vessel, the drop continually rotates. To Bolig belongs the credit of suggesting the practical use of the Leidenfrost experiment, more especially in water analysis for determining the solid residue of natural water. Where hitherto this determination has been effected by evaporating the water to dryness without boiling in a platinum dish on a sand or water bath, and afterward weighing the already tared dish, Bolig, according to the *Rundschau für Pharmacie*, proceeds as follows: He brings a shallow platinum dish to a bright red heat over a gas lamp, measures out 50 c. cm. of the water to be analyzed, and by means of a pipette lets single drops of it fall into the capsule, where they gather into a fluid globule or spheroid, which begins to rotate. The evaporation proceeds quietly, without any spurring, and new quantities of water are added, drop by drop, so that the spheroid always preserves a suitable and comparatively unvarying size. The operation can be carried out successfully with little practice, and is extremely elegant and precise. It is only necessary to be sure that the vessel is kept at a red heat, and that too many drops are not added nor in too rapid succession, as otherwise the sudden cooling would cause a spurring of the fluid. Too rapid a rotation of the globule is prevented by letting the next drops, when it is time to add them, fall in a direction opposite to that of its rotation, so as to keep its movement in check.

When the 50 c. cm. of water are in the capsule, the operation is soon ended, the globule rapidly grows smaller, darker in color, until it resembles a pea, the rotation slackens, and eventually ceases. The flame is then removed. The globule of residue lies perfectly loose on the capsule without showing any adhesion. Thus there is obtained the solid residue of 50 c. cm. of water which has been evaporated without contact with the sides of a vessel without loss and without contaminating mixture, in the shape of a little globule which is exposed for a good while to a temperature of 180° C. until dry, and then is rolled directly upon the scale pan of a chemical balance and weighed within  $\frac{1}{4}$  mg.

The advantages of Bolig's method may be thus summarized: The residue is in the shape of a little bead with so small a superficies that, even if it contains chloride of calcium or chloride of magnesium, the absorption of water from the air is almost nothing, especially as the time of exposure is soon over, on account of the small weight to be weighed. Moreover, there is nothing to prevent the weighing of the globule in an air-tight, closed tube, well dried beforehand. It is unquestionable that this new method can be adopted for the evaporation of all sorts of fluid to dryness without loss and for a large class of cases, if one includes different modifications of the method. For example, the platinum may be replaced with equal or greater advantage by silver, copper, or even pure nickel, and the method is not limited merely to solutions in water. There is no true contact of the fluid to be evaporated with the sides of the vessel, so that no chemical action can affect them. Hence *aqua regia*, sulphur compounds, etc., can be treated in red-hot silver vessels without the latter being at all attacked.

## The New System of Conducting Electricity.

In our last issue we made a brief allusion to the recent invention of Mr. Westinghouse, of a new system for the transmission of electricity by which the cost of the same was greatly reduced. A late number of the *Providence Journal* gives some particulars in regard to the matter of this invention which will possess much interest to all in any way interested in the economic application of this comparatively new source of power. We collate as follows: There is no especial reason to deny that the principle in question can be successfully applied, and if it can, it will certainly result in greatly cheapening the cost of conveying electricity for house illumination or for other purposes.

Roughly and popularly stated, the inventors who have been experimenting under the patronage of the Westinghouse Company claim to have found a method of making entirely practicable the delivery to the same wire of alternate currents from two or more dynamos driven by separate engines. If this can be done, it would certainly have great advantages over the ordinary "three-wire system" now in use. By the latter method the cost of certain copper wire for each 16-candle lamp is \$150 for a distance of four miles, while under the new system the cost would be only \$1.50. The armature, too, for a Westinghouse machine capable of producing a current for 1000 lights requires, in its construction, only 30 pounds of copper wire, as against 225 pounds for armatures of older styles.

Again, it will be to the advantage of the new system that under it there is no necessity of locating electric light plants near the center of illumination, where property is always costly and rents high; they may be placed at a con-

siderable distance away, wherever steam power can be produced more cheaply, or water power made available. These and other more technical advantages give some promise, at least, that the cost of electric lighting is to be cheapened. The fullest hope cannot be placed in the invention as yet; but its future development will be watched with an interest proportionate to the present desire for the supply of electric lights for domestic purposes at a reasonable cost.

## Some Remarkable Experiments.

M. Henri Mohlenbruck, writing to *L'Electricien*, describes some very remarkable experiments which he has recently performed, and which seem to show that in the mesmeric condition an electric current may have a powerful inductive action upon the human nerves. The experiments were made with an apparatus consisting of a ring of iron wires, wound with silk-covered copper, the latter being placed in circuit with a microphone and a battery cell. The ring was about nine inches in diameter. In the first experiment a watch was placed near the microphone, and the ring was placed upon the head of the mesmerized subject. He immediately began to beat time with the ticking of the watch. When the microphone contact was touched with a quill feather, he placed his fingers in his ears. The microphone was then removed to a distant apartment, and the connection of the circuit being completed as before, a violin was played in the distant room; the patient showed the most distinct indications that he heard the music. The next experiment was obviously to speak to the microphone. "To my great surprise," says M. Mohlenbruck, "the patient repeated the words." The last experiment described is that of sending a continuous current through the circuit. This had the effect of causing the patient to throw his arms around in a circle in the vertical plane. The direction of motion was reversed with the reversal of the current. When the patient was asked what he felt like, he said he was turning. M. Mohlenbruck concludes his letter by stating that he has made a great many more experiments not less interesting than these, and has constructed many different kinds of apparatus to aid in these researches. He promises to give further details if they appear to be of scientific value. We await these revelations with breathless interest.—*Electrician*.

CONDUCTIVITY OF ROSINS.—It has been ascertained that the ordinarily perfect insulators of the rosin type become more or less good electrical conductors when heated to softness or melting; afterward their conductivity increases with the temperature. A mixture of guaiacum with naphthalene, the latter a perfect insulator and of the same melting point as guaiacum, conducts much better than the rosin alone, being much less viscous. Oxidized or acid constituents in the rosin also increase their conductivity. Some always conduct very little, as Canada balsam, copal, mastic and dammar; Chios turpentine, pitch, asphalt, colophonium, are moderately good conductors when soft or melted. Styra, jalap, scammonin, dragon's blood, amber; the balsams of Peru, Tolu and copaiba; shellac, laudanum, aloes, myrrh, Venetian turpentine, are good conductors when melted.

THE FLUID ORIGIN OF NATURAL GAS.—It has been asked: Is natural gas confined in the earth in a fluid state? So thinks a Pennsylvania man, who has patented a plan for conducting this fluid to the surface and into receptacles for its preservation and carriage. A dispatch says with much truth: If this theory should prove correct it will be the greatest discovery of the age, as the fluid brought to the surface and confined at a pressure of say 600 pounds to the square inch, can be utilized to an inconceivable extent as fuel. A locomotive, for instance, with a few gallons of the fluid, would have a supply of fuel sufficient to run it from Pittsburgh to Chicago, and an ocean steamer would require only a few barrels to make the trip to Europe.

ELECTRICITY IN MEDICAL PRACTICE.—Quite a novel method of applying an electric current to the body forms the subject of a patent granted to the agent of Senor Pumariga, of Avile, Spain. The inventor steepes flannel in a bath composed of equal parts of oxide of iron, copper, zinc and tin, mixed in fine powder in weak gum water. The flannel thus takes up a quantity of the metallic oxides which are excited by the perspiration of the body, which is thus subjected to a weak but constant electric current. This would be a vast improvement on the electric belt system.

ANOTHER NEW ELEMENT.—Since the recent death of Professor E. Linnemann, of Prague, a description of a new metallic element has been found among his papers. The metal was obtained from the orthite of Ardenal, and is named "Austrium." It may throw new light on the constitution of the sun, as one of its spectral lines appears to be identical with one of the three unidentified lines in Anestrom's map of the normal solar spectrum.

TO DETECT ALCOHOL.—If any fluid is suspected of containing alcohol, add pulverized chromate of potash and sulphuric or muriatic acid and warm the mixture. If any alcohol is present, the mixture will turn green.



## A Year's Prospecting in Colorado.

The Denver Tribune-Republican says:

The season for prospecting for undiscovered mining claims has closed for 1886. With the exception of the gold discoveries in Larimer county, no new district has been reported. The time for finding new districts has passed. There is no part of the State which has not been tramped over many times by prospectors, and all which contain any considerable showing of ore are known. The Larimer county district is not a newly-found one. It was known years ago, but was not promising enough to lead to development. It is handicapped by a prejudice that seems to be well based upon observation; the country rock inclosing the veins is a coarse-grained, red granite, similar to that which prevails over all the mountain part of Northern Colorado, in which no rich ore veins have been found.

The year's prospecting has resulted in proving up the great value of the district at the head of Cross creek, and has added considerably to the knowledge of the mineral wealth of the La Plata mountains and Eagle county. Several rich telluride veins have been opened in the eastern portion of the La Platas, and that region has added to the production. The telluride ores are known to extend over a larger area than the tellurides of Boulder county, and they promise to, in the near future, add considerably to the annual yield of gold and silver.

The quartzite ore deposits of Battle mountain, in Eagle county, have proved to be extensive and rich. The overlying carbonate deposits on the lime contact have improved with development, and the veins in the underlying granite have become profitable producers. At Leadville, a large area of new and rich ground has been opened, and there has been an increase of product, as well as a growth in confidence, that the camp will be a lasting and heavy producer.

The carbonate ore deposits at Monarch, in Chaffee county, have developed splendidly.

The only places where performance has belied the promise are about Portland, in Ouray county, and some portions of Park and Summit counties. There the disappointments have not been great or serious, because expectations were based upon work by and sales to Eastern companies. Any one who has ever had anything to do with these Eastern concerns knows how unreliable they are, and how they can be relied upon to do the things they ought not to do, and leave undone the things they should do.

Aspen has developed some fine ore deposits, and gives an abundance of evidence that faith in the camp was not misplaced. It has not done so much as would have been done had not apex claimants retarded progress.

Altogether the season has been satisfactory, and when the books are closed on December 31 the product will be found to have been heavier in 1886 than during any previous year.

## Working Assessments.

The following is a copy of the new ruling in regard to the working of assessments for the year in which the application for patent is made. The circular is as follows:

GENERAL LAND OFFICE,

WASHINGTON, D. C., August 7, 1886.

To Registers and Receivers and Surveyors General: Your attention is directed to the following ruling of the Hon. Secretary of the Interior contained in his letter to this office, dated July 31, 1886, viz.:

"I am in receipt of your letter of the 26th ultimo, inclosing a letter addressed to you, inquiring as to the proper construction of paragraph 3, Circular N, Dec. 15, 1885 (4 L. D., 374), which is an extract from Departmental Decision in the case of the Good Return Mining Co. (4 L. D., 221) and which reads as follows:

"That compliance 'with the terms of this chapter,' as a condition for the making of application for patent, according to Section 2325, requires the preliminary showing of work or expenditure upon each location, sufficient to the maintenance of possession under Section 2324, either by showing the full amount for the pending year, or, if there has been failure, it should be shown that work has been resumed so as to prevent relocation by adverse parties after abandonment.

"Your inquiry concerns the words 'the full amount of work for the pending year,' and your letter construes them as meaning 'an amount sufficient to make the claim a valid and subsisting one at the date of the filing of the application for patent.' Said construction is correct. The exact meaning of the paragraph will perhaps more fully appear, from a slight transposition of its words, as follows:

"3. That compliance 'with the terms of this chapter,' as a condition for the making of application for patent according to Section 2325, requires the preliminary showing of work or expenditure upon each location, either by showing the full amount sufficient to the maintenance of possession under Section 2324, for the pending year, or, if there has been failure, it should be shown that work has been resumed so as to prevent relocation by adverse parties after abandonment.

"The pending year' means the calendar year in which application is made. And you will observe that the paragraph has no reference to a showing of work at date of final entry."

This ruling of the Department will be strictly observed.

WM. A. J. SPARKS, Commissioner.

## USEFUL INFORMATION.

**BLADES OF POCKET KNIVES.**—The blades of very cheap pocket knives, says *Mechanical News*, are punched in dies from sheet steel, but those for first-class pocket cutlery are hand-forged, a good workman being able to forge from 25 to 30 blades per hour and about 40 pen blades per hour. There is a pattern and gauge furnished the forger for each sort of blade, but the experienced workman rarely refers to either, his accuracy of eye and skill of hand being sufficient guides to exactness. The blades come from the hand of the smith perfect in form, except the bevel of the back intended to guide engaging blades, this bevel being formed by grinding. The steel used in these fine blades is Wardlaw's (English) or the best American made. As they come from the forges the blades are "choiled," or filed, to make a nick between the blade and the tang. Then the blades are tempered, having received the trade-mark stamp on the tang under a press. The hardening is done in an ordinary coke fire, the operator heating two at a time and plunging them in cold water. The drawing to temper is also done over a coke fire. If the blades are sprung in hardening they are straightened, after tempering, by repeated strokes of a hammer, having a thin face like the pene end of a machinist's square hammer, the blows being given on the concave side of the blade, as in the peening of cast iron, and with the same effect, that of stretching the hammered face. The blades are ground on Sheffield and Nova Scotia stones, "glazed" on emery wheels, honed or "set," and finally are polished on wheels of walrus hide fed with rotten-stone.

**CLAY AS A WATER PROOFING MATERIAL.**—A new mode of treating clay for use as a water-proofing material has, according to the *Builder*, been devised by Mr. Thomas Fraser, of Aberdeen, a gentleman interested in the manufacture of bricks and tiles. It is usual in puddling with clay, to prevent the penetration of water, to place the clay in trenches or between rows of sheet piling, in a plastic condition, mixing it first with water and tempering carefully before using. It occurred to Mr. Fraser to test the permeability to water of clay tempered with various proportions of water, and he found that when mixed with all the water the solid mass would take up, the clay was easily penetrated by liquids. It appeared also that as the clay absorbed moisture it increased in volume, and he reasoned from this that conversely if the volume were prevented from increasing, absorption would be restricted and the clay might be maintained with certainty at such a point of moisture as to have its maximum resistance to penetration by water. In order to accomplish this result it would only be necessary to put the clay in place in the form of fine dry powder, packed in so tightly as to be incapable of absorbing more than a certain percentage of water. In practice Mr. Fraser proposes to reduce the clay to very fine powder and pack it into trenches in the ordinary way. So treated, it is found when the water is allowed to reach it to absorb about 35 per cent of its weight, but the expansion due to this compresses the mass so much that it remains impenetrable.

**LIFE OF CAST-IRON PIPES.**—The fact is well sustained that the wear and tear by rust in uncoated cast-iron pipe exposed to the action of clean, fresh water on both sides is not more than one-eighth inch in three generations. With the present method of protecting such pipe with asphaltum, the life of the ordinary cast-iron pipe used in building construction may be greatly prolonged; indeed, even an ordinary coating of coal tar pitch, when properly applied, is sufficient to add at least a score or two of years to its durability. The life of a soil pipe, even when quite thin and uncoated, has been found by experience to be so great that it is not unreasonable to suppose that the greasy matter contained in sewage serves to coat and protect the iron from the corrosive action of the water and the acid component of the sewage. The defects and leakages more generally met with in such pipes are caused by the defective manner in which the joints are made and improper placing and securing.—*London Ironmonger*.

**A NEW SOAP** for cleaning surgical instruments and other articles of polished steel which have become flecked with rust by exposure in a show-case, is made by adding precipitated chalk to a strong solution of cyanide of potassium in water until a cream-like paste is obtained. Add to this white castile soap, in fine shavings, and rub the whole together in a mortar until thoroughly incorporated. The article to be cleaned should first be immersed, if possible, in a solution of one part of cyanide of potash in four parts of water, and kept there until the surface dirt and rust disappear. It should then be polished with the soap, made as above directed. Articles so treated look as "good as new."

**MANUFACTURE OF CELLULOSE.**—The manufacture of celluloid has made rapid advances since the first patents were taken out in 1870, and is controlled thus far by one parent company, which not only sells the crude article in bulk, but receives a royalty from net sales. A few years hence, after the United States patents have expired, a much larger development may be expected. While so much jeopardy exists in this industry from chemical reactions

in the midst of heat and friction, it is extremely difficult to obtain workmen who observe the requisite care.

**HATS FROM WOOD-PULP.**—By a new process of manipulation, hats more serviceable and finer than anything now on the market are made of wood-pulp. They are impervious to water, and not wanting in flexibility. It is claimed that felt hats will have to take a back seat as soon as the new hats can be placed in the market in sufficient numbers to supply the demand. They are certain to revolutionize the hatter's trade, as they can be molded into shape or style desired and colored to meet the taste of the public. They can be made to represent a glossy or nappy appearance.

**IRON IN RAILWAY CONSTRUCTION.**—More half of all the iron and steel produced in the United States since 1865 has been used in the construction and equipment of railways. At the present time the railway mileage in the United States exceeds that of the whole of Europe. While at the beginning of 1865 there were only 34,000 miles of railway in operation in this country, there are at present 130,000 miles. The railway construction of the present year will probably reach 7000 miles of new track.

**AN ELASTIC MUCILAGE.**—To make an elastic mucilage, dissolve one part of salicylic acid in 20 parts of alcohol, add three parts of soft soap and three parts of glycerine. Shake thoroughly, and add the mixture to a mucilage prepared from 93 parts gum arabic and the requisite amount of water (about 180 parts). This mucilage is said to keep well, and, when it dries, to remain elastic without tendency to cracking.

**MIXTURE FOR CLEANING GREASE SPOTS.**—Equal parts of strong ammonia water, ether and alcohol form a valuable cleaning compound. Pass a piece of blotting paper under the grease spot, moisten a sponge, first with water to render it "greedy," then with the mixture, and rub with it the spot. In a moment it is dissolved, saponified and absorbed by the sponge and blotter.

## GOOD HEALTH.

## Smoking and Heart Disease.

In a report by Dr. Frantzel, of Berlin, on immoderate smoking and its effects upon the heart, it is stated that the latter show themselves chiefly by rapid, irregular palpitation of the heart, disturbances in the region of the heart, short breath, languor, sleeplessness, etc. Dr. Frantzel says that, if the causes of these complaints are inquired into, it is generally found that the patients are great smokers. They may not smoke cigars rich in nicotine, but full-flavored cigars imported from the Havanas. Smoking, as a rule, agrees with persons for many years, perhaps for 20 years and longer, although by degrees cigars of a finer flavor are chosen. But all at once, without any assignable cause, troubles are experienced with the heart, which rapidly increase, and compel the sufferer to call in the help of a medical man. It is strange that persons consuming cigars of ordinary quality, even if they smoke them very largely, rarely are attacked in that way. The excessive use of cigarettes has not been known to give rise to similar trouble, although it is the cause of complaints of a different nature. The age at which disturbances of the heart become pronounced varies very much. It is but rare that patients are under 30 years of age; they are mostly between 40 and 60 years old. Persons who are able to smoke full-flavored Havanas continue to do so up to their death. If we look round among the better classes of society, who, it is well known, are the principal consumers of such cigars, it is astonishing to find how many persons with advancing years continue smoking. As a rule, affection of the heart has caused them to abjure the weed. In such cases the patient has found the best cure, without consulting the medical man. If he makes up his mind to discontinue smoking at once, the complaint frequently ceases at once; in other instances it takes some time before the action of the heart is restored to its normal state. In such cases, besides discontinuing smoking, relief must be sought also by regulating the diet, taking only easily digestible food, light beer and wine in moderate quantities, abjuring coffee, as well as by short walks, residence among mountains of moderate elevation, and suitable interior treatment. By taking this course, all symptoms disappear in the course of a year and do not reappear if the patient does not recommence smoking. In a third category of cases the more acute disturbances leave the patient; he feels well and hearty, but an irregularity of the heart, more or less pronounced, is left behind. It has not yet been determined what it is that makes smoking injurious; but this much appears certain, that it does not depend upon the amount of nicotine which cigars may contain.

**THE SECRET OF SCARLET FEVER.**—Certain English physicians have made a most important discovery. They have found that the scarlet fever poison really comes from diseased cows. The contagion is not necessarily in the milk. Indeed, a cow impregnated with the fever may give wholesome milk, but there is always dan-

ger that in milking the cow the matter from the sores on the udder may find its way into the milk-pail. Then comes the rapid multiplication of the scarlet fever germs, which technically are known as "streptococcus." These germs have been transmitted to calves and other animals, which have thereupon shown the symptoms of scarlet fever. The disease is so deadly an enemy of the human race that now we have discovered its origin every effort will be made to put an end to its depredations. The cow is of the greatest benefit to the human race, but the milk it furnishes sometimes communicates the infection of typhus as well as scarlet fevers.

**LOSS OF MEMORY.**—The loss of memory in the aged is a familiar example, says Dr. M. L. Holbrook, and can only be accounted for by a deterioration of the brain elements and a diminution of blood supplied to them. One of the worst features of such cases is the fact that an old person is not, for a long time after decay has begun, aware of it. I am now treating a case of loss of memory in a person advanced in years, who did not know that his memory had failed most remarkably until I told him of it. He is making vigorous efforts to bring it back again, and with partial success. The method pursued is to spend two hours daily, one in the morning and one in the evening, in exercising this faculty. The patient is instructed to give the closest attention to all that he learns, so that it shall be impressed on his mind clearly. He is asked to recall every evening all the facts and experiences of the day, and again the next morning. Every name heard is written down and impressed on his mind clearly, and an effort made to recall it at intervals. Ten names from public men are ordered to be committed to memory every week. A verse of poetry is to be learned, also a verse from the Bible, daily. He is asked to remember the number of the page in any book where an interesting fact is recorded. These and other methods are slowly resuscitating a failing memory.

**A NEW ANÆSTHETIC.**—Prof. O. Brunter, of Germany, who is at present at Underwood Springs, near Portland, Me., performed a series of interesting scientific experiments recently, the object of which was to demonstrate the value of a new anæsthetic, which seems to possess wonderful virtues. Prof. Brunter first transformed German water-gas into snow, and then into a mass of beautiful white crystal, resembling ice, but in reality a local anæsthetic, so powerful that a single touch completely benumbs the member, arrests the flow of blood, and enables the subject to endure any operation without suffering or any considerable loss of blood. One individual was given too prolonged a touch on the back of the hand, when he found that the hand was devoid of all feeling. For four hours needles inserted caused no pain, and yet the hand was not powerless. No blood followed the puncturing. It is claimed that this gas will take the place of ether. No ill-effect except the possibility of blistering follows its administration. The gas is to be bottled at the Underwood Springs.

**OVERSTUDY.**—School-girls of the present day are too often overtaxed. Think of an undeveloped brain getting up book knowledge on ten different subjects all the same day, and this going on day after day for several years! It is altogether contrary to the principles of a sound psychology to imagine that any sort of mental process worthy of the name of brain thinking can take place in that brain while this is going on. The natural tendency of good brain at that age to be inquisitive and receptive is glutted to more than satiety. The natural process of building up a fabric of mental completeness by having each new fact and observation looked at in different ways, and having it suggest other facts and ideas, and then settle down as a part of the regular furniture of the mind, cannot possibly go on where new facts are shoveled in by the hundred, day by day. The effect of this is bad on boys, but it is worse on girls, because it is more alien to their mental constitution.

**SHADE TREES CAUSE SICKNESS.**—The shade trees about our dwellings have done much to make our wives and daughters pale, feeble and neuralgic. Trees ought never to stand so near to our dwellings as to cast a shade upon them. If the blinds were removed, and nothing left but a curtain with which to lessen on the hottest days the intensity of the heat, it would add greatly to the tone of our nerves and to our general vigor. The piazzas which project over the lower story always make that less healthful than the upper story, especially for sleeping purposes. I have cured many cases of rheumatism by advising patients to leave bedrooms shaded by trees or piazzas and sleep in rooms constantly dried and purified by the direct rays of the sun.—*Dio Lewis' Journal*.

**A NEW DISINFECTING COMPOUND** for purifying the atmosphere of the sick-room has just been presented to the Berlin Medical Society. Oils of rosemary, lavender and thyme, in the proportion of 10, 2½ and 2½ parts respectively, are mixed with nitric acid in the proportion of 30 to 1½. The bottle should be shaken before using, and a sponge saturated with the compound and left to diffuse by evaporation. Simple as it is, the vapor of this compound is said to possess extraordinary properties in controlling the odors and effluvia of offensive and infectious disorders.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**MILL SOLD.**—Amador Ledger, Nov. 27: The 10-stamp mill of the Tellurium has been sold, and is now being hauled to Camp Seco, Calaveras county, to be erected on a quartz mine in that vicinity. This disposes of all the surface improvements made at the Tellurium. Most of the machinery has long since been taken out and stored at Pine Grove; the framework of the mill is now being torn down preparatory to removal. Spagnoli Bros. have purchased 300 feet of pipe from the Tellurium Co., and it is now being removed to be placed in position for their new mill above Clinton. The Volcano Gold Gravel Mining Co. have just had a donkey-engine placed in position at their claim at Volcano, for the purpose, we presume, of hoisting gravel in spots considerably below the tunnel level. The rain last Saturday and Sunday was not sufficient to materially affect the water supply of the Amador canal.

**RICH ROCK.**—Calaveras Chronicle, Nov. 27: Judging from the splendid specimens of rock shown us the other day by our townsman, Wm. M. Nuner, Esq., that gentleman is the owner of a half interest in a very rich mine. We have made mention of this property some time ago. It was named the Riverside mine, situated in Hundred Ounce gulch, north of the town, on the Amador side of the river. Work was suspended on the mine during the last three months, pending a sale, but the parties failing to come to time with the cash, Messrs. Nuner & Lowry have resumed work. The lead, which is from 2½ to 3 feet wide, has been uncovered a distance of 75 or 80 feet, and all along shows rock rich in free gold.

**SUTTER CREEK.**—An accident occurred at the Mahoney mill the latter part of last week, causing a delay in the dropping of the additional 10 stamps. The cam shaft broke, bringing a portion of the mill to a standstill. The necessary repairs are almost completed, and it is expected the 10 stamps will be started to-day. Knight & Co. have just taken a contract to build a large derrick for the Lambing gravel mine near Lone City. The derrick will weigh in the neighborhood of 65 tons, and will have a lifting capacity of seven tons. The same firm has also engaged to make two or three dredges for the same mine. The South Spring Hill mill was started this week. The additional 10 stamps are about completed, and will be set in motion shortly if the water supply will permit. Water in the Amador canal is still very slack.

## Fresno.

**HILDRETH NEWS.**—Cor. Fresno Examiner, Nov. 26: Excitement prevails among the mining population, occasioned by daily discoveries of quartz ledges that prospect from \$20 to \$60 per ton free gold, and in some cases are pregnant with sulphurets. The surrounding hills are being industriously prospected by quite a number of mine-hunters. This section is noted for rich surface prospects of free gold, principally in quartz formation, and with two exceptions, white talc containing blue streaks accompanies the ledges in selvages of from one to two feet, which prospects to an astonishing amount. Prospects are changing hands from the locator to the capitalist; but in regard to the most valuable locations, prices are being asked that are out of all common sense, according to the judgment of San Francisco mining men, which is keeping good property from development. At the James mine, a clean-up was made in the astras yesterday. From a run of five tons of ore, \$1000 was the amount produced. This property is the richest mine in the district. The owners are sinking on the ledge, which is four feet wide, with selvages of talc, porphyry and sediment of three feet that assays \$60 per ton. The present depth of the incline shaft is 145 feet. The McNally ledge, in the shaft below the 500-foot level, has widened out to four feet of good ore. Some say they can judge the increase and decrease of the ledge daily by the length of Mac's smile. The Wilson mine shows up a fine ledge of very rich ore in the shaft with well-defined walls. This mine is next to the James mine in richness. San Francisco mining men have made some high offers for this property. Louis does not want the world because he has no place to put it. Chas. Taylor and N. Niven, while prospecting on the west side of Fine Gold river, uncovered an eight-foot ledge of quartz that contains galena sulphurets that assay \$600 per ton. The ledge in one place is 28 feet wide, which seems to be a blow-out, and if the ledge prospects \$6 to the ton in free gold it is a big thing.

## Inyo.

**WAGES.**—Register, Nov. 25: The Darwin mines are paying good wages, as mining wages go in these days of reductions. The Deference and other mines pay \$3.50; the Modoc mines work two eight-hour shifts, at \$3.75 per shift.

**TO SHIP TO RENO.**—Inyo Independent, Nov. 26: Most of the miners in Inyo county who are taking out lead and silver ores are making arrangements to send their ores to the new reduction works at Reno. It is reported that some shipments of gold ore will also be made.

## Nevada.

**MINING IMPROVEMENTS.**—Transcript, Nov. 27: The 10-stamp mill on the Baltic quartz mine near Graniteville, in this county, is being enlarged by the addition of 10 stamps more. Another tunnel is being run to tap the ledge 500 feet below the present tunnel. The Baltic is said to be giving good returns now. It is owned by an incorporated company principally consisting of Oakland men, and E. W. Roberts, formerly of the Buck claim at Moore's Flat, is superintendent.

**THE DELHI STRIKE.**—North San Juan Times, Nov. 27: The rich strike made in the Delhi mine the other day gladdened many a heart in this portion of God's country. It made owners, employees and everybody else who cares for the prosperity of the Ridge, and who is not envious of the prosperity of his neighbor, feel happy.

**A DEBRIS DAM.**—Nevada Transcript, Nov. 26: A large dam made from wood and stone, and calculated to hold two years' washing of "slickeys," is

being constructed at the Omega gravel mine in this county. Twenty thousand feet of heavy timbers are to be used in making it. It will be as solid as the rocks on which it is to stand.

**LOCATING FOR SILVER.**—Grass Valley Union, Nov. 30: The recent favorable prospects for silver ore over on Greenhorn creek have started something of an excitement, and in consequence numerous claims have been located. The fact that much of the land is held under agricultural patents has not deterred locators from posting their notices. Some of the notices are amusing compositions, showing an intention to locate about all creation in order to make sure of a silver lead. In the prospects already obtained ruby silver is shown in good quantity from a lode that at present shows a width of four feet.

**AFTER A QUARTZ MILL.**—Transcript, Nov. 24: Pat. Campbell, owner of the Golden Gate gravel mine, near Smartsville, was in town yesterday negotiating for a 10-stamp quartz mill. He proposes to hereafter work his claim by the drifting process, and as the gravel is cemented together will be obliged to crush it before the gold can be washed.

**HORSESHOE MINE.**—Foothill Tidings, Nov. 27: Yesterday the miners struck a good vein of ore in the north end of the north drift of the Horseshoe. The ledge is six inches in width, and is full of mineral, with occasional glimpses of free gold. This ledge is 208 feet below the surface, and is 32 feet from the shaft. A large stream of water gushes from the ledge, which is considered a good indication. Some of the rock was brought to town and can be seen at W. K. Spencer's.

## San Bernardino.

**JENNY LIND MINE.**—Calico Print, Nov. 28: Operations on this claim are increasing in activity and the chlorides are all doing well with plenty of ore in sight of a fair grade. There are 20 miners at work on the several leases taking out about 12 tons of ore per day of about 60-ounce rock. Over \$2000 in royalties are now due the owners for the past seven weeks' work. Work on the Iron Clad is still progressing in good shape and undoubtedly will be permanent and dividend-paying. A rich strike is reported in the Little Waterman. This mine has paid its owners handsomely from the start. Chloriding in East Calico and all over the camp, in fact, never was in a more flourishing condition than at present.

## San Diego.

**JULIAN MINES.**—Cor. San Diego Sun, Nov. 20: Since your last published report of mining operations in this district some valuable accessions have been made to the bullion producers.

**THE STONEWALL.**—Since its change of owners, arrangements are being perfected to increase its milling capacity from 10 to 20 stamps. The assured continuance of its large ledge and high grade of ore warrants its enterprising management in placing it on the roll of first-class gold mines.

**THE OWENS.**—This mine, under its present efficient management, bids fair to rival the Stonewall as a bullion producer. Recent discoveries in its lower levels of large bodies of marvelously rich ore sustain previously expressed opinions of the high character of its formation and its permanency as a true fissure ledge; its main shaft is now being sunk with vigor, when a juncture of its two ledges, Nos. 1 and 2 are reached—forming a ledge seven feet wide—more water may be found available to keep its 10 stamps continuously running.

**THE OROFLAME.**—Its large ledge of fairly average ore, its perfect mill—10 stamps—its efficient management, guarantees an output of bullion of no mean proportions.

**THE BLUE HILL OR GARDINER.**—This famed mine, under its indefatigable owner, still yields its abundance of marvelously rich ore. The last crushing—some 20 tons—having yielded only \$80 per ton, is by no means a fair average yield. This mine has produced over \$150,000 from about 1500 tons of ore reduced.

**THE ARGONAUT.**—This mine immediately adjoins the Blue Hill or Gardiner, on the west and north. The ledge of high-grade ore forms the Blue Hill or Gardiner, traversing the Argonaut limits. On it working has been resumed, disclosing a ledge of valuable ore.

**THE ELLA.**—The tunnel to tap this famed mine is now in some 600 feet. As the distance to this ledge is expected to be made within two months, you may expect in the near future a large increase in the bullion products of this district. The Pocohontas, the Gipse, the Hubbard, the Tarwater and Stratton locations and others of no less prominence are being worked with prospects of flattering results. A rich gold yield is here inviting the aid of small capitalists to rescue from its primitive condition that which is the main factor to their ambition, to commerce and trade.

## Shasta.

**COPPER CITY.**—Republican Free Press, Nov. 29: C. C. Jones, of the Old Winthrop mine, has let the contract for getting out timbers, with a view to starting mining operations. As soon as the contract is completed, Mr. Jones will come up from San Francisco and put a number of men to work. So, you see, we are likely to have another boom here.

**MILL.**—Shasta County Democrat, Nov. 24: Paul's 12-stamp quartz mill, and other machinery, arrived last week. Mining matters are looking up again. Quite a number of capitalists are in the county looking for investments. It is reported that Camden, Magee & Co. gave \$10,000 for the fine 20-stamp mill, and all the rest of the machinery erected on the Lost Confidence mine, by Col. Elsworth. This plant originally cost \$125,000. Weil, Conroy & Co. have, for the past three months, been running a tunnel on the Ballakala mine, and last week struck an immense body of ore, much of it being high grade. The proprietors are highly gratified with the late developments on this mine. Bob Kennedy is developing a very promising free gold prospect, about a quarter of a mile north of the Muchmore mine, near lower Springs. The vein is well defined, and yields as rich ore as any one would care to see. Andy Fife is piping water across the river, at the mouth of Spring creek, from the old Spring creek ditch to his Huntington mill on the east side. By this means he gets sufficient water power to run 50 or more stamps. We are told that Mr. Fife will prepare his plant to do all the custom work he can

get. The proprietors of the Snyder and Last Chance intend to commence another tunnel 300 feet lower than the old tunnel, at a point where the veins crop and show rich free gold. This new tunnel will satisfactorily prove the length and extent of the ore body, now partly exposed by the upper tunnel—or, in other words, it will expose an ore chute from 450 to 500 feet in length, and at the lowest level at least 350 feet in depth.

## Sierra.

**THE PHOENIX.**—Tribune, Nov. 29: The main tunnel is in 700 feet. The crosscut on the west side is about 65 feet, and that on the east side about 55 feet. The indications are said to be excellent. The boarding-house will be ready for occupancy in a week. Nearly 100 men are employed in and about the mine. In the gravel-claim of John Sorocco, Wm. Neville, and others near Johnstown, a well-defined quartz ledge has been found, the rock of which prospects very well. No. 2 tunnel at the Young America mine is in about 125 feet. Only 65 men are at the mine. The mine never looked better.

**PROSPECTIVE SALE.**—A wealthy company has been formed in Scotland to purchase the Gibsonville ridge, and develop the rich gravel mines there. One of the company recently spent several days in and about Gibsonville, and seemed well satisfied with the outlook. The purchase price will be in the neighborhood of \$1,000,000. It is said that the company also intend making an examination of several promising quartz mines in the vicinity of Sierra City, with the idea of purchasing.

**THE EMPIRE MINE.**—About 375 feet of tunnel has been run at this mine. Only a few men are now employed. It may be given out as a fact that the company will erect an 80-stamp mill and chlorination works in the early part of next spring. The company is justly sanguine as to the future of the mine.

**1001 GRAVEL MINE.**—Operations in this mine will be commenced anew in a few days. Notwithstanding that over \$60,000 has been spent by the present company in prospecting and developing the mine, operations of an expensive character will again be indulged in. An assessment will soon be levied.

**GOLD CLIFF MINE.**—Excellent reports are received from this promising property. The tunnel is in 15 feet on the lode which is 4 feet in width, and widening out as work progresses. By running 300 feet along the vein from the mouth of tunnel, the owners expect to encounter the shaft. Many years ago a portion of this mine was worked by Mexicans with good success, astras being used. Winter supplies have been laid in, and work will steadily continue. Surveyor C. W. Hendel is the principal owner. The mine lies in Gold Valley, and is but a short distance from the Empire. Work at the Cleveland mine has been partially suspended. Some trouble exists between the mine-owners and the creditors of the mine.

**BUNKER HILL.**—Mountain Messenger, Nov. 27: The Bunker Hill Co., at Newark, has its outside work all done and is about ready to commence taking out pay gravel. We hear that some excellent prospects have been obtained. The tunnel of the Goodhope is going steadily ahead with the prospect that 150 feet more will tap the ledge a long way below the old works. The water is not as troublesome as it was a short time ago.

## Sonoma.

**MARK WEST COAL MINE.**—Santa Rosa Democrat, Nov. 26: Messrs. King & Killis, of the Mark West coal mine, are much encouraged over the promising indications of a paying coal mine. Five veins have been opened so far and several tons of coal have been taken out. Mr. Killis stated to a reporter, Friday, that they could take out 50 tons at once, but prefer to go deeper in order to get to the better quality of coal supposed to be in the hill. That which is on the surface, from being exposed to the atmospheric changes, is inferior to that mined at greater depths. An experienced miner by the name of West has been engaged to superintend the work.

## Trinity.

**WAITING FOR WATER.**—Trinity Journal, Nov. 27: Hydraulic miners in all districts of Trinity county are said to have their claims in working order and only await the coming of storm and a plentiful supply of water to begin active operations. It has generally been complained of late years that early fall rains ruined the mining season; but this year has been remarkably dry, wherefore we may reasonably hope for proportionately increased storms later on.

## NEVADA.

## Washoe District.

**CON. CALIFORNIA AND VIRGINIA.**—Virginia Enterprise, Nov. 27: About 400 tons continues to be the daily output of ore from this mine, reduced at the Morgan and Eureka mills, assays from battery samples averaging about \$47 per ton. Twenty-five bars of bullion, weighing a ton and a half, valued at \$110,000, were shipped to San Francisco last evening. On the 1650 level the upraise above the east crosscut is in a good quality of ore and being carried to a connection with the good ore development in the levels above. The drift southwest from the C. and C. shaft has been advanced to the total extent of 555 feet. On the 1600 level the lateral drift south from the north end of the mine is in 380 feet, running in favorable working ground. On the 1500 level the lateral drifts running north and south from the Old Con. Virginia shaft are making good progress, the ore north being 212 feet in length, and the south drift 336 feet. On the 1435 level, at the end of the east crosscut, which has reached the east clay of the ore body, a station has been cut out for a winze to be sunk to the 1550 level to ascertain the boundaries of the ore in that direction. On the 1300 level the north drift from the Con. Virginia shaft is in 360 feet.

**POTOMAC.**—The southeast drift from the Chollar line, on the 250 or Old Potosi tunnel level, is in 60 feet from the line, all the way in good ore. Two crosscuts, east and west, a short distance back from the face of the drift, have been made to ascertain the width of this fine ore vein. Each is in nearly 12 feet, showing the extent of the ore in either direction, and defining the vein to be about 25 feet in width. It still shows well in the face of the main drift. The ore mentioned in last week's report as being found 300 feet south of the Chollar south line,

is in what is known as the Lindsay drift, which is being run in a northwesterly direction, and only day before yesterday it cut through into the Old Potosi upper workings, carrying the same character of ore all the way through, the entire length of ore being 95 feet. This is all high-grade ore, and its width will now be explored and ascertained. It is an important development, with extensive possibilities. A drift is now to be made from the Lindsay drift to connect with the Old Potosi tunnel for air circulation, etc.

**HALE AND NORCROSS.**—Since the cessation of work through the Combination shaft, the main shaft of the company has been reopened and well repaired to the 1300 level, with new timbering where required, new stage guides, etc. The incline is also being repaired to the Suro tunnel level. Some of the old upper levels of the mine are now being reopened for the resumption of exploration after ore bodies left behind years ago in the popular desire to sink deeper after bonanzas. The old second station level has been reopened but a short distance, the drift running to the southeast. The seventh level is also being reopened, repaired and straightened up. The eighth level has been reopened and repaired to the distance of 40 feet southeast. More or less good-paying ore was found in former times on all these levels, and it certainly is to be hoped still more will now be found.

**CHOLLAR.**—The principal work is confined to cleaning out and repairing the old shaft, the surface or top of which is on D street, just south of the office of the company. This work has been done as far down as the 250 station, which is one of the old working levels of the mine. The timbering is considerably out of repair, but it will soon be renewed and straightened up. Below the 250 station the shaft is found to be clear for a distance of 102 feet, below which point it is filled solid with debris, apparently. A strong flow of water comes in at the 250 level, but it is surface water, which will necessarily drain out in a short time. From the floor of the works or surface of the shaft to the Old Potosi tunnel is 50 feet; to the old drain tunnel, 80 feet farther, or 130 feet, and to the bottom of the vertical shaft, 960 feet in all. The ore found in the southeast drift near the Chollar and Potosi line proves to be in Potosi ground.

**ANDES.**—Steam was got up in the hoisting works a day or two since, and the machinery found to be in perfect working condition, starting off first rate. It will take three or four days yet to make the few necessary repairs to the shaft guides and other arrangements down to the 350 level, which is the present objective point of attack. Some good ore is known to exist on that level, which was passed by in the desire for deeper working, and this ore is considered desirable now. Meanwhile, in exploring it some ore of higher grade might very possibly be found. The total depth of the shaft is 615 feet.

**SAVAGE.**—On the 500 level the south lateral drift is in 150 feet from the upraise above the 600 level at the Gould and Curry line. The last 40 feet of it is in pretty good ore. On the 600 level the south lateral drift is 680 feet in length, and 80 feet further will carry it to its desired connection with the main Savage shaft. It has been turned away eastward from the ore vein for that purpose. On the 800 level the lateral drift runs about southeast, and is 300 feet from the Gould and Curry line. It is in very favorable-looking vein material at the present time, showing ore of rather low grade.

**ALTA.**—On the 725 level the north lateral drift in Lady Washington ground, and the south lateral, also following along the Keystone vein, are making good progress, and both are in vein matter carrying streaks and bunches of ore. The winze being sunk below crosscut No. 2, west in the main Alta vein, is now down 108 feet. A little water is coming in at the bottom, but not sufficient to seriously interfere with the progress of sinking. This winze follows the dip of the vein at an angle of about 55 degrees.

**BEST AND BELCHER.**—On the 600 level east crosscut No. 2 has been advanced 75 feet, and the drift northeast from east crosscut No. 1 has been extended 22 feet, making a total of 189 feet. On the 800 level, at the line of the Con. California and Virginia, an east crosscut has been started from the end of the main north lateral drift, which is now out 38 feet.

**ALPHA AND EXCHEQUER.**—The grading and other preparations in commencement of placing the requisite steam-hoisting machinery over the shaft are going vigorously ahead at the old Alpha shaft, through which it is proposed to work both of these mines.

**SIERRA NEVADA.**—On the 520 level east crosscut No. 5 from the north lateral drift has been advanced 49 feet, making a total distance of 236 feet. It is now in a more favorable formation for finding ore, the material being softer and carrying quartz giving low assays.

**CROWN POINT AND BELCHER.**—About 375 tons is the regular daily yield, principally from the 1600 level, with a small proportion from the 1700 and the levels above, keeping the Mexican, Santiago and Vivian mills steadily running.

**YELLOW JACKET.**—About 150 tons continues to be yielded daily, of low-grade ore, from the 1300 level and some of the levels above. The reopening of the lateral drift north on the 1400 level is making good progress.

**OCCIDENTAL.**—The upraise to connect the lower with the upper tunnel is now up about 100 feet in hard quartz. A few tons daily of low-grade ore continue to be extracted from the upper tunnel for milling.

**UTAH.**—On the 472 level the main west drift is 432 feet in length, 57 feet having been added since last Friday's report. Material in the face, clay and porphyry, with small quartz seams.

**OPHIR.**—On the 1065 level, the excavating of the shaft station is well advanced. About 300 tons of ore daily are being hoisted through this drift for the Con. California and Virginia.

**KENTUCK.**—Daily yield 60 tons, most of which comes from the 800 level, keeping the Rock Point mill steadily running. A dividend of 10 cents per share was declared yesterday.

**GOULD AND CURRY.**—On the 425 level the old south lateral drift has been cleaned out and retimbered 40 feet further, making a total distance of 233 feet.

**OVERMAN.**—The hoisting engine and other sur-



face machinery at the old shaft are being put in order for active resumption of work in the old upper levels of the mine.

**UNION AND MEXICAN.**—The joint lateral drift north from the station in the Ophir drift, on the 1300 level, is progressing well in favorable ground.

**BULLION.**—The surface machinery is being placed over the old Croesus shaft, preparatory to explorations at that point after the low-grade ore known to exist there.

**JUSTICE.**—The drift run into the south portion of the mine from the old Woodville shaft is in low-grade ore.

**MONTE CRISTO.**—The upraise above the 150 level from the new shaft is making slow progress in very hard rock.

#### Hawthorne District.

**THE NORTH STAR CONSOLIDATED.**—Walker Lake Bulletin, Nov. 26: The ledge in the North Star Consolidated has been struck on a lower level, and as it is of the same quality the value of the mine is vastly increased. As soon as a mill starts work in the Hawthorne district this mine will be one of the richest and most productive in the State.

**THE HINDLEY.**—Another body of rich ore has been struck in the Hindley mine, near the end, and running into the claim. This is of the same quality as the very rich rock previously extracted and will make a nice lot of dividends; in the meantime the owners have been shipping what they call second-class rock, which would be considered as remarkably first-class ore in most mining districts.

**A RED CANYON MINE.**—Senator Danberger is working the Golden Era mine, in Red canyon, with encouraging results and has several men at work. They are now sinking a shaft on a ledge of very rich gold ore. The Golden Era is situated near the well-known Golden Belt mine, owned by Williams & McKnight, and from which was taken so much rich specimen rock two years ago.

#### Jackrabbit District.

**IMPROVING.**—Pioche Record, Nov. 20: From a party, recently having made a visit to the Onondaga mine, Jackrabbit District, we learn that the mine, during the week, has steadily improved both as regards the quantity and quality of the ore, a great many tons of which have been taken out within the past four days. A frame building has been put up on the dump, to be used as an orehouse, for assorting and sacking purposes. Here's success to the Onondaga boys; they deserve it, and a big one, too.

#### Kinman District.

**THE NORRIS MINE.**—Virginia Enterprise, Nov. 30: J. W. Norris, locator of the mine of that name in Kinman District, on the western slope of Mount Davidson, returned last Saturday after an absence of several months in Montana and Idaho, where he claims to have discovered, through the agency of the divining rod, numerous veins of ore assaying high in gold and silver. The shaft on the Norris Consolidated is now down 335 feet below the surface. The formation in the bottom is said to indicate the proximity of an ore vein. Notwithstanding the principal owners in the mine have expended a large sum in prospecting it to its present depth without realizing a cent on their investment, their faith is still unshaken in the infallibility of the power of the divining rod—when manipulated by their apostle Norris—to detect the presence of precious metals below the surface. Sufficient supplies have been delivered on the ground to operate through the winter.

#### Pioche District.

**PIOCHE CON. LEACHING WORKS.**—Pioche Record, Nov. 20: The Pioche Consolidated Leaching Works, under the contractor's supervision, W. T. Rich, are rapidly approaching completion. These works are being constructed on a larger scale than they were supposed to be, and it is evident that the Pioche Consolidated Mining Co. has come to stay, and again place Pioche in the leading ranks as a bullion producer. From a flying visit we were able to obtain the following in regard to the leaching works: They are to be of 60 tons capacity, and everything throughout is to be constructed on a labor-saving principle. The roll and engine-room is 28x30 feet. The ore is to be run from the mine to the works in cars, and it then goes directly into a separator, the fine going into a large bin of 100 tons capacity and the coarse is conveyed back by an elevator and is then run through what is called the bolter, which again separates the ore, the fine going into the bin and the coarse is carried back by the elevator over and over again until it is all run through and deposited in the bin. The leaching-room is 52x40 feet, the tanks occupying the space, which are fed by chutes from the bin, the tailings being dumped over the road, where there is sufficient dumping-room, and it was on this account that the site was chosen.

#### Rebel Creek District.

**EXCELLENT PROSPECTS FOR GOOD MINES.**—Silver State, Nov. 30: Rebel Creek District, which is sometimes called Yellow Creek, is situated about 50 miles north of Winnemucca on the Idaho road. It was discovered some years ago by F. P. Snapp and Joseph McColley, who located the Ohio mine. Subsequently several other mining locations were made, some of which have been worked to a considerable extent and produced large quantities of rich ore. The district is comparatively unprospected, however, and new locations are being made by prospectors. Among the recent discoveries is a lead found by Chris. T. Raabe and named the Bismarck. It is a gold-bearing ledge, which can be traced by croppings along the mountains for 15 miles in almost a due northerly direction. The formation is talcose slate, through which the lead in many places crops from 10 to 20 feet wide. The ledge is located by different persons and companies for a distance of seven miles, the Bismarck being the most southerly. Mr. Raabe has stripped the ledge for some 40 or 50 feet along its course, and prospected it by a shaft to the depth of 15 feet. The lead at that depth is over 10 feet wide, and while all of it carries more or less gold, the rich streak is from 18 to 30 inches thick. The ore in this streak carries free gold, which is plainly visible to the naked eye, and some of the quartz carries almost sufficient gold to make it valuable for jewelry. Mr. Raabe, who is now here attending court, has several specimens of the quartz, which are literally covered with gold, one piece weighing a little over an ounce being valued at \$10. He intends to keep

developing his mine, as he can work enough of the ore in a mortar of evenings to pay all his expenses and have a little left for a rainy day. The Choate Brothers, who own the next claim to the Bismarck, have a tunnel in 80 feet on the course of the lead, with good ore all the way. The mine is called the Planet, and it produces ore enough to pay for running the tunnel. Adjoining the Planet is the Mammoth, owned by Shrewsbury & Wilson, who have a tunnel in 25 feet on the lead, and are now sinking a 50-foot shaft at the end of the drift. They have rich, gold-bearing quartz, and work enough of it in an arastra to pay expenses. Sooner or later capital will get into the district and make it one of the liveliest mining camps on the coast.

#### Taylor District.

**A NEW STRIKE IN THE ARGUS.**—White Pine News, Nov. 27: As we are ready to go to press, we learn that an important strike has been made in the Argus mine. They have been getting at it for several days, but it was only yesterday that it opened out. Of its size we are not advised, as the management themselves do not yet know.

#### Tuscarora District.

**BELLE ISLE.**—Tuscarora Times-Review, Nov. 25: Crosscut west, 150-foot level, extended 27 feet. Crosscut east, same level, extended eight feet.

**TORNADO CONSOLIDATED.**—We have advanced 11 feet in tunnel during last week. The ledge twisted from its regular course, and the ground is therefore very tight and unkind.

**NAVAJO.**—South drift, from No. 5 crosscut, east vein, 250-foot level, has been extended five feet. No. 1 winze, on vein west of east lateral vein, same level, has been sunk six feet; total depth 22 feet.

**NORTH BELLE ISLE.**—North gangway on the 300-foot level has been extended the past week 30 feet. The formation is a lively looking quartz porphyry, and very close and hard. Fair progress has been made in extending north drift from No. 1 crosscut, 150-foot level. Very rich ore is being followed north, and looks favorable to continue to the north line. No. 3 winze has reached a depth of 23 feet, and is yielding some very rich ore. The ore strata in the vein continues about the same. The ore is a little higher grade.

**NEVADA QUEEN.**—Shaft has been sunk eight feet. It is hard, but breaks well. There are 3000 gallons of water every 24 hours. Will make better progress now, as everything is in good running order. South drift from No. 2 shaft has been advanced eight feet; only working one shift here. Ore is four feet thick, and continues fully as rich as ever. Crosscut from north gangway, 150-foot level, has been extended 25 feet. Indications are that we will have to go 25 feet farther, provided that the vein does not vary its course. There are seams of ore in the face which look very favorable. Everything around the mine is running smoothly.

#### Union District.

**GOLD MINE.**—Belmont Courier, Nov. 26: Theo. Cirac is expected to return to Grantsville, from San Francisco, with a party of capitalists, to look at his gold mine in Union district. There is a streak of ore in the ledge in this mine that gives assays of over \$60,000 per ton. Union mining district is prolific in ledges that carry gold and silver and other metals. Grantsville and Lone City will yet be the centers of immense mining operations.

#### ARIZONA.

**NEVADA MINE.**—Prescott Courier, Nov. 26: The above-named mine is in Groom Creek district, about six miles south of Prescott. It belongs to Mr. Wm. N. Kelly and others, of Prescott. Mr. John Hutchins prospected it enough to satisfy the other owners that it was a mine. It carries gold in paying quantities, and the vein is of good size. Not long since, Mr. Riley, a real quartz miner, leased it, went to work and has to-day, at least, \$5000 worth of rock as his share. Owners have much more and are satisfied. Now, there are many other properties in this section, quite as good as the Nevada; but it will take work to make them remunerative. So we say to other mine-owners, don't fritter away labor on several ledges. Select the best, work it, and you will receive your rewards.

**MOHAVE CO. MINES.**—Miner, Nov. 24: J. J. Hyde made another shipment of ore from the Keystone dump last Monday. Jas. W. Michaels has leased the first north extension of the Rainbow mine, and put several men to work on it last Friday. The Minnesota mine, near Chloride, is producing considerable high-grade ore. No less than nine heavily loaded wagons left Kingman on Wednesday last, with lumber, provisions and mining supplies for the different mines in this district, and all of them came in loaded with ore. Messrs. Bassett and partners will make quite a shipment of chloride ore from the Crosscut claim in a few days. This claim is about half a mile east of town, and the present shipment is the result of three or four months' work. Messrs. Young & Evans are sinking a new shaft on the Sabbath Bell mining claim. This mine is situated about half a mile east of Mineral Park, and has had considerable work done on it in former years. The ore streak in the bottom of the old shaft is about eight or ten inches wide, and assays from \$100 to \$150 per ton. A large quantity of ore has been run through the sampling works at Kingman during the past few days from the American Flag mine, Wallapai mountains. Messrs. Richards, Corin & Co. are the fortunate possessors of one of the best paying mines in the Territory of Arizona. J. H. Johnson, who has lately made a sale of the C. O. D. mine to Messrs. Howell & Dana, had 18 tons of ore worked at the Kingman sampling works last Wednesday, and has about 45 tons yet to work. This ore was already on the dump at the time the mine was sold, and was not included in the trade. These 63 tons of ore will net Messrs. Johnson & Clark something in the neighborhood of \$5000. Rees Jones has a carload of ore ready to ship from the Rocky Point mine, the result of his own work for the past six weeks.

#### COLORADO.

**TABOR.**—Georgetown Courier, Nov. 26: E. Beaudry & Co., lessees, have been meeting with highly satisfactory results in their work upon this property. In the stope above the 100-foot level west, which is 65 feet long and about 30 feet high,

they have had a continuous body of ore, and as they raise it, it has been found to increase in quantity and quality. The ore body is now from 8 to 10 inches in thickness and extends the entire length of the stope. The ore has been sorted into two classes, the first of which has been milling about 112 ozs. silver per ton and 42 per cent lead. About 30 tons of ore is ready for shipment which they think will run some better. The bottom of the east drift shows 16 inches of solid galena, and an equal body is shown in the bottom of the west drift. The heading of the west drift is in scattered mineral. The extension of this drift will be commenced next week, and pushed to the junction of the Tabor and Gov. Thomas lodes—a distance of 75 or 80 feet. Considerable high-grade ore was taken out of the surface workings at the junction of these veins, and the lessees are confident of finding a good body of ore ahead of them. Mr. Beaudry is one of the owners of the Tabor, and under his supervision the property is being worked to its best advantage and with a view to its future welfare.

**CENTENNIAL.**—A contract has been let to sink the shaft an additional 50 feet. Eighteen inches of pyritous ore was encountered soon after commencing work, and on the first of this week it had increased to a width of nearly three feet.

**RED ELEPHANT.**—The Swartz shaft on the Red Elephant has been surveyed with the view of straightening it. It is probable that the work will be commenced soon.

**SILVER CACHE.**—Supplies are being laid in to work this property all winter. "Sailor" Evans expects to have a big showing by next summer, as well as a big lot of ore to mill.

**WHEELING.**—Mr. E. Moore has laid in supplies on this snow-bound property to work it all winter.

**FOUR-THIRTY.**—Charley Veatch expects to work the property all winter.

#### IDAHO.

**THE GOLD BELT.**—Wood River Times, Nov. 24: The development of the Gold Belt will naturally cause inquiry into the best methods of reduction, as the mills there have heretofore simply been reducing the ores for what gold they could catch, allowing the larger and better part of the precious metals to run to the tailings reservoir. But this wasteful system will soon have to be abandoned for a more satisfactory one that will work the ores up to the 95 per cent which is common now, in old mining districts. What that system or process will be—whether chlorination, or lixiviation, or what, remains to be determined by actual and exhaustive experiments; but certain it is that the owners of mines on the Gold Belt can no longer be satisfied with the low percentage heretofore obtained. If a really first-class mill is ever built to reduce Gold Belt ores, it will make such a record that the public will be astonished and wonder how so much wealth has been permitted to lie dormant so long. Then will come a genuine and lasting boom, for Hailey and the Gold Belt.

**GOLD HILL.**—Ketchum Bulletin, Nov. 24: The Gold Hill mine, at Quartzburg, Boise county, Idaho, has been sold to San Francisco parties for \$150,000. The purchasing parties also pay for all supplies on hand and the expenses on the new mill since the fire, which will probably be \$30,000 more. Sam Allen says the Parker Mining Co. has expended \$75,000 in prospecting its property since the pay ore has been exhausted in the Parker mine. A small crew of men is still kept prospecting in the Western Reserve mine, adjoining the Parker. Mr. Allen says they intend to find it, if there is any more ore in the mountain. Messrs. Stone and Rineheart are now employed at the Mattie mine, on the head of Trail creek. Mr. Stone came down to town Monday. He informs us that the mine is looking finely, with plenty of good ore in sight. Fifty sacks of high-grade ore is now ready for shipment and will be brought down this week. Ore is being taken out every day. This property is turning out a good one. It belongs to the Fall City Mining Company, J. B. Rieff, superintendent.

**FLINT.**—Idaho Avalanche, Nov. 27: We learn from a gentleman in from Flint that the mines being worked by the company at that place never looked better than at present. Supt. Stanton feels from the present appearances of the ore bodies that the company has a bonanza in the Perseverance, Sherman, Star of the Evening and the Rising Sun. Work is now being prosecuted on all the lodes named. The drift being run to connect with the bottom of the Perseverance shaft is nearly completed, and is in very rich ore, as is also the north drift from the bottom of the shaft. The ore exceeds all expectations, being worth about \$1500 per ton. In the Star of the Evening, the ore body is steadily growing richer as the drift is extended into the hill, while rich ore has been struck in the Sherman and Rising Sun. The crosscut from the Perseverance to the Rising Star is being run as fast as possible, and before a great while the last named will be reached and opened. Mr. Stanton feels jubilant over the outlook.

#### MONTANA.

**THE ANACONDA SMELTER.**—New Northwest, Nov. 26: The Anaconda Smelting Works started up a number of their matting furnaces on Monday with over 100 men working. The number was increased by Tuesday morning to the firing of the entire 26 matting furnaces and the employment of over 200 men, with applications from fully 50 more men wanting employment. Trains of ore and coal are arriving, the steam stamp is crushing 300 tons of ore a day, the calcine furnaces are now being fired, and it is anticipated the concentrators, which will put all the old works in motion, will be started up in a day or two. The company has adhered to the scale of prices offered, and a large majority of the workmen remaining in Anaconda have decided to go to work at the reduced rates rather than remain idle or depend upon the contributions of others. Sheriff McMaster has been in Anaconda this week and says quiet prevails. Some 60 or 70 special deputies and watchman have been sworn in as a precautionary measure, but there has been no occasion manifest for their services. We learn from other sources that there are about the same number of men in Anaconda who will not be reconciled to accepting the rates offered, and hold frequent meetings to discuss the matter, but have made no demonstrations to interfere with others who are at work or seeking it.

We learn also that the foreman of the Anaconda mine, Batte, has been instructed to hold himself in readiness to put out 1000 tons of ore per day, and that the Dilon quarries are to furnish more rock for the new concentrator. It seems probable that the works will be started up to full capacity as rapidly as possible and the money paid out will greatly relieve the situation at Anaconda. The workmen there have doubtless chosen wisely in taking a reduced rate of wages, for the winter at least, in preference to idleness or want, or perhaps both. The Anaconda matter in several points is a special case and is not a precedent for establishing rates elsewhere.

**THE BALD BUTTE GROUP.**—What is known as the Bald Butte group of mines in the main range, west of Marysville, has been bonded to an English concern, somewhat allied to the Montana and Empire companies. The principal mines of the group are the Sterling and Albion, and these are being now developed under the bond. What is known as the Sterling Gold Mining Co., has been formed to purchase and operate the property, and is capitalized at £100,000 in shares of £1 each. It is stated that the purchase price of the property is £38,000 in cash and £27,000 in paid-up stock of the company. The principal owners of the property are understood to be B. H. Tatem, Wm. Chumaseiro and the Chadwick estate.

#### OREGON.

**DIGGINGS.**—Jacksonville Times, Nov. 27: J. Klippel & Co., who have excellent diggings on Applegate, commenced mining last week. The miners feel encouraged and many of them expect a wet winter, as considerable snow already lies in the mountains. Haskins, Long & Co., who will operate the Star Gulch claim this season, have everything in readiness and in better shape than ever. John O'Brien has been making much preparation at his mines in the Steamboat district and will soon be ready for active operations. F. A. Davis, of Grave creek, will mine on a more extensive scale than ever this season. He has first-class diggings and will no doubt do well. Operations have commenced at some of the hydraulic claims in Josephine county, where mining operations will be more extensive this season than for many past. Brown & Co.'s mill, at the Swinden ledge, is running on full time and crushing several tons of quartz daily. There is an abundance of quartz on the dump and in sight. The weather of the past week has been more favorable for the miners, and the ground is becoming so well soaked that it will not take much more rain to start many of the placer mines. Another cleanup was made at Klippel, Baume & Co.'s mill during the past few days, which resulted quite favorably. Quartz from the claim of McKenzie & Co. is being crushed, which is turning out well.

**BAKER CITY ITEMS.**—Cor. Bedrock Democrat, Nov. 27: The mines are attracting attention; mining men are coming here from Colorado, New York City, San Francisco and other places with money in their hands and stop off with the view of spending a month or two looking over the country and purchasing mining property. Mr. H. Hill, of Leadville, Colorado, is here with the view of building concentrating works and sampling and buying ores. He will spend a month looking up the business. Col. W. M. Wilson, of Montana, is looking after a gold mine—wants to purchase an improved property. Another gentleman from New York is also looking after mining property. We have talked with these gentlemen and are satisfied they mean business. The Virtue mine, eight miles east of here, has been pumped out and will start up the mill and commence crushing ore in a week. The Connor creek mine is running 35 stamps and produces 150 pounds of gold a month. We are told that there are four quartz mills on the road to Canyon City that are producing large amounts of gold and paying handsome dividends. The placer mines have had a dry season, but they are scattered over a large area of country and have yielded handsomely. The Chicken Creek and several other mines on Burnt river, and the mines in Rye valley and on Upper Burnt river, have all yielded satisfactory results.

#### UTAH.

**MINING REVIEW.**—Salt Lake Tribune, Nov. 26: The week has been a dull one in mining circles, heavy storms having prevented the free handling of the metals. The especially noteworthy feature of the week has been the purchase by Salt Lake parties of the Camas No. 1 and the Fraction on the Wood River (Idaho) gold belt for some \$45,000. They will be incorporated. The receipts of ore for the week ending the 24th inclusive were the lightest for many weeks, being \$23,373.50; of bullion for the same time, \$105,867.38, a total of \$129,240.88. For the previous week the receipts were \$88,491.44 of ore and \$74,873.31 of bullion, a total of \$163,364.75. The output of the Ontario mine for the week was 26 bars of bullion, 15,958.11 fine ounces; and \$8745.49 ore sales; a total of \$24,704.60. The daily product for the week was six bars of fine bullion \$8535.84; no ore sales. Fine bar receipts for the week were \$27,764.81; base bullion, \$13,300. The product of the Hanauer smelter for the week was \$24,250 in bullion. Ore receipts here for the week were \$8800 by Wells, Fargo & Co.; \$9465 by McCormick & Co.; \$5108.50 by T. R. Jones & Co.

#### NEW MEXICO.

**IN BETTER SHAPE.**—Rio Grande Republican, Nov. 28: We are glad to note that the Stephenson mine is now in better shape than it has been for the past few years, as far as title is concerned. A four years' lease on the property has been made by H. Lesinsky, General R. B. Marcy and C. F. Sturtevant, comprising a majority of the stockholders, to Dougher & Bennett, and they, in connection with Foy Bros. & Baren, are equally interested in working it, each owning a one-fifth interest. Fifty per cent of the net proceeds are paid to the stockholders. S. M. Ashenfelter has also a lease on record agreeing to terms. This is the most promising property now developed in the Organ mountains, and in connection with the Bennett and adjoining property, it is thought by interested parties that a sale to capitalists, who will work the mine thoroughly, can be easily consummated.



WM. H. TAYLOR, Prest.

R. S. MOORE, Supt.

L. R. MEAD, Sec'y

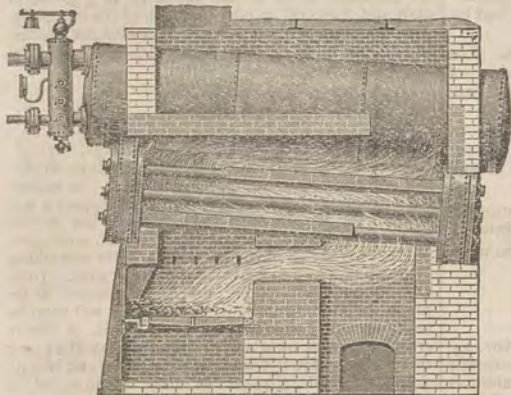
# RISDON IRON & LOCOMOTIVE WORKS.

LOCATION OF WORKS:

S. E. Cor. BEALE and HOWARD STS., SAN FRANCISCO.

Manufacturers and Sole Agents for the Pacific Coast for

## HEINE SAFETY WATER TUBE BOILER.



HEINE SAFETY WATER TUBE BOILER.

HAS THE FOLLOWING  
ADVANTAGES:

**SAFETY,  
DURABILITY,  
ECONOMY,**  
AND

**Facility of Inspection and Repairs.  
60,000  
HORSE POWER NOW IN USE.**

Boilers can be seen working in San Francisco at Palace Hotel, Spring Valley Water Works, Hueter Bros. & Co., California Jute Mills, and other places.

**GUARANTEED MORE EFFICIENT  
than any other Boiler made.**

Also Manufacturers and Sole Agents for the  
Pacific Coast for

## MACBETH'S PATENT PULLEYS.

STEEL RIMS,

WROUGHT IRON ARMS,

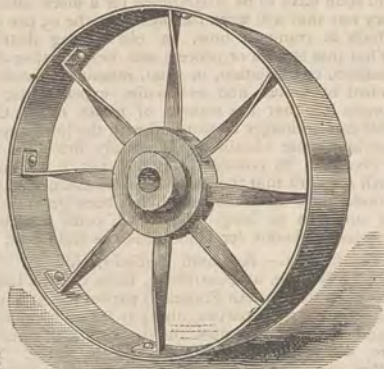
LIGHTEST, STRONGEST AND

BEST PULLEY IN THE MARKET.

HALF THE WEIGHT OF CAST-IRON

Accurately Balanced,

Cannot be Broken in Transportation.



MACBETH'S PATENT PULLEY.

Sole Agents Pacific Coast for

## FOX'S CORRUGATED FURNACE FLUES.

For BOTH LAND &amp; MARINE BOILERS.

Rapidly Replacing Old Style.

Over 10,000 now in use. Have just fitted 12 furnaces in Oceanic S. S. Co.'s Steamer Zealandia. Send for Circular of comparative tests.



FOX'S CORRUGATED BOILER FLUES.

### BUILDERS OF

**QUARTZ MILLS**—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
**AIR COMPRESSORS**—Rope Power Transmission.  
**HYDRAULIC PUMPING** and Hoisting Machinery.  
**WROUGHT-IRON WATER PIPE** a Specialty. *Note*—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.  
**SAW-MILL MACHINERY** of all kinds.  
**STEAM ENGINES**—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
**SOLE MANUFACTURERS** for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.  
**MACBETH PATENT STEEL-RIM PULLEYS**—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.  
**REFRIGERATING MACHINERY** for Steamships, Breweries, and Cellars.  
**WILSON'S PATENT GAS-PRODUCER**.  
**STEAM BOILERS** of all descriptions.  
**SUGAR MACHINERY**—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.  
**STEAMSHIPS**—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.  
*Note*—Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.  
Send for Circular and Price Lists.

PATENT

## LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning  
and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, Threshing and Stock-driving, and all other occupations where there is dust, poisonous vapor, or bad odor.  
In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,  
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.



## H. P. GREGORY & CO.

Nos. 2 and 4 California St.,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

# MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING  
MACHINERY.FRANK & CO.'S WOODWORKING  
MACHINERY.NEW HAVEN MANUF'G CO.'S MA-  
CHINISTS' TOOLS.BEMENT & SON'S MACHINISTS  
TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM  
PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND  
EXHAUSTS.

SHIMER MATCHER HEADS.

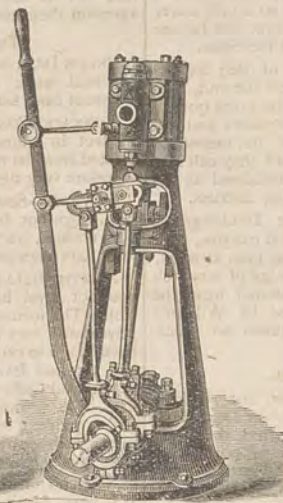
BRANARD MILLING MACHINES.

TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS

MASSEY'S STEAM HAMMERS.

SCHLENER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISH-  
ERS.WILLIAMSON BROS' HOISTING  
ENGINES.ATLAS ENGINE WORKS ENGINES  
AND BOILERS.PAYNE'S VERTICAL AND HORI-  
ZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS.

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS  
AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJEC-  
TORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACK-  
ING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACK-  
ING, PAINT, ETC.

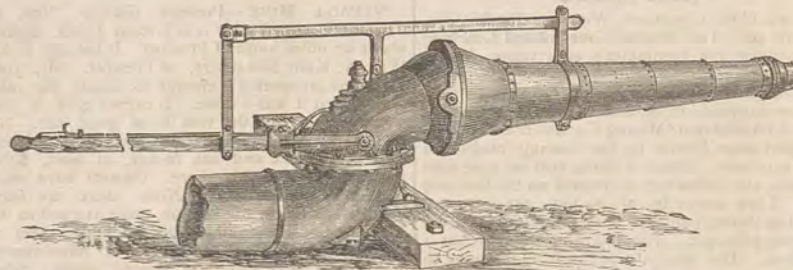
YACHT ENGINES.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

## IMPROVED FORM OF HYDRAULIC GIANTS.

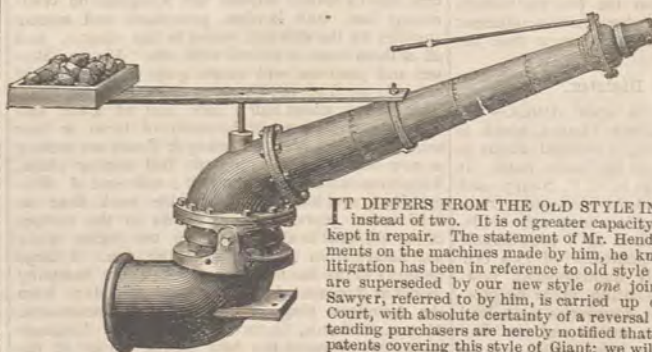


The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco, Cal.



This cut represents our

**IMPROVED  
HYDRAULIC  
MACHINE.**

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Miners and intending purchasers are hereby notified that we are the sole owners of the patents covering this style of Giant; we will prosecute to the fullest extent of the law manufacturers or users of an infringement.

Send for Circulars and Price List.

HOSKIN &amp; CO., Marysville, Cal.

## SPENCERIAN STEEL PENS

Are The Best

Established 1860.

### USED BY THE BEST PENMEN

Noted for Superiority of Metal,  
Uniformity, and Durability.  
20 Samples for trial, post-paid, 10 Cents.

IVISON, BLAKEMAN, TAYLOR, & CO.,  
753 and 755 Broadway, New York.

NATIONAL ASSURANCE CO.,  
OF IRELAND.ATLAS ASSURANCE COMP'Y,  
OF LONDON.BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.

H. M. NEWHALL &amp; CO.,

GENERAL AGENTS,

809 &amp; 311 Sansome St., San Francisco, Cal.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in lead-  
ing smelting works  
and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

**MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.**

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,

JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

DENVER OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

UTAH OFFICE—SALT LAKE CITY, UTAH.

## Metallurgy and Ores.

**SELBY  
SMELTING and LEAD CO.,**  
416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY  
And Assay Office.**

Highest Prices Paid for Gold, Silver and  
Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

**Standard Shot-Gun Cartridges,**  
Under Chamberlin Patent.

**W. A. GOODYEAR,**

**Civil and Mining Engineer  
MINING EXPERT and GEOLOGIST.**

Address care of DEWEY & Co., 252 Market Street, San  
Francisco, Cal.

## JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

**ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,**

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists,  
Mining Companies, Milling Companies, Prospectors, etc.,  
to our full stock of Balances, Furnaces, Muffles, Crucibles,  
Scorifiers, etc., including, also, a full stock of  
Chemicals.

Having been engaged in furnishing these supplies since  
the first discovery of mines on the Pacific Coast, we feel  
confident from our experience we can well suit the de-  
mand for these goods, both as to quality and price. Our  
New Illustrated Catalogue, with prices, will be sent on  
application.

Our Gold and Silver Tables, showing the value per  
ounce Troy at different degrees of fineness, and valuable  
tables for computation of assays in grains and grammes,  
will be sent free upon application. Agents for the Patent  
Plumbago Crucible Co., London, England. Also for E.  
G. DENNISTON'S Silver Plated Amalgam Plates. The  
plates of this well-known manufacturer are thoroughly  
reliable, and full weight of Silver guaranteed. Orders  
taken at his lowest prices.

JOHN TAYLOR & CO.

## Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED 1869

Ores worked by any Process.  
Ores Sampled.  
Assaying in all its Branches.  
Analyses of Ores, Minerals, Waters, etc.  
Working Tests (practical) Made.  
Plans and Specifications furnished for the  
most suitable Process for Working Ores.  
Special attention paid to Examinations of  
Mines; Plans and Reports furnished.  
O. A. LUCKHARDT & CO.,  
(Formerly Huhn & Luckhardt,)  
Mining Engineers and Metallurgists.

J. KUSTEL. H. KUSTEL.  
**METALLURGICAL WORKS,**  
318 Pine St. (Basement),  
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my  
Process.  
Assaying and Analysis of Ores, Minerals and Waters.  
Mines Examined and Reported on.  
Practical Instruction given Treating Ores by im-  
proved processes.

G. KUSTEL & CO.,  
Mining Engineers and Metallurgists.

C. H. AARON,

**ASSAYER AND METALLURGIST,**  
NOGALES, ARIZONA,

Will attend to business in connection with mines in So-  
nora or Arizona.

WM. D. JOHNSTON,

**ASSAYER AND ANALYTICAL CHEMIST.**  
514 Kearny Street,  
SAN FRANCISCO, CALIFORNIA  
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

This paper is printed with Ink Manufactured  
by Charles Eneu Johnson & Co., 500  
South 10th St., Philadelphia. Branch Offi-  
ces—47 Rose St., New York, and 40 La Salle  
St., Chicago. Agent for the Pacific Coast—  
Joseph H. Dorey, 529 Commercial St., S. F.

## JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and  
high heads are utilized, and are guaranteed to give more power with less water than  
any other wheel made. Being placed on horizontal shaft, the power is transmitted  
direct to shafting by belts, dispensing with gearing.  
Estimates furnished on application for wheels specially built and adapted in  
capacity to suit any particular case.  
Further information can be obtained of this form of construction, as well as the  
ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost,  
by applying to the manufacturers.

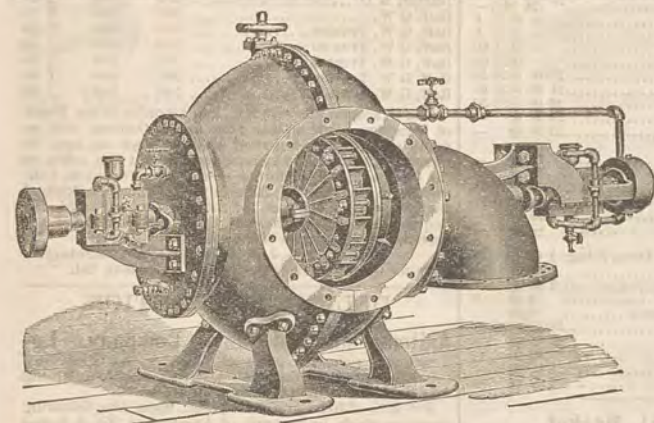
JAMES LEFFEL & CO.,

Springfield, Ohio,

or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents,  
Chicago, Ill., and Denver, Col.

PARKE & LACY, General Agents, San Francisco, Cal.



## CALIFORNIA HAND ROCK DRILL,

—FOR—  
**TUNNELING, DRIFTING,  
and SINKING.**

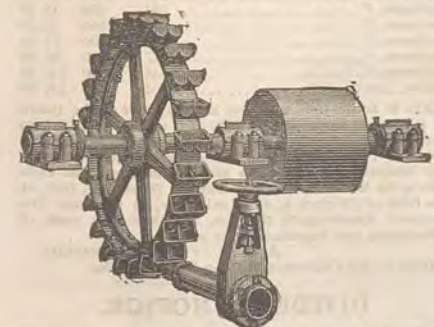
Buy the best and latest improved  
Hand Rock Drill; can be run by hand-  
steam, compressed air, or water power.  
Machine made entirely of crucible  
steel; light, compact and durable.  
Strikes 250 blows per minute with 7-lb-  
hammer. A perfect reproduction of  
hand drilling; will drill one inch per  
minute in the hardest rock, using  
one-quarter the number of drills  
equired by hand labor.

Machines on exhibi-  
on at No. 32  
First St., San  
Francisco.

Send for  
circulars.

GEO. T. EMERY, General Agent.

## PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED  
by the Idaho Company at Grass Valley, Cal., and  
gave 90 2 per cent., distancing all competitors. Send for  
Circulars and guaranteed estimates.

L. A. PELTON,  
Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street  
San Francisco, Cal.

**Engraving**—Superior Wood and Metal Engrav-  
ing, Electrotyping and Stereotyping  
done at the office of this paper.

## THE CONSUMERS' COMPANY.

## VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

**Vulcan Nos. 1, 2 and 3,**

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank  
Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**

218 California Street, San Francisco, Cal.



## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

**GIANT POWDER or DYNAMITE,**  
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and  
GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

**JUDSON POWDER IMPROVED.**

FOR RAILROADS and LAND CLEARING. Is from three to four times stronger than ordinary Blast-  
ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and  
saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

**BANDMANN, NIELSEN & CO.,**

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

## THOMAS PRICE'S ASSAY OFFICE,

CHEMICAL LABORATORY,

**BULLION ROOMS and ORE FLOORS,**

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed  
of in the Open Market to the Highest Bidder.



## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING NOVEMBER 23, 1886.

- 353,118.—CAR COUPLING—J. J. Bogard, Tehama, Cal.  
 353,050.—LAWN TENNIS NET POLE—Emilie G. Booth, Berkeley, Cal.  
 353,211.—PISTON PACKING—J. W. Dudley, Portland, Ogn.  
 353,133.—PATIENT'S ELEVATOR AND PERAMBULATOR—Margaret Hammond, Port Madison, W. T.  
 352,920.—SULKY GANG PLOW—J. W. Holland, Pomeroy, W. T.  
 353,073.—WASHING MACHINE—Jos. La River, Hayward, Cal.  
 353,079.—HARROW—J. G. Owen, Covello, W. T.  
 353,083.—DISCHARGING CARGOES—James Reid, Portland, Ogn.  
 353,160.—CAN TOP AND COVER—F. A. Robbins, S. F.  
 352,936.—PLOW—J. T. Senteney, Blocksburg, Cal.  
 352,985.—PROPULSION OF CARS BY COMPRESSED AIR—Jas. M. Thompson, S. F.  
 353,187.—GAS BURNER—J. S. Wethered, S. F.  
 353,043.—MANTEL GRATE—E. W. Williams, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Mining Share Market.

There has been no such "boom" in mining shares for years as is now being experienced here. Prices have advanced very rapidly, all varieties following Con. California and Virginia, which is the leading stock. In this mine the Comstock papers say the new ore development not only holds good, but, in fact, shows considerable improvement in size as well as quality with further development. The shipment, Nov. 27, of 25 bars of bullion, weighing a ton and a half and valued at \$100,000, was a reminder of old bonanza days. Ophir and Best and Belcher have both advanced materially on account of their nearness to the leading mine, though they do not pretend to have found anything new. Thus far, as the rise in prices has been continuous and steady, most all dealers have made money; it will only be when the first drop comes that there will be sufferers. Even if Con. California and Virginia keep in the good ore they are said to have, this is no reason that a lot of other mines, without ore, should be worth the advanced prices now quoted. It is useless, of course, to warn poor people to keep out of stocks, the dealing in which should be left to persons of financial standing, to whom a loss of a few hundreds or thousands will be no great matter.

Since writing the above the first "set-back" has occurred, owing to the failure of a Virginia City firm of brokers. Other failures followed; and on Thursday there was a panic in the market.

The Virginia Enterprise says: All sorts of rumors are prevalent as to the developments in the leading mines, and matters connected with the mining situation generally, most of them erroneous and deceiving. Therefore, all should be on their guard and not believe everything they hear.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Moulton, Nov. 24, \$12,792; Alice, 24, \$32,720; Con. California and Virginia, 25, \$101,623; Barbers, 24, \$14,861; Hanauer, 25, \$4,150; Bannock, 25, \$18,000; for November, \$30,000. Hanauer, 27, \$6650; Stormont, 27, \$28,410; Alice, 24, \$11,223. The banks of Salt Lake City report the receipt for the week ending November 24th, inclusive, of \$105,867.38 in bullion, and \$23,373.50 in ore, an aggregate of \$129,240.88.

## New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

Heath M. Co., Dec. 1. Location, Idaho Territory. Capital stock, \$100,000, in \$100 shares. Directors—Thomas Bell, E. B. Pond, W. L. Oliver, L. P. Drexler and S. Linkton.

Baltimore S. M. Co., Dec. 1. Location, Storey county, Nevada. Capital stock, \$10,500,000. Directors—John H. Dickinson, E. Strother, George Childs, John F. Taylor and C. A. Sankey.

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.		LOCATION.		AMT. LEVIED.		DELINQUENT SALE.		SECRETARY.		PLACE OF BUSINESS.	
Acme M & M Co.	California.	9.	21.	Oct 25.	Nov 29.	Dec 20.	J. M. Buffington.	309	California St.		
Aultman M & M Co.	California.	3.	21.	Oct 26.	Nov 29.	Dec 20.	J. M. Buffington.	309	California St.		
Alta S M Co.	Nevada.	34.	25.	Oct 16.	Nov 20.	Dec 10.	W. H. Watson.	302	Montgomery St.		
Benton Con M Co.	California.	16.	10.	Oct 27.	Dec 1.	Jan 6.	J. P. Flannigan.	302	Montgomery St.		
Centennial Gravel M Co.	Nevada.	27.	02.	Oct 25.	Dec 6.	Jan 1.	J. P. Flannigan.	309	California St.		
Columbus Con M Co.	Nevada.	22.	50.	Oct 27.	Nov 29.	Dec 20.	J. P. Flannigan.	309	Montgomery St.		
Chollar S M Co.	Nevada.	41.	15.	Nov 25.	Dec 29.	Jan 19.	A. S. Groth.	414	California St.		
Champion M Co.	California.	23.	10.	Nov 29.	Jan 7.	Jan 28.	T. Wetzel.	552	Montgomery St.		
Diana M Co.	California.	6.	25.	Oct 12.	Nov 22.	Dec 13.	P. J. Flannigan.	318	Pine St.		
Excelsior M Co.	Nevada.	23.	20.	Oct 18.	Nov 24.	Dec 15.	C. E. Elliott.	306	Montgomery St.		
East Mt Diablo M Co.	Nevada.	23.	10.	Oct 30.	Dec 4.	Dec 30.	G. W. Fisher.	318	Pine St.		
Golden Fleece G M Co.	California.	7.	10.	Oct 22.	Nov 22.	Dec 15.	J. W. Gleason.	310	Pine St.		
Independence M Co.	Nevada.	16.	21.	Oct 12.	Nov 16.	Dec 8.	J. W. Gleason.	310	Pine St.		
Mayflower Gravel M Co.	California.	35.	10.	Nov 19.	Dec 22.	Jan 17.	J. Morizo.	328	Montgomery St.		
Mountain Tunnel M Co.	California.	2.	10.	Oct 27.	Nov 29.	Dec 20.	A. B. Paul.	328	Montgomery St.		
North Sierra Nevada M Co.	Nevada.	4.	20.	Nov 26.	Jan 21.	Jan 24.	J. L. Fields.	330	Pine St.		
Pneumatic M Co.	California.	1.	12.	Oct 5.	Nov 11.	Dec 9.	H. Pictor.	326	Sansome St.		
Peerless M Co.	Arizona.	9.	10.	Nov 16.	Dec 23.	Jan 17.	A. Waterman.	309	Montgomery St.		
Peer M Co.	Arizona.	6.	10.	Nov 12.	Dec 22.	Jan 7.	A. Waterman.	304	Montgomery St.		
Potosi M Co.	Nevada.	39.	10.	Nov 10.	Dec 14.	Jan 4.	C. E. Elliott.	304	Montgomery St.		
Polar Star M Co.	California.	35.	07.	Nov 17.	Dec 31.	Jan 15.	J. C. Stump.	339	Montgomery St.		
Rocky Bar M Co.	California.	3.	50.	Oct 15.	Nov 20.	Dec 7.	G. W. Hill.	324	Grass Valley		
Renton Coal M Co.	Wash Ter.	7.	2.	Oct 20.	Dec 6.	Jan 5.	J. H. Henderson.	24	Sansome St.		
Spring Valley G M Co.	California.	10.	25.	Oct 19.	Dec 3.	Jan 3.	H. Pictor.	320	Sansome St.		
Santa Anita M & M Co.	California.	10.	13.	Oct 26.	Nov 29.	Dec 20.	J. M. Buffington.	309	California St.		
Sierra Iron Co.	California.	8.	25.	Nov 18.	Dec 22.	Jan 18.	H. P. Bush.	431	California St.		
Summit G M Co.	California.	9.	10.	Nov 24.	Dec 29.	Jan 18.	G. R. Spinnery.	339	Montgomery St.		
Scorpion M Co.	Nevada.	21.	10.	Nov 11.	Dec 17.	Jan 7.	G. R. Spinnery.	318	California St.		
Tyrolite M Co.	Idaho.	1.	15.	Oct 23.	Nov 30.	Dec 28.	F. Frankenthal.	121	Battery St.		
Tallulah M Co.	California.	21.	33.	Oct 30.	Dec 8.	Dec 29.	A. H. Fish.	334	Mark t St.		
Union Con M Co.	Nevada.	34.	25.	Nov 3.	Nov 24.	Dec 7.	J. M. Buffington.	309	California St.		
Utah S M Co.	Nevada.	34.	50.	Nov 20.	Dec 24.	Jan 19.	A. H. Fish.	339	Montgomery St.		

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Eintracht Gravel M Co.	California.	H. Kunz.	239	Annual.	Dec 4
Gould & Curry S M Co.	Nevada.	A. K. Darlow.	309	Annual.	Dec 20
Mt Diablo M & M Co.	Nevada.	R. W. Heath.	318	Annual.	Dec 20
Mexican M Co.	Nevada.	C. E. Elliott.	309	Annual.	Dec 7
Ophir M Co.	Nevada.	E. B. Holmes.	309	Annual.	Dec 15

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Martin White M Co.	Nevada.	J. J. Scoville.	309	30.	Oct 11
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328	10.	Nov 30
Silver King M Co.	Arizona.	J. Nash.	328	25.	Aug 16
Young America M Co.	California.			40.	May 20

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING NOV. 11.	WEEK ENDING NOV. 18.	WEEK ENDING NOV. 24.	WEEK ENDING DEC. 2.
Alpha.	.95	1.80	1.75	2.85
Alta.	1.00	1.10	1.05	2.60
Andes.	.35	.70	.70	1.25
Argenta.	.35	.70	.70	1.25
Belcher.	.35	.70	.70	1.25
Belling.	.35	.70	.70	1.25
Best & Belcher.	2.40	4.30	4.20	6.57
Bullion.	.65	1.10	1.00	1.35
Bonanza King.	.65	1.10	1.00	1.35
Belle Isle.	.25	.40	.35	.40
Bodie Con.	2.30	2.45	2.30	5.00
Benton.	.15	.20	.35	.45
Bodie Tunnel.	1.55	1.70	1.50	2.50
Bulwer.	8.70	12.00	11.62	20.17
California.	.35	.65	.65	1.20
Challenge.	.35	.65	.65	1.20
Champion.	1.50	2.00	1.60	6.22
Chollar.	1.50	2.00	1.60	6.22
Confidence.	2.90	5.15	5.37	7.00
Con. Imperial.	.15	.25	.35	.45
Con. Virginia.	8.75	12.00	11.62	20.17
Con. Pacific.	1.20	1.25	.90	2.00
Crown Point.	4.00	4.25	4.25	4.50
Eureka Con.	1.5	.30	.55	.85
Eureka Tunnel.	1.5	.30	.55	.85
Excelsior.	1.5	.30	.55	.85
Grand Prize.	1.50	2.00	1.90	5.02
Gould & Curry.	1.50	2.00	1.90	5.02
Goodshaw.	.95	1.80	1.70	3.95
Hale & Norcross.	2.25	2.50	2.25	2.50
Holmes.	.95	1.80	1.70	3.95
Independence.	.95	1.80	1.70	3.95
Julia.	.95	1.80	1.70	3.95
Justice.	.95	1.80	1.70	3.95
Martin White.	2.30	3.50	3.30	2.35
Mono.	1.40	2.80	2.45	3.35
Mexican.	1.40	2.80	2.45	3.35
Mt. Diablo.	2.25	2.50	2.25	2.50
Northern Belle.	.80	.85	.85	.90
North Belle Isle.	5.87	8.00	7.75	7.00
Ophir.	4.30	7.37	7.10	2.91
Ophir.	.45	1.20	.87	1.07
Overman.	.80	1.20	.60	1.50
Potosi.	.90	4.25	3.90	3.60
Pinal Con.	2.70	3.25	2.85	8.25
Savage.	1.95	4.00	3.50	3.50
Seg. Belcher.	1.30	1.70	1.15	3.50
Sierra Nevada.	1.30	1.70	1.15	3.50
Silver Hill.	.10	.15	.15	.30
Silver King.	.10	.15	.15	.30
Scorpion.	.10	.15	.15	.30
Syndicate.	.10	.15	.15	.30
Union Con.	.80	1.60	1.50	3.50
Utah.	1.45	1.80	1.70	4.80
Yellow Jacket.	1.75	2.15	2.40	3.75

## Sales at San Francisco Stock Exchange.

THURSDAY Dec. 2.	100	Independence.	35@45c
2220 Alta.	4@55	2000 Justice.	3.25@3.65
1175 Andes.	2@65	750 Julia.	1.40@1.50
225 Alpha.	1@65	1855 Lady Wash.	1.20@1.35
1485 B. & Belcher.	2@62	770 Mad. Wash.	1.20@1.35
1330 Bullion.	3@41	550 Mono.	4.00
1200 Belle Isle.	50@55c	50 Mt. Diablo.	3.50
60 Bodie Con.	3.10@3.30	710 N. Belle Is.	6@71
400 Bulwer.	2.15@2.25	1550 Navajo.	14@11
950 Benton Con.	1.10	855 Ophir.	30@31
50 Belcher.	7.75	2700 Overman.	3@64
300 Con. Pacific.	45c	445 Occidental.	6@62
1355 Chollar.	7@74	1900 Peerless.	11@14
1575 Con. Va. & Cal.	48@52	1720 Potosi.	10@10
200 Confidence.	15	625 Savage.	19@20
350 Crown Point.	8@9	680 Scorpion.	2@21
450 Challenge.	4@65	550 Syndicate.	1@50c
1355 Excelsior.	3@63	300 Silver Hill.	1.40@1.60
100 Eureka Con.	9.00	1085 Sierra Nevada.	12@13
585 Gould & Curry.	13@13	1085 Union Con.	8@9
2510 Hale & Nor.	71@94	150 Utah.	9@91
400 Holmes.	4.00	2200 Yellow Jacket.	11@11

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
 G. W. INGALLS—Arizona.  
 E. L. RICHARDS—San Diego Co.  
 R. G. HUSTON—Montana.  
 GEO. McDOWELL—Fresno and Tulare Cos.  
 J. C. SWERNEY—Sonoma and Mendocino Cos.  
 O. F. BERGMAN—Yolo and Solano Cos.  
 M. S. PRIME—El Dorado and Placer Cos.

**HEALD'S BUSINESS COLLEGE,**  
 24 Post St. S. F.  
 Send for Circular.

## San Francisco Metal Market.

[WHOLESALE.]		THURSDAY, Dec. 2, 1886.	
ANTIMONY—French Star.....		94	@
BORAX—San Bernardino.....		—	@ 8
Armago.....		—	@ 5
IRON—Glenbrook ton.....		—	@ 23 00
Eglinton, ton.....		—	@ 22 00
American Soft, No. 1, ton.....		23 00	@ 24 50
Oregon Pig, ton.....		21 00	@ 23 00
Clippage Gap, Nos. 1 & 4.....		22 00	@ 23 50
Clay Lane White.....		21 50	@ —
Shotts, No. 1.....		23 50	@ —
COPPER—			
Bolt.....		20	@ —
Sheathing.....		18	@ —
Ingot.....		12	@ 13
LEAD—Pig.....		5 00	@ 5 12 1/2
Bar.....		5 25	@ —
Pipe.....		—	@ —
Sheet.....		8	@ —
Shot, discount 10% on 500 bag		1 05	@ —
Drop, 7 1/2 bag.....		1 85	@ —
Buck, 7 1/2 bag.....		1 85	@ —
Chilled, do.....		2 05	@ —
ZINC—German.....			
Sheet, 7 1/2 lb. to 10 lb. less cask.....		8	@ 9
QUICKSILVER—By the flask.....			
38 50 @ 39 50		38 50	@ 39 50
Flasks, new.....		1 05	@ —
Flasks, old.....		85	@ —
TINPLATE—Coke.....		5 00	@ —
Charcoal.....		6 50	@ —

## New York Metal Market.

Telegraphic advices dated Dec. 2d give the following New York prices:

BORAX—5 1/2 @ 6 1/2 c.  
 BAR SILVER—98 1/2 per oz.  
 COPPER—LAKE—\$12.00 @ \$12.50  
 IRON—No. 1, \$18.50 @ \$19.50.  
 LEAD—\$4.85 @ \$4.95.  
 QUICKSILVER—53 1/2 @ 55c.  
 The following is the latest by mail from the "New York Metal Exchange Market Report":  
 COPPER—Firm, spot closing @ \$12.00 @ \$12.15.  
 Transferable Notices (Lake) issued at \$12.05.  
 Transferable Notices (Chili Bars) issued at \$12.15.  
 LEAD—Quiet at \$4.20 @ \$4.30c spot. Transferable Notices issued at \$4.42 1/2.  
 TIN—Dull at \$22.45 @ \$22.60. Transferable Notices issued at \$22.75.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers and sellers views. All prompt delivery.—Australian Tin, \$22.50 @ \$22.80; Billiton Tin, \$22.75 @ \$23.10; Banca Tin, \$23.00 @ \$23.50; Baltimore Copper, \$10.35 @ \$10.95; Orford Copper, \$10.50 @ \$11.00; P. S. C. Copper, \$10.25 @ \$11.00; Foreign Lead, \$4.35 @ \$4.70; Foreign Spelter, \$4.35 @ \$4.75.  
 MAKER'S PRICES—At tidewater, 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$18.50 @ \$19.50; No. 2, \$17.50 @ \$18.50; Grey Forge, \$16.00 @ \$16.50. Hudson River, Grade No. 1, \$18 @ \$19.50; No. 2, \$17.50 @ \$18.00; Grey Forge \$15.50 @ \$16.50. Southern, Grade No. 1, \$18.00 @ \$19.00; No. 2, \$17.00 @ \$18.00; Grey Forge \$15 @ \$16.

## A CHANCE TO INVEST.

A patent was granted me Sept





**THE Sign of the Arkansaw Cough Syrup** is looking you all square in the face.  
Do you want a sure, safe and reliable Cough Syrup? Are you troubled with a Cough, Cold, Bronchitis or Lung Complaint? Do your Babies keep you awake all night with Hacking Coughs, Colds in the Head, etc. Do you want something reliable in the house to meet these emergencies? We answer to all: "Go to your Druggist and get a Bottle of the Arkansaw Cough Syrup, and be troubled no more." Price, 50 cents per Bottle!

For Sale by all Druggists.

### GOLD MINING PROPERTY FOR SALE.

One of the most promising pieces of Gold Mining Property in Southern California for sale. Owners have not the capital to work it. Call or address

D., 526 Sacramento St.,  
San Francisco.



FOR THE BEST IMPROVED  
**ARTIFICIAL LIMBS**  
ADDRESS  
**MENZO SPRING,**  
9 Geary St.  
SAN FRANCISCO, Cal.  
OFFICE 5,  
Up-Stairs.

### San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice  
**TUBBS & CO.**

611 and 618 Front St., San Francisco

### MACHINISTS, ATTENTION!

AN OUTFIT FOR A MACHINIST.

Good Tools, Patterns and an Established Business

FOR SALE AT A BARGAIN,

If applied for immediately.

Address, B. A. W.,  
Care of this Paper.

### American Exchange Hotel,

SANSOME STREET.

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50  
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.



LIFE SCHOLARSHIP, - \$75.00

Full Business Course.

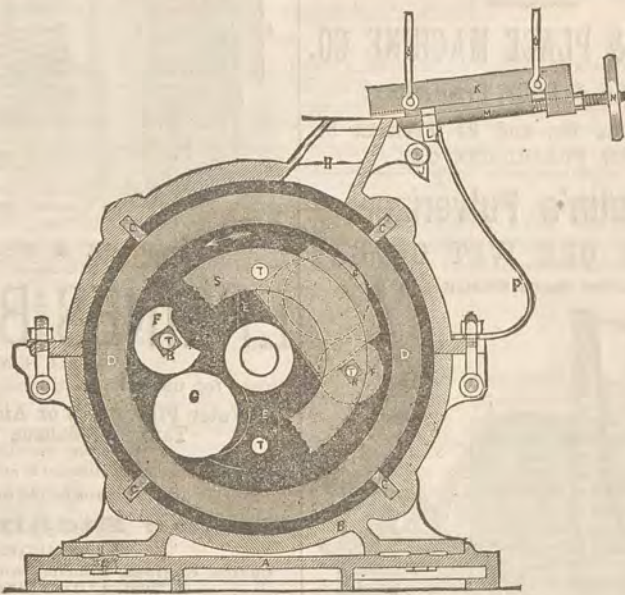
SIX MONTHS' COMBINED COURSE, \$75.

Including the Business Course, Academic Course, Modern Languages, Telegraphy, Shorthand, Type-Writing, etc. Ladies admitted into all Departments. Day and Evening Sessions during the entire year.

CALL OR SEND FOR CIRCULARS.



## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or other Mineral Substance to any degree of fineness in a rapid and economical manner.

Any method of amalgamation may be applied. At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.

Certificates as to performance of the Mills, and any information required, furnished on application.

### THE FRISBEE-LUCOP MILL CO.,

Office, 104 & 106 Washington St., NEW YORK.

OR PACIFIC IRON WORKS, SAN FRANCISCO.

## THE GUTTA PERCHA AND RUBBER MANUFACTURING CO.

—MANUFACTURERS OF—

## RUBBER GOODS.

Patentees of the Celebrated "MALTESE CROSS" Brand Carbolized Hose.

TRADE MARK.



MALTESE CROSS.

The Best Belting for Thrashing Machines is our MONARCH RUBBER BELTING, made with Cotton Stays or Flexible Rivets.

We have also the Patent RED STRIP Rubber Belting, and our Superior STANDARD Rubber Belting. Send for Price List of kind wanted.

JAMES F. HOUGH, General Manager of San Francisco and Portland, Or., Branches, 15 and 17 FIRST ST., near Market, SAN FRANCISCO, CAL.

## ROCK BREAKERS!

"DODGE."

"GIANT BLAKE."

STEAM ENGINES,

MINING MACHINERY, SHAFTING, PULLEYS.

Machine Work to Order.

SAVAGE, SON & CO., 135 to 143 Fremont St., San Francisco.

## JAMES' PATENT RECIPROCATING STAMP MILL.

(PATENTED AUG. 16, 1881.)

Weight of Boss and Shoes (1200 pounds) acts on each Shoe separately. It is practically the same as the regular Stamp Mill.

Capacity, 6 Tons in 24 Hours. 4 H. P.

Parties wishing to test the Mill with any ore they may bring, will find one in operation at our works in this city.

### PRICES:

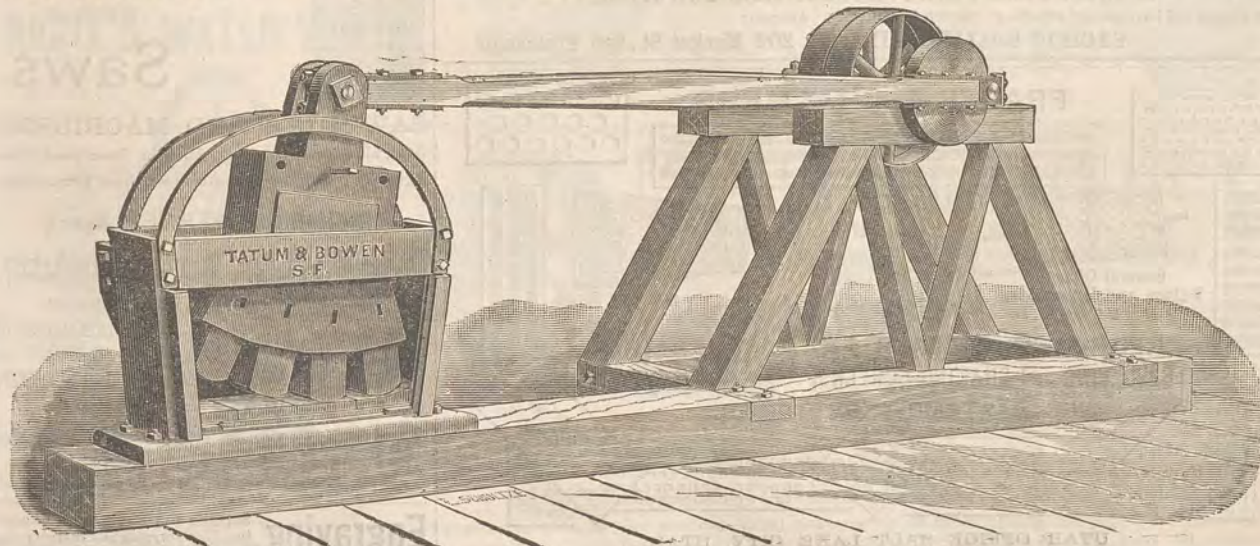
Reciprocating Stamp Mill,	\$350 00
Rock Breaker, - - -	100 00
Automatic Ore Feeder, -	50 00
Single Track Ore Car, -	40 00

SEND FOR CIRCULAR.

TATUM & BOWEN,

34 & 36 Fremont St., San Francisco.

91 & 93 Front St., Portland, Oregon.





NOTICE TO  
**MINING MEN,**  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.

Engineers' Tables of Progress

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, Etc. address:

**INGERSOLL ROCK DRILL CO.,**

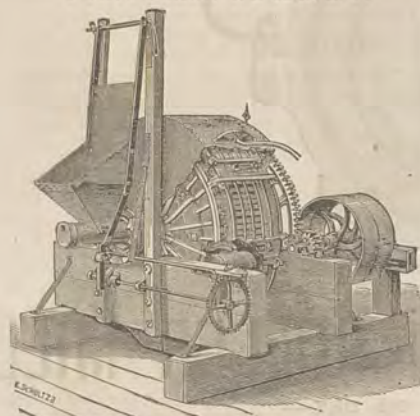
REPRESENTED BY

**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

**Tustin's Pulverizer**  
WORKS ORE WET OR DRY  
FULTON IRON WORKS, S. F.



MANUFACTURED BY

**HINCKLEY, SPIERS & HAYES,**

**MACHINE TOOLS,**  
PRESSES AND DIES,  
PUNCHING and SHEARING  
MACHINERY.

**F. A. ROBBINS,**

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and  
Dies, 20-inch Engine Lathes,  
12-inch Shapers.

Punching and Shearing Machinery for  
Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.  
Gear Cutting a Specialty.

221 and 223 First St., San Francisco.



The California  
Perforating Screen  
Company.

All kinds of Quartz Screens,  
slot or round holes; zinc,  
copper and brass for

**FLOUR AND OTHER MILLS.**  
Quartz Mill Screens a Specialty.  
147 Beale Street, San Francisco.

**THE RUSSELL PROCESS COMP'Y.**

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake. The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**  
316 California St., San Francisco.

## FULTON IRON WORKS,

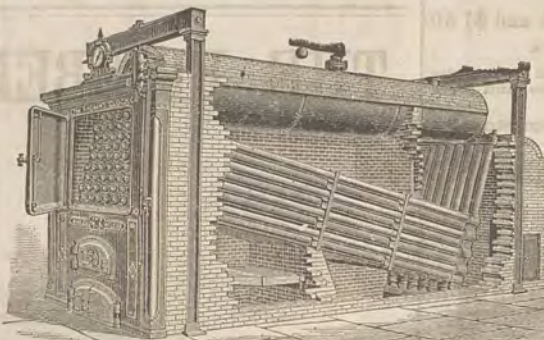
HINCKLEY, SPIERS & HAYES, Proprietors.

(ESTABLISHED IN 1855.)

Office, 220 Fremont St.,

MANUFACTURERS OF

San Francisco.



BABCOCK & WILCOX BOILERS.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure  
or Compound, Stern or Side-wheel En-  
gines.

MINING MACHINERY—Hoisting En-  
gines and Works, Cages, Ore Buckets,  
Ore Cars, Pumping Engines and Pumps,  
Water Buckets, Pump Columns, Air Com-  
pressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for  
Dry or Wet Crushing, Amalgamating  
Pans, Settlers, Furnaces, Retorts, Con-  
centrators, Ore Feeders, Rock Breakers,  
Furnaces for Reducing Ores, Water Jack-  
ets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MA-  
CHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines  
and Boilers, Dredging Machinery, Pow-  
der Mill Machinery, Water Wheels.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

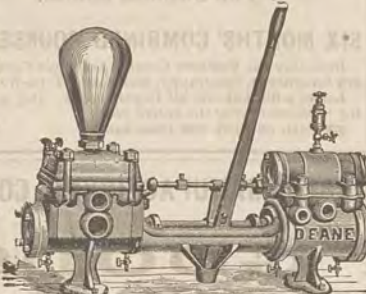
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

...MANUFACTURERS OF...

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.

—ALSO—

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**

## FRASER & CHALMERS.



CHICAGO, ILL.

U. S. A.

General Office:  
Fulton and Union Sts.,  
CHICAGO, ILL.

PERFORATED METALS FOR

REVOLVING and SHAKING-SCREENS,

JIGS & STAMP BATTERIES.

Denver  
Office:  
No. 248  
18th Street,  
Denver,  
Colo.

Mexico  
Office:  
No. 11  
Calle  
de Duques  
Chihuahua,  
Mex.

UTAH OFFICE—SALT LAKE CITY, UTAH.

## Iron and Machine Works.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - San Francisco.

—BUILDER OF—

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines  
Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. **ORDERS SOLICITED.**

### UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

Steam Engines, Boilers,

AND ALL KINDS OF

MACHINERY FOR MINING PURPOSES.

Flouring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front St., bet. N & O Sts., Sacramento, Cal.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

**EUREKA FOUNDRY,**

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.



WATER TANKS! WINE TANKS!

**CALIFORNIA WINE COOPERAGE CO.**

FULDA BROS., Proprietors,

80 to 40 Spear St., - San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

### N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

## Saws.

SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Cata-  
logue. 17 and 19 Fremont St., San Francisco.

RICHARD C. REMMEY, Agent,

**Philadelphia Chemical Stoneware Manufactory,**

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of

all kinds of

Chemical Stoneware

—FOR—

Manufacturing

Chemists.

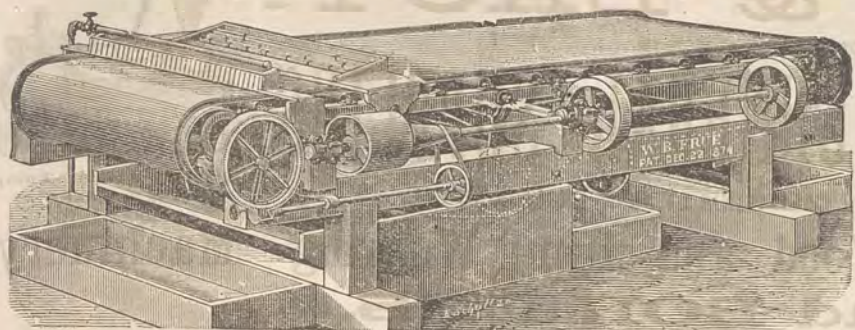
Also Chemical Brick

for Glover Tower.

**Engraving.** Superior Wood and Metal Engrav-  
ing, Electrotyping and Stereotyping  
done at the office of this paper.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR**  
OR VANNING MACHINE.

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS**  
(\$575.00) F. O. B.

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

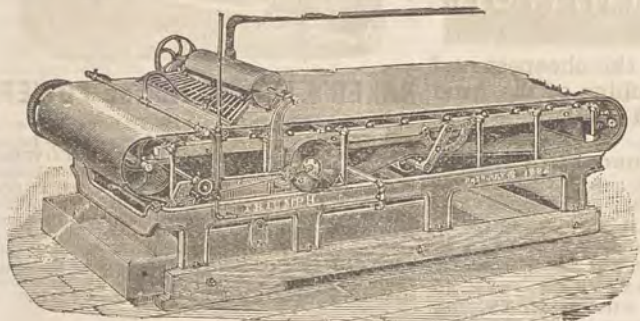
N. B.—Since the above was written the 20 Vanners having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

**ADAMS & CARTER, Agents Frue Vanning Machine Co.,**  
Room 7, No. 109 California Street, SAN FRANCISCO, CAL.

# \$1,000 CHALLENGE ACCEPTED,

## PRICE, FIVE HUNDRED AND FIFTY DOLLARS (\$550.00).



**THE "TRIUMPH" ORE CONCENTRATOR.**

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

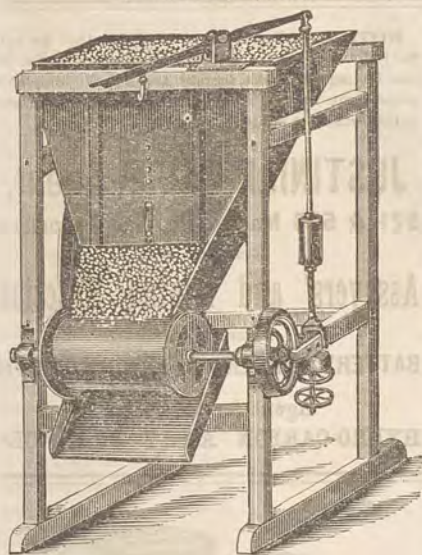
They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE, placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

**JOSHUA HENDY MACHINE WORKS,**  
Nos. 39 to 51 Fremont St., San Francisco, Cal.

## THE ROLLER ORE FEEDER

[Patented May 28, 1882.]

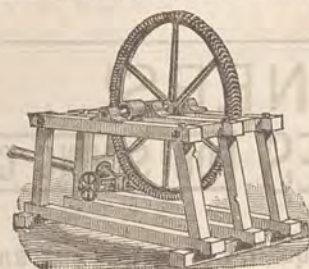


This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

**Golden State and Miners' Iron Works,**  
Sole Manufacturers,  
227 First Street, San Francisco, Cal.

## KNIGHT'S WATER WHEEL



**For Mills, Pumping and Hoisting**

OVER 300 IN USE!  
**All Estimates Guaranteed.**  
SEND FOR CIRCULAR.

**EDWARD A. RIX & CO.,**  
Sole Agent,  
18 and 20 Fremont Street, San Francisco.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.  
J. C. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

## STEAM, AIR, AND HYDRAULIC MACHINERY.

**Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

## UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



Chicago Prices Beaten!

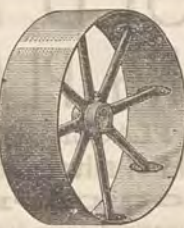
ESTABLISHED 1860.

**S. F. PIONEER SCREEN WORKS,**

221 & 223 First St., cor. Tehama, S. F.

**J. W. QUICK, Prop'r.**

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Meat Drills, Furnaces, Chases, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed



PAT. OCT. 25, 1881.

## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

**CLOT & MEESE,**

Sole Licensed Manufacturers of the

**Medart Patent Wrought Rim Pulley**

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

**SHAFTING, HANGERS AND APPURTENANCES.**

SEND FOR CIRCULAR AND PRICE LIST.

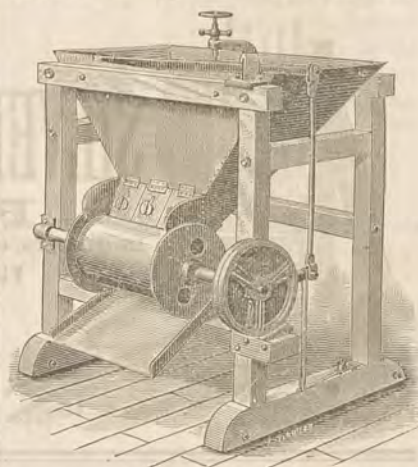
Nos. 129 & 131 Fremont Street,

San Francisco, Cal.

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of references. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.

## THE ORIGINAL Roller Ore Feeder



This form of Ore Feeder is well adapted for its peculiar work.

In reference to a similar form of "Roller" Feeder, which is being manufactured and offered for sale in this city, and of which a cut appears in this journal, we have to say that the Superintendent of the Bunker Hill Gold Mining Company states that the "Challenge" is far superior to the "Roller," he having had both of them operating side by side. We shall be pleased to show this letter, upon application, to any one interested.

We are also manufacturers of the "Challenge" and "Stanford Improved."

Prices furnished by the

**JOSHUA HENDY MACHINE WORKS,**  
39 to 51 Fremont St., San Francisco.

## ORE FEEDERS.

We direct attention to an advertisement, which appears in our journal of the "Original Roller" Ore Feeder, manufactured by the "Joshua Hendy Machine Works," of Nos. 39 to 51 Fremont St., this city.

As the manufacturers of a similar form of Feeder, known as the "Templeton Roller," claim that it is superior to any other style, and cite those in operation at the "Bunker Hill" mill in Amador county, we expressly contradict the statement, and in substantiation submit a copy of a letter shown to us by a representative of the "Joshua Hendy Machine Works," which speaks for itself

BUNKER HILL GOLD MINING CO.,

AMADOR CITY, CAL., July 12, 1886.

To Joshua Hendy Machine Works, No. 51 Fremont St., S. F.—GENTLEMEN: We have used the "Challenge" and "Roller" or "Templeton" Ore Feeders in our mill for the past three years, and I am free to say that I consider the "Challenge" far superior to the "Roller" Feeder, in that most important of all things in a quartz mill, namely, the regular feeding of ores to the batteries. If the "Roller" Feeder is regulated to feed finely pulverized ore, the coarser ore will choke the outlet of the Feeder, and no ore can reach the batteries. If, on the other hand, it is regulated to feed coarse ore, then the fine ore when it comes will sluice right through and fill the batteries. The "Roller" Feeder requires constant attention. Yours truly,

(Signed) N. W. CROCKER, Supt.

BACK FILES of the MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$5. Inserted in Dewey's patent binder, 50 cents additional per volume.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.

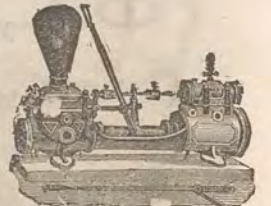


Putnam Planer.

# PACIFIC & LACY.

Cooper Union Institute  
January 1 '85  
10744

## MACHINERY AND GENERAL SUPPLIES,

Knowles Steam Pump  
The Standard.

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.



1850. 1885.  
**RANKIN, BRAYTON & CO.,**  
...BUILDERS OF...  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

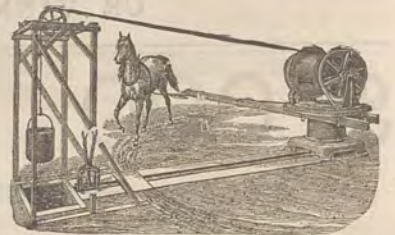
### WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



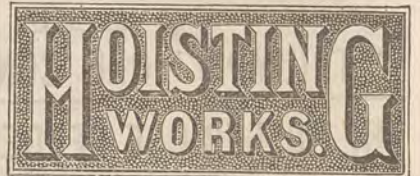
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



### BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700-pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE OF CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



## NOTICE TO GOLD MINERS! SILVER-PLATED AMALGAMATED PLATES For SAVING GOLD!

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER FULL WEIGHT OF SILVER AND BEST QUALITY OF WORK GUARANTEED.

GET OUR PRICES BEFORE ORDERING ELSEWHERE. SAMPLES FURNISHED ON APPLICATION.

**SAN FRANCISCO NOVELTY AND PLATING WORKS,**  
No. 108 FIRST STREET.

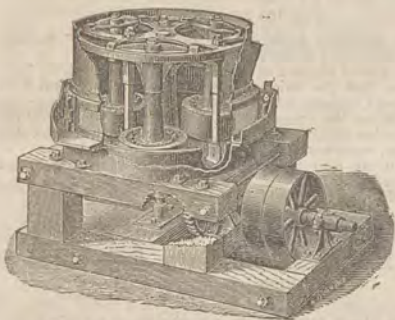
NOTICE.—All our plates are guaranteed to have the full weight of silver agreed upon, and are tested before leaving our works, thereby avoiding the complaints about light weight, made so often before we started in this branch of industry.

**JUSTINIAN CAIRE, Agent,**  
521 & 523 Market St., San Francisco,  
—DEALER IN—

Assayers' and Mining Material.

—MANUFACTURER OF—  
BATTERY SCREENS AND WIRE CLOTH.

Agent for HOSKINS'  
HYDRO-CARBON ASSAY FURNACES.



Centrifugal Roller Quartz Mill.

### F. A. HUNTINGTON,

MANUFACTURER OF

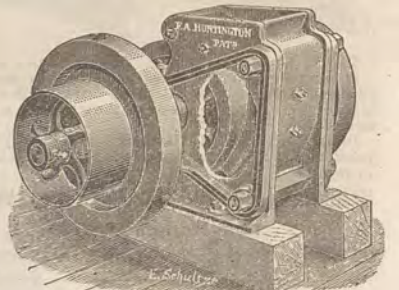
**Centrifugal Roller Quartz Mills,  
CONCENTRATORS AND ORE CRUSHERS,**

Mining Machinery of Every Description,

**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.



SEND FOR CIRCULAR.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

**BEST SOFT LAKE SUPERIOR COPPER USED.**

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.**

**E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, DECEMBER 11, 1886.

VOLUME LIII.  
Number 24.

## The Clifton Copper District.

The Clifton district, on Copper mountain, discovered in 1865, has been the scene of continuous operations since 1876, and is not only the oldest copper-mining district in Arizona but also the largest producer in the Southwest. It lies within an almost circular range of mountains, forming a large basin, some 10 miles in length north and south, and six or seven miles in width in an easterly and westerly course. The sketch map on this page gives an approximate idea of its topography. It is from a drawing accompanying the descriptive paper read before the American Institute of Mining Engineers by Arthur F. Wendt.

The basin is found between Eagle creek on the west and the San Francisco river on the east, and there is only one practicable outlet from it, namely, by Chase creek, which drains the whole basin and cuts through the range, separating the basin from the San Francisco river. At the junction of Chase creek and San Francisco canyon is the town of Clifton, which is connected by the Arizona & New Mexico Railway, a narrow-gauge line about 70 miles long, with the Southern Pacific Railway at Lordsburg.

The San Francisco river is a rapid stream, which carries a large volume of water the year round, but Chase creek runs dry in autumn. The water of the creek is heavily charged with copper, so that it is unfit for drinking purposes, except during the rainy season and while the snows on the mountains are melting. The geology of the district, although much disturbed in details, is, on the whole, simple. The center of the basin is a vast mass of porphyry. Leaving the center of the basin in almost any direction, the crests of the mountains surrounding the district are formed of stratified limestone. Where the limestone is wanting in the circular range, granite fills the gap. The beds of limestone are, in every instance, horizontal, and lie conformably on beds of sandstone. Both seem to abut unconformably against the granite. This granite seems to be eruptive, and the presence of large dykes of felsite cutting vertically through the bedded lime and sandstone gives additional weight to this view. The porphyry is undoubtedly of more recent age than the granite; for, in the Coronado mines, the porphyry which here assumes the character of a true quartz porphyry cuts the granite as a huge dyke some 10,000 feet long

and as much as 300 feet in width. Near the center of the district the porphyry incloses large masses of limestone, which stand like islands in a sea of porphyry.

Following Chase creek canyon from its origin in the basin easterly toward its junction with the San Francisco river, we first find ourselves in the rugged hills of porphyry of the basin. Opposite the Longfellow mines we strike the inclosing range of mountains, and the lime and sandstones. The canyon here is eroded on the contact of the porphyry and the stratified

trachyte took place, while their age is limited on the other hand by the fact of their being found both in the sedimentary limestone and in the eruptive porphyry and in granite.

The mines of Clifton district are readily divided into three groups. First, those occurring in limestone; second, those occurring in porphyry; and third, those occurring in granite. The ores of the first system of veins are oxides, primarily the red oxide or cuprite in a gangue of compact hematite and malachite and azurite in a gangue of manganese ore

lowed into the hill by a horizontal tunnel, and led to the discovery of two parallel veins of ore striking approximately northeast and southwest, and dipping at an angle of about 80° or 85° to the southeast—that is, with the slope of the hill. Fig. 2 illustrates these conditions.

At and below the level of the upper Longfellow tunnel the two veins carry an iron ore containing red oxide of copper and but little carbonate of copper. On the dip of the veins from this level only such ores are found until the veins approach the underlying sandstones.

Native copper there occurs sparingly, and the veins become pinched and finally barren. They have not been followed into the sandstone, and it is quite problematical whether they have any value in that rock.

It will be seen by Fig. 2 that the Longfellow mine is an almost vertical fissure in stratified limestone, at or near the junction with a dyke of felsite. In places the vein or branches of it are at the contact of the limestone and felsite, there forming a true contact vein. Again, branches of the vein are entirely in felsite, and others entirely in limestone. We see an illustration in this mine of the general conditions of veins of ore in stratified limestone so well described by various writers as occurring in the lead veins worked on the mountain limestone of England.

We find true "flats" or bodies of ore branching from the main fissure, and practically replacing one or more beds of limestone. Again, we find other masses of ore that leave the main fissure and follow the vertical seams in the bedded limestone. More generally, the ore occurring entirely in the limestone assumes irregular shapes, as if it had fill-

ed an irregular cavity. Hence, many engineers and miners have called the Longfellow mine a "deposit" or "pocket." Indeed, the same opinion has been expressed by different geologists of all the other large copper mines of the southwestern districts. It is, however, says Mr. Wendt, erroneous. With only two exceptions of minor importance, all of the large copper mines of the southwest are true fissure veins in the sense that they are bodies or masses of ore deposited in the rocks which now contain them, subsequent to the deposition or formation of these rocks. The fact of profitable veins occurring in limestone and presenting all the usual irregularities of veins found in this rock cannot blind the careful observer; for no other theory than that of an intrusive origin will explain all the phenomena of the occurrence of these ores.



Fig. 1.—SKETCH MAP OF CLIFTON MINING DISTRICT, ARIZONA.

rocks, the porphyry forming the northern walls of the canyon and the lime and sandstones the southern. Fig. 2, on page 377, is a section across the canyon at this point.

Continuing down the canyon we reach the granites, and, approaching the town of Clifton, modern trachytes.

Crossing the San Francisco river, and continuing our journey still further east, we find a range of hills and mountains of quite recent volcanic origin. Further south and toward the Gila river, a distance of some 15 miles, a very recent conglomerate is found, in which round boulders of this lava, the trachyte of the town of Clifton, and round boulders from the copper mines, form component parts. The mines must, therefore, have been in existence before the eruption of the lava and the older

or wad. The ores of the second and third systems are oxides and oxysulphides on the surface, changing into copper glance at a trifling depth, and into yellow sulphurets in the deepest workings. While the extent and number of the veins of the second and third class is considerably larger than that of the first class, these latter are, by far, the most valuable and productive, and are the ones which first gave prominence to the Clifton mines.

The principal mine in the district is the well-known Longfellow, now owned by the Arizona Copper Company. The first discoveries made on the Longfellow were some small seams and pockets of ore cropping out near the crest of the Longfellow hill in a decomposed shaly limestone largely altered into clay. These small strings, veinlets and bunches were fol-



## CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

## The Drumlummon.

## A Famous Paying Mine in Montana.

[From our Traveling Correspondent, R. G. HUSTON.]

In a former letter written when here one year ago, I gave your readers a sketch of this locality, but perhaps it would be well to again give it in detail. This mine is 22 miles northwest of Helena, in Lewis and Clarke counties, Montana, on the headwaters of Silver creek. The placer mines on the lower portion of this creek were among the first discovered in the Territory.

This mine was discovered and partially developed by Thos. Cruse, and some years ago a sale was effected to some English capitalists, who immediately incorporated and capitalized it with 330,000 shares, at \$10 per share, under the name of the Montana Company, Limited. They at once commenced to systematically develop the mine and to place thereon a plant of the proper capacity to work it up to a dividend-paying basis. The first management was not fully up to the requirements of the situation, but a 50-stamp mill with all the modern improvements was built in addition to the old 10-stamp mill bought with the property, this giving them an equipment of 60 stamps. The Maskelyne tunnel tapped the lead at a favorable point near to one of the best ore chutes in the mine. Still, under the first administration, they were unable to bring their product to a higher figure than \$28,000 or \$30,000 per month. The natural result of this was to depress the value of the shares, and down they went to about \$2.50. Two years ago, on the 1st of December, R. T. Bayliss was placed at the head, with H. Bratnober as mine superintendent, and since that time the product and price of shares has been greatly increased. Shares are now quoted in the London market at \$47.50, and this extraordinary advance in values will not be surprising when we find that nearly \$330,000 was disbursed in dividends on the 15th of January and 15th of July. This, with a continual increase in monthly product and continual permanent improvement going on around the mine and works.

## The New 60-Stamp Mill.

The new 60-stamp mill, now about completed, was constructed under the careful and efficient superintendency of Thomas W. Fisher, who has had charge of the construction of several of the finest mining plants built in Montana. The 60-stamp silver mill at Gloster and the Algonquin 20-stamp mill at Phillipsburgh are standing evidence of his ability in this direction, and the fact that he had a carte blanche to order whatever he needed will be proof enough that the mill is complete from top to bottom.

The dimensions are 160 feet frontage by 112 feet in depth, and from basement to the ore-house roof 100 feet.

The carway from the mouth of the Maskelyne tunnel being on a level with this, the rails are run in over an elevator tramway, and the mules used to bring out the ore trains take them right in over the ore bins, when the first drop is made. These bins have a capacity of 2000 tons, and are built with a view to convenience and economy. As the stamps are subdivided into three 20 stamp sections, the bins are so arranged that different classes of ore may be handled in each section if it is desired. From the bins the ore runs down over grizzlies to the rock-breakers, of which there are three of Blake's latest-improved 15x9 crushers, and their capacity for chewing up ore is simply immense.

From here the ore is dropped into 12 of Hendy's automatic Challenge feeders, and from them the 60 stamps of 750 pounds each are kept in provender. These, moving at the rate of 95 drops per minute, will pulverize a mountain of ore in a short time. They are secured in place by Fargo patent stamp guide, which enables them to hang up and unshin any one of the stamps without interfering with or stopping any of the others, making a convenient improvement over the old way.

## The Concentrating Room.

From the batteries the pulp passes over silver-plated amalgamating plates, and as it is a gold mill, from there it is dropped to the vanning-room for concentration. This room is 110x42 feet in dimensions, and contains 24 Frue vanners, or two to each 5 stamps. This company, about one year ago, gave the Frue and Triumph vanners an impartial trial, the result of which was that they chose the Frue. In consequence, they at once put in 24 of them in the two mills then running, and, of course, when the new plant was placed it was also equipped with the same pattern, making 44 Frue vanners this company is now operating.

## The Power to Operate

The whole concern is furnished by a compound Corliss engine of 150-horse power. The high pressure cylinder is 14x42; the low pressure is 24x42, and the heaters, air-pump and condenser are in the basement below, thus leaving the engine-room in tidy shape. The manager is so well pleased with the general appearance of it that he has ordered a carpet for it—a rather snug corner for a couple of engineers to winter in, I should say, and made me almost wish I was an engineer. The steam is fur-

nished by two standard size boilers, 16 feet long by 42 inches in diameter. The foundation they were compelled to blast out of solid granite in order to place it up to the side of the mountain to get the full benefit of the continuous drop from one department to the other. The whole mill is lighted by a 60-light incandescent Weston dynamo, and it is a perfect success both as to light and economy, being liked very much better than the arc system and costing much less.

The fireman has not been forgotten, either, as they have a car track placed right in front of his furnace and he has no difficulty in getting his material on hand for use.

The aim in building this plant from top to bottom has been to reduce the general expense of milling their ore, as they have an abundance of a low grade, and to make it work to a profit as well as to get the concentrates. It is my impression that it will be a grand success, as the main advisers and promoters are careful, conservative men, and have, no doubt, closely investigated the proposition. The new mill was

## Formally Set to Work

On the 17th of November, Mrs. R. T. Bayliss doing the honors by turning on the steam for the first time, setting the ponderous machine to work, at first only dropping 20 stamps, and a few hours afterward 20 more, and this morning, the 18th, the other 20 were set to work to be continued indefinitely. Everything moved off smoothly without a jar or stoppage, not even a belt breaking or getting loose. These are all arranged with patent tighteners, enabling a man to tighten them without danger to himself or inconvenience.

All the lumber consumed in building was shipped in from Oregon. The sides are all double boarded and lined with heavy building paper, and it is heated by 16 radiators, which will no doubt keep the atmosphere at the right temperature during the winter months.

They expect to operate it with five men to each shift, exclusive of the engineer and fireman, and if they succeed it will be a very cheaply operated mill of that size—the most economical in point of labor that I have seen. Frazer & Chalmers were the designers, and from their works everything was placed. The other mill and the large air compressor were built by the Union Iron Works of San Francisco; and although nearly all were unanimous in the idea that the Drumlummon would never have use for a compressor of such a large capacity, it is now found to be none too large to meet the present requirements. Thus what at one time seemed almost an elephant is now really a boon to the company.

## The Engine Running the 50-Stamp Silver Mill

Is certainly a phenomenon, as it has been running some two years and eight months and the total repair expense is less than \$10. The work done by it is immense, running the two rock-breakers and 50 stamps and other machinery. After the pulp passes over the plates it is elevated to the vanner-room and concentrated before amalgamation, as the management discovered by experimenting that they obtained much better results in that way. Then it is run down to the pans, settlers and agitators. All of these are driven by this engine, and for the length of time run and the amount of work done it is certainly unprecedented for neatness and durability. It is one of the best here.

The old 10-stamp mill is still in service and doing satisfactory work, probably more so than when Mr. Cruse first started it up on the mine years ago. The whole development is a fair illustration of the old maxim that "great oaks from little acorns grow." The manager's residence is located a short distance above the old mill, next to those of the superintendent and assistants (the company physician next door), making the offices of the company as convenient as possible, so that at any time they may be called for on short notice.

## The Mine

Is still under the practical and skillful management of my old friend, H. Bratnober, and to his constant and unremitting attention to details the continued prosperity of the Montana Co. (Limited) is largely due. Early and late he may be found in the line of his duties, ever on the alert to observe and take any advantage of the work that opportunity may offer to further the interest of the company. His many years' experience in the handling of men and mines is proving a handsome capital for him. He will experience no difficulty in keeping the 120 stamps dropping on ore that will net the owners handsome results for a long time to come.

The Maskelyne tunnel is their principal opening. This was driven into the mountain over 1200 feet before it tapped the lead at a depth of 400 feet from the surface, and nearly all the ore that has been milled up to date has been taken from this tunnel. From it levels have been driven north and south to a distance of 1400 feet.

The vein being a contact one, it was comparatively easy to follow. It is very irregular in size, ranging from 8 feet to 35 and 40 in width, the rich ore lying in chutes [as was shown by the diagram given in the MINING AND SCIENTIFIC PRESS of Nov. 27, 1886.—Eds. PRESS]. From the superintendent's report of June 30, 1886, I extract the following figures: High-grade \$20 and upward, 71,817 tons; low-grade under 20 and good enough to mill, 113,567 tons. This is exclusive of anything below the 400-foot level, or the Maskelyne tunnel.

Since that time he has started a large three-compartment shaft, and at the 100-foot level cut out a station and started levels, and then continued sinking.

They are about ready to commence cutting out the 200-foot station, and the general appearance is much the same as at the 400-foot level, giving them now an apparent reserve of 200 feet of solid ore body. The intention is to run the shaft down and cut out stations every 100 feet to 500, and they will undoubtedly be then satisfied with their development for the time. I also extract from the statement of accounts for the half year ending June 30, 1886, the gross product of the mine, which aggregated nearly \$700,500. The total expenditure was \$260,840, leaving a balance of \$439,660, to be passed to net revenue account. This is a healthy showing and cannot fail to please the shareholders. This is one mine that I can safely recommend as

## Run Wholly on its Merits

As a mine. There is no small pecuniary speculation of the management to obtain a profit out of each man's earnings.

Every man who has any business transaction with the company whatever is paid in the coin of the realm, and there are no company stores or company boarding-houses to which they are given orders, or given their choice to either pay tribute to the company or not have employment. Every employee of the Drumlummon is a free agent and allowed to transact his own business to suit his own sweet will. They pay the full measure of wages going in the country, and all they exact in return is a good honest day's work.

This consistent course toward their employees will enable them to snap their fingers in the face of any labor organization on the continent with impunity. The safety of their men is another special study with them, and until the past week they have not had an accident for two years, and then two followed each other in close succession. In neither case could the management have done anything to prevent. The first one occurred by the man entering the drift too soon after a blast had been put off, and a large piece fell on him and broke his back. The second, a man tried to take some planks up into the shaft without making them fast to the cable, and they caught under the timbers, threw him down, and he paid the forfeit with his life. Two others were hurt, but not seriously. There is now a meeting called by Mr. Bayliss, of the men, for the purpose of

## Organizing a System of Insurance

For the benefit of the men. The assessment system will probably be the one adopted, as that is now the popular mode. The proposition laid before the men is about as follows: To be of the number employed by the company is, of course, compulsory, and a regular contribution is to be deducted from each employee's pay at the end of each month; the company to pay into this sinking fund a sum equal to half of the men's own contributions, thus making one of the most liberal propositions I have ever known a company to make its force. From this sum a weekly indemnity will be paid each injured man during his disability; and if death ensues, a stipulated amount is to be paid to the relatives of the deceased.

## The Town of Marysville

Has been built up almost wholly since the development of the Drumlummon. It contains about 1200 inhabitants. The town for the most part is built as nearly all mining towns are, without a thought of anything but the present, and general utility always eclipses architectural beauty in the hurry and skurry of building up a mining camp; but comfort and convenience are the more desirable when there is a choice between the two. They are to be connected by railway communication with the outside world at an early period. The Montana Central is graded within a short distance of the town, and the Northern Pacific is now completing its survey and will be there early in the spring. The town at the present time contains four general merchandise stores, seven hotels, five private boarding-houses, two churches, a public school building, and the usual number of other business houses are here located. The Orders of the A. O. U. W., Knights of Pythias and Odd Fellows are represented and are all in a prosperous condition. The former capacity of the Drumlummon mine was about 3000 tons per month, but the new plant doubles their capacity. This, in connection with the immense amount of exploratory work being prosecuted by the company, makes the outlook for Marysville remarkably bright. All of the other mines in the vicinity will be to a greater or less extent tributary to Marysville when the railroad connection is made, as then Marysville will be the nearest shipping point for the Gloster mine, the Empire, the Jay Gould mine and all the Stemple district.

From the Jay Gould mine some fabulous stories are told of the extent and richness, all of which I hope will prove true when they start up their new mill. This is some 15 miles from Marysville and is close to the Homestake mine, owned and worked by Negus & Jacobs, and is still a producer, but is not so widely heard of as one year ago. There is some talk of its being sold, yet these reports have not been confirmed.

As is usually the case, the speculator is

## Looking after the London Market

That is now so amply pleased with their investment in Drumlummon stock. The first of these

outbreaks was Anglo Montana Co. Limited. This scheme was concocted by a former employee of the Montana Co., to foist upon the London market, at an immense sum, a piece of wildcat mining property.

An elaborately written-up circular was issued, with a description of the localities and mines known as the Parker & Griff mines. A number of locations were made here and some work done to develop them. There were also certificates of some assays made by H. Longmaid, with a view of buying the ore on their dump, and which he wisely concluded not to purchase. These were taken and an immense body of ore was computed to be there, and the expense of putting a 15-stamp mill was all figured up in good shape. Then the probable profits were dilated upon until by arithmetical calculation a possible profit of some \$200,000 per annum was to accrue to the fortunate stockholders, and they were only asked to pay \$600,000 for this privilege.

High-grade ore on their dump was estimated at 430 tons, when, as a matter of fact, there is none at all that will pay to mill. Further, I am told, that the party who signs his name to the report as mining expert never was in the mine, and if he had been, would not have been capable of making a lucid report of it. He could not truthfully say he knew anything of its merits or demerits, simply on the grounds of ignorance of the subject. Taking his own report and once reading it will condemn it to any one accustomed to the business, as he goes glibly to work and from less than 1000 feet of shafts and levels he figures up a four-foot ledge to contain 180,000 tons of pay ore. This, of course, no one could for an instant believe.

My impressions are that acting as telephone boy for the Montana company is not the proper school to perfect the education of a first-class mining expert. It is to be hoped that this mining "deal" has been nipped in the bud. According to the prospectus, the so-called mining expert was undoubtedly pulling the chestnuts from the fire for other and deeper parties. Cablegrams were passed over of the developments and value of assay taken, when the real truth was that not one day's work had been done on the mine for the past 18 months.

The Sterling Gold Mining Co., Limited, is also a scheme, but has more merit than the Anglo to back it. They are attempting to float this on the London market for \$500,000, a sum that from positive evidence it can never pay interest upon.

I am sorry to know that one of Helena's citizens signed his name to a favorable report on these mines, when he really did not know where they were located, and in order that he might not give himself away in case of some one being referred to him, he drove out and hunted it up. Now, I cannot think that this is the right spirit, particularly for men of capital living among us. If outside capital is needed to develop the country, give them a show, at least, for their money, or else take the more honorable method of a short shot-gun on the highway and make them disgorge their ducats by compulsion.

Now, if the Sterling Gold Mining Co. investors will be satisfied with a very small percentage on their capital invested, of say three or four per cent, with close and economical management and no extravagant wasting of the stock, they can make it for awhile, but it will never bear up under half a million capital. The fact that this mine is worth some money is in its favor, for the Anglo scheme is worth nothing as it now stands.

## Shingle Springs, El Dorado County.

EDITORS PRESS:—Having had occasion to visit a few of the numerous quartz mines in this vicinity in the past week, I take the liberty of furnishing you with a few items respecting the several claims, which I trust may be found of sufficient interest to warrant your giving them space in the columns of your valued journal.

The Pine Hill Gold and Silver Mining Company, Incorporated, have sunk a shaft to a depth of 50 feet on their Pine Hill ledge, which is situated about five miles north of this place, developing a large body of sulphuretted ore, a quantity of which will soon be crushed by the Pyramid Mill and Mining Company to determine its positive value. The Pyramid mill is now running on custom rock from the celebrated Barnes mine and the claim of Messrs. Kipp and Boldton. This mill is furnished with the Frue concentrators and is run by water-power, using a 40-inch Knight wheel.

The Crystal mine, located on French creek, about three miles southwest from Shingle Springs, has been bonded by parties from Alameda, and, we learn, will start up immediately.

Continuing our journey about one and a half miles beyond the Crystal mine, we found ourselves at the Vandalia, owned by Messrs. Kelly and Ives. Here we met the genial Mr. J. W. Kelly, superintendent and part owner of the mine, who furnished us with a full description of the mine and mill. The company has just completed a five-stamp mill, on the most approved plan, and expects to start up at once. It has a shaft 70 feet deep on the mine and from 500 to 600 tons of ore on the dump. The mill is supplied with steam-power, having capacity for 20 stamps. This is reputed to be one of the best paying mines in this section.

One mile below the Vandalia is the Big Can-



yon mine (incorporated). Here we had the pleasure of making the acquaintance of Mr. P. Bargon, the superintendent and part owner of the mine, who kindly furnished the following information respecting the company's works. They are erecting a 20-stamp mill, which they expect to have in operation by December 10th. The mill is built after the most approved plan, and is complete in every particular.

The mortars, which were supplied by the Risdon Iron Works, are of high discharge and are placed on solid blocks of timber 12 feet long and 30 inches square.

These blocks are placed upright and imbedded in solid concrete. The stamps are of 800 pounds weight, and the batteries are fed automatically. The mill will be run by water-power, using a four-foot Pelton wheel under a pressure of 365 feet. A No. 15 Blake rock-breaker will be run by a 24-inch Pelton wheel, thus furnishing separate power from that supplying the batteries and concentrators. Eight Triumph ore concentrators will be used, which will be placed in a room 41x42 feet, supplied with numerous skylights. The sills of the building are all placed on walls of solid masonry and are raised about two feet, thus affording better protection from the elements. The sills of the ore bin are all laid in solid concrete. The timbers supporting the batteries, as also those of the ore bin, are all separate from the main building. The ledge, which is of immense magnitude (being 265 feet in width), yields five per cent of sulphurets. The company contemplates the erection of chlorination works in connection with the mine in May next.

### Evidences of Prosperity.

Perhaps the best evidence of the general return of the country to its late normal condition of prosperity is the great activity which is everywhere manifested in railroad building and extension in the increasing demand for iron of every kind and for almost every purpose. The furnaces, foundries and machine-shops throughout the country are generally overrun with orders. The demand for iron ores to keep the furnaces running are taxing all railroad facilities in that direction to their utmost capacity. These things are in marked contrast to the recent past. For several years, until quite recently, the most of our railroads have been starving for work, and reducing the cost and expenses of their rolling stock and repairs to the lowest possible minimum in order to meet the pressure of hard times and to squeeze out even the leanest dividends. The phantom of bankruptcy which hovered over many of our railroad centers and which actually took possession of some roads has been fully replaced by a reign of prosperity, which requires the fullest repairs and extra equipments. In regard to California, we refer the reader to an article in another column on the new railroad era in this State.

These facts in regard to iron and railroad matters are most unmistakable indications of a general return to prosperity. There can be no doubt that the country is now fairly on the road to an era of prosperity which will in all probability equal anything in the past. The papers which come to our table from various parts of the country all read the same way. There is no particular "boom," but there is a steady, healthy expansion of business, which is not going to "let up"—at least not in the near future. New industries are everywhere springing up, and old industries are being pushed with renewed vigor. Throughout the great West and Northwest, and the East as well, manufactories are generally busy, with a full demand for their various lines of goods, and, in most cases, orders ahead.

The latest news from Europe tells of an improved condition of business there also. Much satisfaction is expressed at the manifest improvement in this country, and that the demand in some instances, particularly in the iron trades and ore productions, is so much greater than our productive capacity that we are obliged to call on English producers for the surplus of supply demanded. For some months English producers have been looking to this country for a "boom" which shall be felt even there, and are more than half ready to acknowledge that "when Uncle Sam takes snuff the whole world sneezes."

**SODA ASH.**—About 190,000 tons of soda ash are annually used in this country. Of this, only about 19,000 tons are of home manufacture, leaving a balance of 171,000 tons to be imported at a cost of over \$4,500,000. There are various localities in the country where the raw materials for this manufacture can be readily obtained—salt, pyrites, coal, limestone and manganese. There is a large manufactory of soda at Syracuse, N. Y., working with a capital of \$1,000,000; but it is said that foreign competition is so bent on breaking down these works that it is thought they will have to succumb, unless there is a trifle more added to the present tariff. If these works are discontinued the importers will have it all their own way, and prices will be materially advanced. Sufficient protection to encourage the profitable establishment of a number of well-conducted manufactories, simply in competition with each other, would result not only in low prices, but also in a large amount of home labor beyond that now employed.

### The Minting of Gold and Silver.\*

NUMBER 5.

[By ALBERT WILLIAMS, JR.]

#### Melting Rooms, San Francisco Mint.

The gold and silver are melted in separate rooms. The gold-ingot melting room contains six furnaces 14 inches square. The plumbago pots used are Nos. 45 and 50, and occasionally No. 60. In melting gold, charcoal and occasionally hard coal are used. The silver-ingot melting room has also six furnaces 14 inches square; and the same sizes of crucibles are employed in this room. Charcoal, coke and hard coal are used as fuel. The furnaces for ingot melting are of the Feix pattern, having a series of air-chambers and a water-jacket condenser to diminish the loss by volatilization. The fluxes used are borax, niter, sal ammoniac, bone-ash and powdered charcoal. The deposit-melting room contains four furnaces 14 inches square, for melting bullion on its receipt. There are also in this room six furnaces for melting the large bars to be granulated previous to parting. Four of these are 16 inches and two are 22 inches square. The granulating tubs are of copper, having each a capacity of 100 gallons or more. Charcoal, coke, and hard coal are used as fuel. The zinc used in reducing the chloride of silver comes in slabs 14 by 7 by 1 inches. A special furnace, 14 inches square, for granulating this zinc, is in the basement. There are also two copper-melting furnaces, 14 inches square, in the basement. The copper is melted in Nos. 45 and 50 plumbago pots, and is refined by the Feix process. The sweeps room has two ovens for drying sweeps, a Chili mill, two amalgamators and concentrators, and a large vat for collecting the sweeps after washing. In the refinery, seven trucks and 24 carrying tubs are used for transporting bullion, chloride, etc. A condenser in the attic supplies 2000 to 3000 gallons of distilled water per day for use in the assay department and refinery.

#### Coiner's Department.

The manipulations involved in making coins from the standard ingots are similar to those practiced at the Carson mint with but slight deviations in method, but they are conducted on a much larger scale. The writer is indebted to Mr. Frank X. Cicott, the coiner, for full notes on the system of checks against loss or error followed in this department.

**Receiving ingots.**—The transfer clerk delivers the ingots to the coiner's department. They are weighed by him in the presence of the coiner's receiving clerk and the melter and refiner, or his representative. The delivery is made in quantities called "melts." Each melt for double-eagles is composed of 40 ingots, weighing about 3000 ounces. When the transfer clerk weighs the melts, he takes the weight, number and denomination of the ingots as well as the number of ingots composing each melt, and makes the proper entries in his book. The receiving clerk of the coiner's department and the melter and refiner's clerk do the same. Then they carefully compare their respective accounts, and if these agree the melts are turned into the coiner's office, whence they are passed into the rolling-room.

**Rolling-room.**—This is between the coiner's office and the cutting-room. The total force is eight men. Here the number and the weight are again taken and entered in the roller's book. Each melt is provided with a copper tag bearing its number, and this tag remains with it during the whole manipulation. The rolling-room contains four sets of rollers, two breakdown and two finishing, having a pressure varying from 20 to 80 tons. The rolling machines are similar to those of the Carson mint, but have not the flat guides for preventing flexure of the strips. The rolls are of cast iron (not steel, as at the Carson mint). The lubricant is castor-oil. The ingots are now drawn into strips of about 3 feet 6 inches in length by means of this flattening or drawing process, and naturally become brittle and in some cases are split or broken on the ends. To remedy the brittleness, the strips are now prepared for the annealer. First, however, the fractured ends are removed by a powerful cutting machine. The thickness of the rolled strips is tested by gauge instead of by weighing a trial planchette.

**Annealing-room.**—This is on the first floor, between the cutting and the whitening rooms. The total force is four men. The gold strips are placed in copper canisters, the silver being annealed in open pans. The canisters are of two sizes, those for "short gold" being 3 feet 10 inches long, 4½ inches diameter, outside measurement, and 3½ of an inch thick, and those for "long gold" 5 feet 7 inches long, 4½ inches diameter and 3½ of an inch thick. Each is capable of containing 20 strips. The canisters, after being capped and sealed with fire-clay, are placed in a reverberatory furnace, four at a time, where they remain for about one hour. There are four annealing furnaces. The fuel is oak. An hour is usually required with a moderate fire; much, however, depends upon the operator, he being guided solely by his judgment, as no established rule exists. The main point is to see that the heat is equal-

ly distributed, and to insure this, the canisters are turned half over at intervals of 15 minutes. Great care must be taken to avoid overheating. When sufficiently heated the canisters are removed from the furnace, by means of iron tongs, into vats containing cold water, and in three or four minutes the caps or seals are removed so as to allow the water to enter. When sufficiently cooled, the strips are dried with cotton cloths and then removed to the rolling-room to be passed through the finishing rolls and reduced to the required thickness; i. e., the thickness of the coin for which they are intended, which could not be done prior to the annealing, by reason of their brittleness. This operation completed, the strips are again returned to the annealing-room for final annealing, which is a necessary preparation for the cutting machine.

**Cutting-room.**—The cutting-room is on the first floor at the west side of the building, between the rolling and the annealing-rooms. The force employed in this room is nine men, and two others are engaged in the cleaning-room. From the annealing-room the strips are taken to the pointing machine, which shapes the end of each strip so as to admit it with facility in the office of the draw-bench, where the strips are reduced to the exact thickness necessary. Before being subjected to the operation of the draw-bench, however, the gold strips are heated to a temperature of 100° F. in a steam chest, and then they are separately covered with melted wax. They are now taken to the draw-bench; one strip is drawn through and passed to the cutter, who cuts off one planchette from the first end and one from the middle of the strip. These planchettes are passed to the foreman of the cutting-room, who weighs them. If he finds them correct, the strip is cut into planchettes. This same operation is performed with each strip. If one is found too heavy it is again placed in the draw-bench and reduced; if too light it is placed upon the "light bench," when it is cut by a concave punch, thus correcting the deficiency. There are three draw-benches and four cutting-presses in this room. When all the strips are cut the planchettes and clippings are sent to the cleaning-room.

**Cleaning-room.**—Here they are boiled in a solution of potash, for the purpose of removing the wax and rendering them perfectly clean. After this they are rinsed in boiling water and dried in a pan heated by steam. When perfectly clean and dry the planchettes are adjusted. The clippings and chips are returned to the transfer clerk in the same manner that the ingots were received.

**Adjusting-room.**—Gold planchettes are treated as follows: Each planchette is weighed separately, and if too heavy it is reduced by filing the rim by hand; if too light, it is passed to the "light weigher," who weighs it, and in case it is found to be below the legal limit condemns it. The "standard weighers" weigh every standard gold planchette several times to insure correctness. The adjusting force includes 59 women adjusters and weighers and one forewoman. After all the planchettes have been adjusted, the assistant adjuster takes the different pans of standard planchettes and makes them up in what are called "drafts" of 1000 pieces each. These drafts are again weighed in the coiner's weigh room. In the case of double-eagles the draft weighs 1075.10 ounces, being 0.10 ounce in excess of the legal weight, the surplus being added for loss in whitening and pressing. The legal tolerance allowed on the double-eagle, light or heavy, is 0.5 grain. The working limit used is 0.1 grain on the "standards" and 0.3 grain on the "lights." The "standards" and "lights" are kept in separate boxes containing cards setting forth the exact weight and date of adjustment. The "condemns" are also kept separate, and are so marked.

Silver planchettes are not adjusted by hand, but those for the large coins are, if necessary, filed by lathes in the coiner's weigh-room. There are two of these filing machines in this mint, and one has been furnished to the New Orleans mint. They reduce 20 pieces at a time very conveniently and rapidly. The strips for dimes and quarters can be adjusted without difficulty at the draw-bench, but those for half-dollars require much care to keep them within the prescribed limits.

**Whitening-room.**—The gold blanks are placed in iron flasks, which are sealed with fire-clay and placed in the heating furnaces. Silver blanks are charged into the furnaces in copper pans. When thoroughly and uniformly heated the blanks are thrown into a hot bath of water acidulated with sulphuric acid, the same kind of pickle being used for both gold and silver. After remaining in the bath four or five minutes, during which time they are stirred with copper rakes, the blanks are removed, rinsed with boiling water and dried in steam-heated open pans with basswood sawdust, being stirred with wooden paddles until dry. The wastage of gold blanks is reported to be the same as at Carson; that of silver blanks is stated at from 0.20 to 0.30 grains per draft treated. The force employed in the whitening-room is a foreman and four assistants.

[TO BE CONTINUED.]

**NAIL MANUFACTURE.**—Down to 1883 all the cut nails in the United States were made of iron, but in that year 18,224 kegs of steel nails were made, in 1884 the number of kegs was 393,482, and in 1885 it amounted to 1,823,127 (91,156 tons net), including a small quantity of combined iron and steel nails. The credit of

first applying steel to the manufacture of nails is due to Sir Henry Bessemer.

It is now a serious question with the majority of nail manufacturers in New England as to whether they shall put in Bessemer plants or go out of the business. Go out of the business they must if the attempt is made to compete with steel nails and with manufacturers who have facilities for obtaining the steel at the cost of the raw material and converting. Were the conditions of labor favorable, the question would at once be answered in favor of the Bessemer plant. But it is believed that the Knights of Labor will soon make the attempt to advance the rate of wages of nail-workers in New England to the figures which are paid in Pittsburg. This is a condition, however, to which the New England manufacturer cannot consent and live. Cheaper iron and coal enable the Pittsburg manufacturer to pay better wages than is paid in New England, and the recent wonderful development of natural gas has still further added to his advantage. The only feature which counts in favor of the New England manufacturer is the near market in which to sell his goods—the cost of freight to that market tells against Pittsburg. Under such conditions the New England nail industry is evidently in the keeping of the Knights of Labor. Any material advance in the present rate of wages there will send that industry to Pennsylvania.

### The Use of Liquid Fuel.

It appears, after an experiment of several months, that ferry-boats plying between this city and Oakland, which had been fitted up for burning petroleum, have now gone back to coal. The economy, as we understand, so far as the consumption of fuel is concerned, is said to be decidedly in favor of petroleum; but the trouble in its use came from the intense heat produced, by which, or by the peculiar nature of the combustion, the iron of both the furnaces and boilers began to indicate rapid deterioration; hence the return to coal. If the facts in the case are as stated, Russia is certainly ahead of us in one particular. It is stated, apparently on good authority, that her engineers have applied liquid fuel in various ways to 200 steamers, more than 700 locomotives, and about 1000 stationary engines. England is following slowly in the same direction; two pioneer steamers, now in the course of construction at West Hartlepool, will burn petroleum under their boilers. One of these steamers will be employed to carry petroleum from this country to England.

It would appear from this that there must be something faulty in our method of burning the petroleum. Can a country so largely interested in the production of petroleum as this afford to be outdistanced in the method and variety of its use by Russia?

#### How Boilers are Often Injured.

It is barely possible that sulphur may be present to some small extent in the petroleum used on the Oakland ferry-steamers. We have not an analysis of California oil before us, and we are not aware that any has ever been made; but it is well known that sulphur is a very destructive element, even in quite small quantities. As a corroding agent in contact with steam boilers it has of late attracted increased attention, and as a cotemporary correctly remarks, "it is now recognized much more generally as a source of trouble and expense than it was a few years ago. Improved inspection service and a better appreciation of the importance of keeping not only the interior but also the exterior of a boiler in good condition, readily account for this. Careful examinations of the heating surfaces of boilers have taught lessons of the greatest practical value, and among them that relating to the rapid destruction of boiler plates by the action of sulphur in its different forms, as evolved by the coal, has not been the least important. Not only is sulphur directly brought in contact with the heating surfaces by sublimation, tending to produce red-shortness in the exposed plates, but it is also given opportunity to act in the forms of sulphurous and sulphuric acid held by soot deposits. Corrosion due to absorption of sulphurous-acid gases by soot and subsequent conversion into sulphuric acid by the presence of moisture has been known to be extraordinarily rapid, and in view of this circumstance it should be almost unnecessary to urge upon boiler-owners the adoption of every reasonable preventive measure."

In the use of petroleum, sulphur, even if present, would not be deposited with soot, as is the case with coal, but when brought in direct contact as a vapor with heated iron, it would, no doubt, prove very destructive. Both convenience and economy may well be urged in favor of a liquid or gaseous fuel, and every effort and the most exhaustive knowledge and skill should be brought to bear in the direction of making such fuel practicable for use on steam-going vessels. If the reports in regard to Russian practice are correct, and of that there can hardly be a doubt, there is good reason why our engineers should look for a cause for the different results realized there and here. There can hardly be a doubt but that petroleum will become the ocean steam fuel of the future, and notwithstanding the recent failure, petroleum will yet be employed as steam fuel upon the bays and rivers of this State.

\*From the census report on the "Statistics and Technology of the Precious Metals," by S. F. Emmons and G. F. Becker, special agents. The description of the mints and the processes applies to the year 1881, at which time the mints were examined.





A. T. DEWEY. W. B. EWER.  
DEWEY & CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

#### Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrears must be paid for at the rate of \$3.50 per annum.

#### Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month. Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Dec. 11, 1886.

#### TABLE OF CONTENTS.

**EDITORIALS.**—The Clifton Copper District, 373. Passing Events; Gold and Silver on the Comstock; Dividends and Assessments; The Patent Office; Coal and Iron, 376. Machine and Hand Drills in Mines; Permanent Assay Furnaces; Mining in Spain; Foundry Notes; Mining Notes from Abroad; Personal Notes, 378.

**ILLUSTRATIONS.**—Sketch Map of Clifton Mining District, Arizona, 373. Permanent Assaying Furnace; Fig. 2—Section Across Longfellow Hill and Chase Creek Canyon, 377.

**CORRESPONDENCE.**—The Drumlunnon, 375. **MECHANICAL PROGRESS.**—Improvements in the Steam Engine; Tinned Springs—A Curious Experience; Ice Machinery and Refrigeration; Annealing Tenacious Steel Wire; Rolling Small Wire Rods; School of Mechanical Arts; Improvement in Rifle Manufacture; Cast-iron Pillars Tabooed; Smelting of Iron Sand, 378. **SCIENTIFIC PROGRESS.**—Telephonic Induction; Ice Rivers; A new Use for Electricity; A New Coal Oil Ranking with Sperm-oil Test of 480 Degrees; The Southern California Geological Survey; Crayon Pictures by Machinery; The Bobolinks North and South; Not New; Long-distance Induction, 378.

**ENGINEERING NOTES.**—Progress in Electric Railways; The Proposed French Tower; The Swedenmark Tunnel, 379. **USEFUL INFORMATION.**—Lead-eating Insects; Increasing the Hardness of Bricks; Cold Water Paints; Sawdust for Cleansing Garments; Detection of Leaks in Water Mains; What Makes Vinegar Sharp; A Ton of Coal; Incombustible Lace; New Process for Rendering Paper Insensible to the Action of Water; Scarpology, 379.

**GOOD HEALTH.**—Insanity in California; The Increase of Bald Heads, 379.

**MISCELLANEOUS.**—Shingle Springs, El Dorado County, 374. Evidence of Prosperity; The Mining of Gold and Silver; The Use of Liquid Fuel, 375.

**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 380-81.

**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 384.

#### Business Announcements.

Risdon Iron and Locomotive Works.  
Powder—California Vigorite Powder Co.  
Delinquent Notice—Tallulah Mining Co.

See Advertising Columns

#### Passing Events.

An abundant rain has fallen all over the State this week, filling the streams and ditches, much to the delight of agriculturists and miners. Of course, now that there is no hydraulic mining, the water is not so generally important to the mining industry, but it is needed in drift and quartz mining as much as ever. Many quartz mines now use water for power.

Numerous failures of brokers have resulted from the state of affairs in the stock market during the past week. No such excitement as the present has occurred for years in the mining share market. Instead of a steady advance, however, during the past few days, there have been very decided fluctuations in prices, as our stock tables show.

In most of the mining camps, except the warmer ones in California and Arizona, prospecting has been stopped by the advent of the snows. In many places mining has been altogether stopped. The largest companies, however, are now outfitted almost everywhere to carry on work all winter.

THERE is no noteworthy change in quicksilver. For the first 11 months of the year the receipts at this port were 15,964 flasks, against 23,589 flasks in the same period last year. The exports by sea during this time were 9766 flasks, against 16,100 in the same time last year. The volume of the quicksilver trade has fallen off sharply during the past three years.

#### Gold and Silver on the Comstock.

The ore from the great Comstock lode in Nevada is generally classed as silver, and few people are aware of how large a percentage of gold is produced. From the earliest period, however, the proportion of gold has been large, in fact pretty nearly one-half. Baron Von Richtofens' estimate of the yield of the Comstock to the close of 1865 was \$48,000,000, of which \$15,250,000 was gold and \$32,750,000 silver, the percentage of gold being 31.77, and silver 68.23. In the Belcher mine from Jan. 1, 1871, to Dec. 31, 1873, when the mine produced \$15,529,427, the gold yield was \$8,813,196, and silver \$6,716,231, the gold greatly exceeding the other precious metal. Between May 1, 1864, and May 1, 1877, when Crown Point was paying, it yielded \$23,929,460, of which \$10,166,656 was gold and \$13,762,812 silver. At a certain period when the Gold Hill group, Crown Point, Belcher, Yellow Jacket, Imperial and Empire yielded \$45,903,149, the gold was \$47.25 and silver \$52.75 in the total. At a period when the Savage, Gould and Curry, Hale and Norcross and Chollar-Potosi yielded in the aggregate \$30,278,046, the gold proportion was \$35.93 and silver \$64.07 in the hundred dollars.

In the Bonanza group, the Consolidated Virginia had produced up to the end of 1880 \$64,970,777.95, of which the gold was \$29,075,338.75 and silver \$35,895,438.98. California, to same period, produced \$46,736,831.44, of which the gold was \$23,308,012.69 and silver \$23,428,818.75. Without going into close details of total production of these mines (now one incorporation), it is sufficient to say that the proportion of gold still holds about the same. The total yield for the fiscal month of November for Consolidated California and Virginia was \$387,824, the shipments having been as follows:

November 6.....	\$ 54,069
November 13.....	38,786
November 20.....	46,821
November 27.....	101,633
November 30.....	34,492
December 4.....	61,768
December 6.....	50,265
Total.....	\$387,824
Total for October.....	206,742

The November bullion shows a little over 40 per cent in gold. The proportions are as follows:

Gold.....	\$168,788
Silver.....	219,036
Total.....	\$387,824

The October bullion was also over 40 per cent gold. The ore report for the week ending on the 4th inst. shows that 1066 tons were sent to the Morgan mill and 1848 tons to the Eureka mill, the assay value in the batteries being \$40.03 per ton. On ore assaying \$40 per ton there is a royalty to the Sutro Tunnel Company of \$1 per ton. This royalty is \$2 per ton when the assay runs over \$40 per ton. The last four weekly ore reports are as follows:

	Tons.	Assay.
November 13.....	2736	\$36.67
November 20.....	2805	44.22
November 27.....	2799	42.17
December 4.....	2914	40.03

The census officials compute the total yield of the Comstock from its discovery to Dec. 31, 1880, as \$240,670,145.92. Of this the gold aggregated \$102,371,988.06, and silver \$138,298,157.86. In each \$100, therefore, there was \$42.54 in gold and \$57.46 in silver. From these statements it will be seen that there is almost as much gold as silver produced from the mines on the Comstock lode.

**DEATH OF J. F. OSBORNE.**—We regret to announce to the many acquaintances whom he has made in the course of his business, the death of Mr. J. F. Osborne, who has for the last seven years been engaged on this paper in the advertising branch. Mr. Osborne's death is supposed to have been caused by fatty degeneration of the heart, and the event was sudden, while he was alone in his room at his hotel at East Oakland. Mr. Osborne was of English birth and has parents still resident there. He was about 45 years old and unmarried. He was energetic in business, easy in address and successful in his chosen line of work. The funeral services were held in Oakland on Thursday afternoon, Rev. Dr. W. W. McKaig officiating.

THE Texas & Pacific and other American roads are ordering large quantities of steel rails from Europe, all the mills in the United States having orders that they cannot fill.

#### Dividends and Assessments.

No doubt some persons had a vivid recollection of the large and numerous dividends paid by the California and Consolidated Virginia mines during the bonanza days, when they made up their minds recently to invest in the stock now representing these consolidated properties. But 99 out of every hundred buyers of mining stocks appear to care very little for the dividend-paying feature. This is shown by the fact of their investing in all the stocks on the list indiscriminately. The majority of these mines never paid any dividends and never had any chance to do so. Many of them have been "developed" as stock operations, and machinery put on them in order that directors and other insiders could make money in various ways, but with no expectation at all of making a legitimate paying mining proposition out of the property. These facts are well known. Any one familiar with the Comstock can point out this class of mines. Yet the stocks representing such mines are daily quoted in the list of "securities." They have advanced from cents to dollars in the upward range of prices during the present excitement in shares. It is one of the baleful influences of stock operations that absolutely valueless claims are given such fictitious value. Ignorant persons buy the shares and deal in them. They all hope to make money out of the rise of the stock, rather than profit from the mine itself.

For these reasons legitimate mining operations suffer more or less. People, in developing a claim properly, to make a mine out of it, do as little trading of stock certificates as possible, and they generally have some little difficulty in getting men to invest. But once made a stock-jobbing operation and all sorts of persons will buy the certificates. The stock-jobbing field, in times of excitement like the present, affords excellent opportunities for the unscrupulous to take advantage of a confiding public.

For the benefit of those dealing in Comstock shares, it may be stated that the investigations of the Census Bureau developed the fact that there were, up to the end of 1880, 16,906 mining locations in and about the Comstock. In Virginia district there were 8305, in Gold Hill district 7364, and outside districts 1237. This was from 1859 to 1880.

Now let us consider the dividend and assessment feature. It is true that the figures up to the date mentioned showed many millions more disbursed than were collected. That is, the amount paid in dividends far exceeded that collected for assessments. Washoe mines paid, to end of 1880, 399 dividends, aggregating \$115,871,100, and there were 1090 assessments levied, aggregating \$61,715,535. This showed a profit of \$97,547,430; loss, \$43,391,865.

It will be interesting also to note the fact that of the nearly 17,000 locations, only 103 are reported by the census officials as being listed on the stock board and having any record. The following will show the mines which have paid dividends up to and including 1880, with the number and amount:

	No. of Dividends.	Amount.
Belcher.....	38	\$15,397,200
California.....	34	31,320,000
Confidence.....	6	78,000
Con. Virginia.....	51	42,390,000
Crown Point.....	50	11,588,000
Daney.....	2	56,000
Gould and Curry.....	36	3,526,000
Hale and Norcross.....	39	1,598,000
Kentuck.....	32	1,252,000
Ophir.....	24	1,595,800
Savage.....	59	4,460,000
Sierra Nevada.....	11	102,500
Succor.....	2	22,800
Yellow Jacket.....	25	2,184,000

An analysis of the table from which we compile these figures shows that of the 103 mining companies reported, 6 show an excess in amount of dividends over assessments, and 97 an excess in amount of assessments over dividends; 14 have paid dividends and 102 have levied assessments; 1 has paid dividends and levied no assessments; 80 have levied assessments and paid no dividends; and 13 have paid dividends and levied assessments. Still, as stated, the aggregate dividends have been, from Washoe mines, \$115,871,100, and aggregate assessments \$61,715,535.

It is pretty conclusive that a very few paying mines can bring up a great many in the same locality which have never paid and never will. It is this fact that makes a stock market possible, for if all these mines relied on their own merit there would be very few "stock booms." The instinct for gambling is however a better motive for such booms.

#### The Patent Office.

We have several times pointed out the fact that the Patent Office Department of the U. S. Government was more than self-sustaining. The fees received pay all the expenses and leave a handsome surplus each year. Nevertheless, the office has been for some years crippled for lack of assistance. The money received has to be turned into the U. S. Treasury, and the office is run on appropriations by Congress, so it never gets what it earns. Last year all work in the office was very much behind, and even this year there has been considerable delay in getting patents, though improvement is shown. President Cleveland, in his message to Congress, has this to say of this Department of Government:

"On the 4th of March, 1885, the current business of the Patent Office was on an average five and a half months behind. At the close of the last fiscal year such current work was but three months in arrears, and it is asserted and believed that in the next few months the delay in obtaining an examination of an application for a patent will be but nominal. The number of applications for patents during the last fiscal year, including reissue, designs, trademarks and labels, equals 40,678, which is considerably in excess of the number received during the preceding year. The receipts of the Patent Office during the year aggregated \$1,250,167.80, enabling the office to turn into the treasury, over and above all expenditures, \$163,701.73. The number of patents granted during the last fiscal year, including reissues, trademarks, designs and labels, was 25,619, a number also quite largely in excess of that of any preceding year. The report of the commissioner shows the office to be in a prosperous condition and constantly increasing in its business. No increase of force is asked for. The amount estimated for the year ending June 30, 1887, was \$853,960. The amount estimated for the fiscal year ending June 30, 1888, is \$778,770."

#### Coal and Iron.

Although the iron market in the East is more active than it has been for some years, and orders for rails are being sent abroad, it still remains very quiet here. The foundry business, however, is showing some signs of improvement. Dealers in metals hope that the building of a Government cruiser here will help trade. Prices remain at about the same figures they have been for months.

In October we received at this port 155,000 tons of coal, while last month the receipts were only 84,200 tons. The total for the first 11 months of the year is 876,000 tons. The coal market is pretty steady. It is stated that a Los Angeles capitalist is arranging for the building of a steam collier to carry coal from the northern mines direct to Wilmington harbor. He speaks of having the vessel built East when he ought to build her here, where we now have all the appliances. There is a fair inquiry for vessels to carry coal from the northern mines to this and ports more southerly. A local authority says that there are "strong reasons for improvement, as our visible supply from foreign sources is growing gradually less and coast freights have materially advanced the past two weeks, and a unity now exists among our local ship-owners that will lead to their property now paying a fair interest, which it has not done for over a year, as the low import cost of foreign coals would not permit consumers to pay a covering freight to our coast carriers. The major portion of our consumption for several months will require to be drawn from the northern collieries, some of which will be taxed to yield the called-for supply; but in no case may a coal famine be anticipated, as in some of our local collieries the output can be readily doubled or trebled, if carriers can be had to make delivery. Advice from Australia, just at hand, report a marked advance on coal freights and a great scarcity of tonnage, even at enhanced rates."

THE NEW CABLE LINE.—Ground was broken on Washington street below Fillmore, this week, for the proposed Jackson-street cable line. It is the intention to complete the road by next summer.

MINERS are still rushing to the recently discovered silver mines at Sten's Pass, on the Southern Pacific, in New Mexico.



## Machine and Hand Drills in Mines.

At the Drumlummon mine, in Montana, for the purpose of running machine drills and small pneumatic hauling engines underground, a compressor is employed of sufficient capacity to work from 25 to 30 drills, each having a cylinder of 3½ inches in diameter. These drills are used in sinking, driving, rising and in stoping out quartz for the mills, and it is found that they not only materially quicken the result of each operation, but render the undertaking less dependent upon manual labor than if hammers and drills were alone in use. The approximate rate of speed and relative number of hands consequent on the use of the two methods will be seen from the following figures, giving rate of speed per month:

	Machine Drills.	Hammer and Drills.
Sinking shafts.....	50 to 55 feet.	15 to 20 feet.
Driving levels.....	50 to 90 feet.	18 to 25 feet.
Stopping ground, per drill.....	300 to 400 tons.	80 to 70 tons.

The relative number of hands required (15 machine drills in use) is as follows:

Hammer and drillmen required to do the work of 15 drills.....	150
Drillmen required to equal work of 150 hammer and drillmen.....	30

Difference in number of hands.....120

It is stated by consulting engineer, John Darlington, in his report to the directors of the company, that in the use of machine drills, the cost of explosives is nearly two-fold more than the cost incurred in the use of hand-drills, that is, to do an equal quantity of work, while the cost of maintaining the compressor, together with cost and repair of drills must be taken into account. Against these items, however, must be set the cost of 120 miners' wages per day, the impossibility of combining a number of men together to do the work of a single drill, the rapid speed with which the mine is opened out, and the comparative saving of "dead charges" consequent on the attainment of a high rate of speed in the execution of underground work.

## Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held on Monday evening last, President Davidson in the chair.

Among the donations to the museum was a stone (Jade) axe used by the natives of Alaska in making canoes. It was presented by Judge W. Clark. Prof. Davidson stated that this was a very fine specimen. He described the method employed by the natives in using this axe, to which no handle is affixed. Mr. Gordon Bradley presented 17 specimens of ore, comprising native silver, copper, tin, etc., from Arizona and Mexico. J. T. Gibbes presented three specimens of silver ore from the Bolanos mines in Mexico, with maps of the district.

President Davidson stated that on the nights of November 13th and 14th last he had instituted a careful search in the constellation "Leo" for the purpose of discovering any meteoric showers, which were said to be due at that time after a lapse of 33½ years. He failed to see any shower, or even a single meteor, and he gave his negative evidence for what it was worth.

The following gentlemen were appointed a nominating committee to select the regular ticket for election at the first meeting in 1887: William Norris, E. Bosqui, Leo Eloesser, W. S. Keyes and W. A. Aldrich.

Prof. S. B. Christy, of the University of California, read a paper on "Rustless Iron" and its application to architecture and engineering.

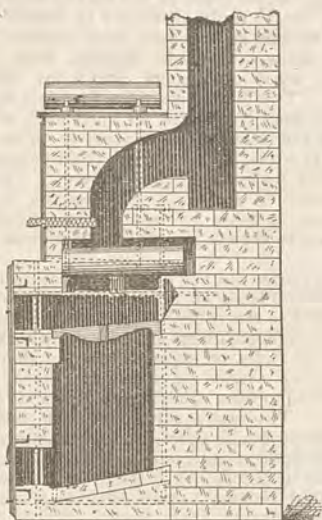
**MOTIVE POWER FROM ARTESIAN WELLS.**—A flour mill in New Jersey is supplied with electric light by motive power derived from a turbine which is set in motion by the water of an artesian well, sunk especially for this purpose. Artesian wells have recently been sunk in several parts of London in order to render the proprietors independent of the water companies. Wherever the rise and the quantity of flow is sufficiently great, these fortunate individuals are in a position to provide themselves with electric light at a very low cost.

The Mount Pleasant mine, at Grizzly Flat, El Dorado county, which was temporarily shut down last month, will be worked on a much larger scale than before in a short time. The mine is looking well.

## Permanent Assay Furnace.

Walter Lee Brown has issued a second edition of his very useful "Manual of Assaying," published in Chicago by E. H. Sargent & Co. The work has been thoroughly revised, corrected and enlarged. It is well printed and arranged. The accompanying engraving is taken from this work. It is a brick furnace which is a modification of Plattner's, constructed for Wm. J. C. Jackson, of Chicago, and is suited to the necessities of any assayer.

The various stamp mills, smelting and sampling works, etc., in the mining regions have usually permanent furnaces for their assay work. The engraving is a vertical section. The scale is one thirty-second. The muffle half of



Permanent Assaying Furnace.

the furnace is at the right and the crucible furnace at the left, both constructed of fire-brick. The lower half of the muffle furnace is anchored with 1½-inch wrought-iron bars and ties, and the upper part with those 1½ inch. The



Fig. 2.—Section across Longfellow Hill and Chase Creek Canyon. (See page 373.)

muffle appropriate for this furnace is the L. Battersea, 15x9x5½ inches. Coke or coal may be used.

## Mining in Spain.

The soil and rock of the peninsula abound in mineral wealth, and there is no doubt that, were capital and enterprise forthcoming, Spain would have no occasion for importing either ores or manufactured metals.

The following is a comprehensive list of minerals common to Spain: Iron and argentiferous iron, arsenical pyrites, ochres, lead and argentiferous lead, copper and argentiferous copper, silver, gold, tin, zinc, copperas, alkaline salts, quicksilver, antimony, cobalt, manganese, coprolitic earths, sulphate of baryta, alum, graphite, amber, anthracite, bitumen, common salt, sulphate of soda, topaz, phosphate of lime, lithographic limestone, fluorspar, steatite, kaolin, asbestos, argillite or plastic clay, sulphur, coal, lignite, peat, bituminous shale, asphaltum, petroleum, naphtha, and a variety of mineral waters.

**CEUR D'ALENE.**—Late advices from this section report the new 10-stamp mill of the Golden King Mining Company, of Louisville, Ky. (built by the Pacific Iron Works of San Francisco), as running very successfully, and the Duncan concentrators, with which the mill is equipped for saving the sulphurets, as being a complete success.—*N. Y. Mining Record.*

## Foundry Notes.

There is some indication of an improvement in business at the foundries, several of the larger ones having more orders on hand than for months past. The granting of the contract for Cruiser No. 2—the *Charleston*—to the Union Iron Works is, of course, a most important event for our local industries. It will provide labor for many additional mechanics, and give a decided impetus to iron and steel ship-building on the Pacific Coast. The Union Works have secured another contract for building a \$200,000 steamer for the coast trade.

The Pacific Iron Works have just finished a 60-ton copper smelting plant for the Atlas Mining Co., near Red Rock, about 50 miles from Tucson, Arizona. Mr. Foss went down a few days since to start the plant, which will be in working order by March 1st. The mine was discovered by J. W. Harker, but is now owned by a Chicago company. They have some 8000 tons of ore on the dump ready for the smelter.

The Pacific Iron Works have been unusually busy of late. Among their more recent orders may be mentioned the following: A 10-stamp gold mill, with Duncan concentrators, for the Chipana mine, near Iquique, Chile; 10 Duncan concentrators for the Mina del Rey mine, Peru; 12 Duncan concentrators for the McCoy mine in Georgia; 6 Duncan concentrators for the Divisadera mine in Honduras; a set of hoisting works for the Silver Star Co., of Nevada; a set of hoisting works for the Golden Star Co., of Inyo county; a 150-horse power Hazelton boiler for the Oakland Cotton Mills.

## Mining Accidents.

Josiah Palamoutain, who was recently hurt in the Idaho mine, died from his injuries.

W. H. Russell fell down the shaft of the Mayflower mine, Forest Hill, Placer county, on the 2d inst., and was instantly killed.

A dispatch from Georgetown, Dec. 3d, says:

D. Hogan and his partner, a man named Pomeroy, were "caved on" in a prospecting tunnel about one mile south of Garden City, to-day, Hogan being killed outright, while Pomeroy sustained severe injuries.

Richard Chenoweth, of the new North Star mill, Grass Valley, was severely injured last week by a fall from a scaffold. Both arms were broken.

James Podesto was killed at the Mammoth tunnel, Amador county, last week, by falling down a chute a distance of about 80 feet. He was working at the drill at the top of the chute, when he lost his balance and fell down the chute, and was killed instantly. Thos. Dwyer, who was working with him at the time, also lost his balance and fell, but caught on to a piece of spiling and saved himself.

The Society of California Pioneers has passed a resolution asking the trustees to amend the Constitution so as to permit the use of all sums of \$10,000 in the Relief Fund, in addition to the interest on that amount, for the relief of needy members of the society.

CONGRESSMAN KELLEY, of Pennsylvania, after a trip through the Southern iron districts, declares that the negro labor there is as well paid as the white labor of Pennsylvania.

The Carson Index predicts a boom within a year in the section through which the Carson & Colorado railroad passes.

## Mining Notes from Abroad.

Tin, cobalt, nickel, bismuth, and uranium have never been found in Turkey, but chrome iron ore, emery and copper are plentiful. Coal is found only in the basin of the Eregli and Amastra on the Black sea. There are numerous petroleum wells on the Persian frontier.

Considerable deposits of sulphur are found in the gypsum formation of Upper Silesia, especially at Pschow and Kokoschutz, near Ratibor.

Chinese diamonds are chiefly brought from the province of Shantung. Men put on thick shoes of straw, and simply roam about the valleys and the rivers. The rough and pointed diamonds penetrate into the straw and stick fast. The shoes are finally collected together and burnt, the diamonds remaining in the ashes.

Some grains of gold from Cornwall have been found to contain: gold, 92.34 per cent; silver, 6.06 per cent; iron, a trace; silica and lass, 1.60 per cent. A fine specimen of filiform native silver, obtained many years ago from the same locality, gave: silver, 99.05 per cent; iron, 0.59 per cent. Neither gold nor copper was present, and the iron might be derived from traces of associated iron pyrites.

## Personal Notes.

A. J. Bowie, Jr., has returned to this city from Mexico, where he has been examining some mining property.

Gardner F. Williams, M. E., who is now in London, will probably go to the African gold fields before returning to San Francisco.

Mr. Geo. W. Dickie, of the Union Iron Works, has returned to San Francisco from Washington, where he went in the interest of his company in connection with the contract for building the new cruiser for the Government.

Mr. Foss, the furnace man, has gone to Arizona to put up a copper smelter for the Pacific Iron Works.

Prof. S. B. Christy, of the University of California, during his recent visit East, visited and inspected all the mining and technical schools and colleges on his route.

Marsden Mansom, engineer of the State Harbor Commissioners, was at the last meeting of the Engineering Club of the University of California, and described to the members the engineering structure on the water-front of San Francisco.

**LUMBER FROM WOOD PULP.**—A correspondent of the *Toronto Globe*, writing of the possibilities of pulp as a substitute for lumber in the manufacture of furniture and other articles now exclusively made of wood, calls the attention of capitalists to the facilities afforded by northern Canada for obtaining the best pulp-making woods. In some localities, he says, the forests are at the best age for pulping purposes, and would yield from 40 to 120 cords per acre if the whole of the timber were utilized. By mixing the pulp with clays, steatite, asbestos, plumago, mica, etc., substances of every possible color and compactness may be produced.

The zinc mines at Roanoke, Va., are stated to have been sold to an Englishman for \$600,000 cash. These zinc mines have been but slightly developed, but it has been understood, for some time, that experts, both from home and abroad, have pronounced the product of unusual richness, with indications of a yield almost without limit.

The Calumet & Hecla Copper Mining Company, of Michigan, paid a dividend of \$5 per share on the 10th. The amount of this dividend is \$500,000, and makes \$1,500,000 paid in dividends this year by this company; and yet it has not been a good year for copper mining.

A rumor is afloat that the Benson, Arizona, smelter is going to resume operations, and if the report prove true a large number of men will be given employment, and ore will be shipped to Benson in great quantities, which will revive business there.

**THE ELECTRIC RAILWAYS OF THE WORLD.**—It is stated that the number of electrical railways and street cars now in existence approaches the respectable number of 80.

The Small Hopes Mining Company paid a dividend of \$50,000 on the 29th November, making \$2,412,500 to date.



## MECHANICAL PROGRESS.

## Improvements in the Steam Engine.

Two alleged important improvements in the steam engine have just been made public. The first is the invention of a young man—name not given—in Iowa, which is described by the *Industrial World* as follows: He dispenses with the steam chest and the governor balls which have for so long been regarded as indispensable to every engine, whether well regulated or otherwise. In place of the latter he employs a pendulum, which permits the overflow of steam at an unvarying speed, but the slightest increase in velocity in the engine lessens the time that the steam has to escape into the cylinder. The apparatus thus effects an instantaneous check upon its own irregularities, which is comparatively slow when the governor is used; and it has the additional advantage of using less steam, while it largely simplifies the working gear. A trial engine was constructed recently, and works to a charm. It was taken down for shipment to Minneapolis, where it will be practically tested at real work. If it succeeds as well as it now promises to do, it will probably be the first of many thousands of engines built on the new plan, and may lead to wonderful results.

The second improvement alluded to is that of the "Merchant engine," so called, a recent English invention which is attracting considerable attention in England, and for which it is claimed that the difficult problem of the return to the boiler of steam which otherwise would be wasted has now been practically solved by it. Several stringent tests have been made by this engine under the superintendence of responsible engineers previously unacquainted with it, and the result of one of the most recent may be here given: "The stated effective horse-power of the engine (933) was obtained at the expenditure of 0.803 pounds Welsh coal per horse-power per hour, and we hereby certify to such ascertained result." The boiler pressure was 241 pounds per square inch, the average vacuum in the condenser 17 inches, and the speed 125 revolutions per minute. The results thus obtained work out to a fraction over half a pound per indicated horse-power per hour. The economy in coal is such that it is calculated that the Peninsular and Oriental Steamship Co. would save \$5000 per day by the use of such engines. As the condenser occupies only a sixteenth of the space of an ordinary water condenser, it is adaptable to locomotives, which might, says Mr. Merchant, the inventor, be built to run 1000 miles without a fresh supply of water.

## Tinned Springs—A Curious Experience.

Recently, a Birmingham manufacturer had occasion to endeavor to coat the surface of some hardened and tempered steel springs with tin, a bright and non-corrodible article being required. The springs are C-shaped, and are about half an inch wide, terminating in two points, by which they are held, and on which they swivel. Large quantities of them had been previously galvanized, and it was found perfectly easy to coat them with zinc, and so regulate the temper in the first instance that the springs retained the necessary temper when finished. When, therefore, the attempt to tin them was first made, it was thought that the temper would be lowered and the spring softened; but the contrary of this was the case. The springs were hardened in oil and then tempered to the proper point, after which the tinning was effected. As soon as the springs were tinned, it was found on testing that they were so brittle that the least pressure caused them to break into fragments. A long series of experiments confirmed this remarkable result, and it was eventually found necessary to pursue an entirely different course. The springs are heated to a white heat and hardened in oil, being then set aside for a day and allowed to dry. In tempering them, they are allowed to reach a dull red heat, and it is found that, when subsequently tinned, the right temper is obtained. The most remarkable feature in the case is that, unless the springs are hardened and tempered, the tinning has no appreciable effect on the hardness or temper of the steel. It would, therefore, appear that the molecular change effected by hardening and tempering the steel leads up to this remarkable action in tinning. At present the cause is not clear, but some of our readers may be able to throw some light on this matter.—*Industries*.

JOE MACHINERY AND REFRIGERATION.—The rise and progress of the ice machine and refrigerating apparatus is one of the most remarkable features of present machine practice. There are only two varieties—those of compression and absorption. In compression practice the competition is not even surpassed by the steam engine. The surprise at the variety of names, manufacturers and titles is only met by that at the very small difference in the details of construction. Each of the constructions is exhibited as far superior and more economical than any other, and yet no data are presented to enforce such claims. Comparing the two independent methods of compression and absorption, we have the value of the first based upon high-priced and expensive compressors and engines, that of the second simplicity of construction and quietness of operation. While in the first case lofty or widespread (and we might

say noisy) plant displays itself as a work of art in machinery practice, in the second, massive construction and quiet operation attract the attention and give rise to the question as to whether the plant is operating at all. A specially bad feature of the compression system is the necessity for duplicate plant consequent upon the great liability to a break-down, due to the extremely trying work coming upon the machinery of this system. No matter how small the plant, duplicate compressors and engines are an admitted necessity. In the face of this extra expense, however, machinery is cheaper than ice itself.—*Ex.*

ANNEALING TENACIOUS STEEL WIRE.—Col. Maitland's method of annealing highly-tenacious steel wire is given as follows by Dr. Percy, president of the British Iron and Steel Institute: The wire was in three pieces, each from three to three and one-half inches long, which together weighed about eight grammes. They were packed round with asbestos to check chilling, and pushed into a combustion tube about eight inches long. At each end of the tube a plug of copper gauze about one and one-half inches long was inserted, the pieces of steel wire and asbestos lying between those two plugs. One end of the tube was sealed and the other drawn out fine. The tube having been thus arranged and placed in a gas combustion furnace, the plugs of copper gauze were first heated to redness with a view of absorbing the oxygen in the tube; afterward the pieces of wire and asbestos were heated to a very full redness and kept at that temperature for half an hour. The gas was gradually lowered and then extinguished, after which the top of the furnace, the bottom and sides of which were of clay, was covered with a tin-plate screen and left until the following day, when the wires were withdrawn; they were slightly dulled on the outside, but quite superficially.

ROLLING SMALL WIRE RODS.—A patent has recently been granted to Benjamin Weaver, of Pittsburg, Pa., for improvements in rod-rolling mills, which have for their object the rolling of small wire rods such as are used for fence and telegraph purposes. These are at present obtained by what is known as the wire-drawing process, it being impossible to roll the smaller sizes of wire rod with the mills now in use. Mr. Weaver's, it is claimed, will combine in its operation both the rolling and drawing processes. This is made possible by the peculiar construction and arrangement of the mills and their driving mechanism, by which the rod is passed automatically through two pairs of rolls, the second pair of the series drawing it through the first pair. This operation is repeated in succeeding sets or series of rolls until rods of the desired size are obtained. Experiments have, it is said, left no doubt of the practical value of this invention. It is stated that a syndicate of prominent rolling-mill owners have offered Mr. Weaver \$80,000 for his patent.

SCHOOL OF MECHANICAL ARTS.—The California School of Mechanical Arts was endowed by the late James Lick with \$540,000. The object of the fund was to educate males and females in the practical arts of life, such as working in wood, stone, iron or other metals. The trustees are: Horace Davis, A. S. Hallidie, John O. Earl, John H. Boalt and William Ashburner. A conference will soon be held with President Holden, of the State University, Prof. Rising and others in regard to the best means of starting the school. The trustees have been in communication with instructors of technical schools in the East, and have received considerable information.

IMPROVEMENT IN RIFLE MANUFACTURE.—Great improvement has recently been made in the manufacture of rifles; 120 barrels can now be rolled in an hour by one machine. They are straightened cold and bored with corresponding speed, and even the rifling is now done automatically, so that one man tending six machines can turn out 60 or 70 barrels per day. With the old rifling machine 20 barrels was about the limit of a day's work; but the improved machines attend to everything after they are once started, and when the rifling is completed ring a bell to call the attention of the workman. He is thus enabled to attend as many as six machines at a time.

CAST-IRON PILLARS TABOOED.—The Berlin authorities having prohibited the use of cast-iron pillars in the underground rooms of dwellings, as being apt to crack in case of fire, and having ordered the use of wrought-iron pillars instead, led Professor Bauschinger to make some tests as to the qualities of each. He has found that under the influence of intense heat, wrought-iron pillars bend to such a degree as to be valueless as supports, while those of cast iron, under the same conditions, never ceased supporting the weight put upon them, and when cooled assumed very nearly their original position.

SMELTING OF IRON SAND.—A method by which the immense deposits of iron sand which abound on the coast of New Zealand can be successfully utilized, has lately been discovered at Auckland. The feature of the new process consists in uniting a quantity of scoria with the sand when put in the blast. This has the effect of preventing the iron from oxidizing, an obstacle that has heretofore never been successfully overcome in smelting iron sand.

## SCIENTIFIC PROGRESS.

## Telephonic Induction.

The extent to which telephonic induction may be carried is one of the remarkable discoveries of the day. Mr. Preece recently read a paper on the subject before the British Association, which has attracted much attention and has revealed a somewhat alarming extent of electrical induction. In Gray's Inn Road a telegraph wire suffered induction from a telegraph cable 80 feet below and in the ground. The complaints induced Mr. Preece to arrange experiments on a larger scale. In Newcastle, induction was noticeable at 3000 feet distance. Experiments on the Durham-Darlington lines and two other parallel lines, the one 10½ miles east, the other 5½ miles west, proved that on a Sunday, when all other traffic was stopped, a peculiar signal given on the central wires of 18 miles length could distinctly be heard at the four corners of the two other parallel wires, and, moreover, Morse signals were heard, which could only come from a line 40 miles away. Two other lines were therefore selected—one from Newcastle, 55 miles long, with 10 wires, the other from Gretna, 40 miles long, with 17 wires, the two being about parallel and 40 miles distant from one another. The wail produced by intermittent increasing and decreasing currents by means of a special commutator in the one line was sadly audible in the other.

Mr. Preece did not consider these tests conclusive evidence of induction, because earth was used as return lead, although the respective line terminals were most carefully insulated. Another series of experiments is, therefore, now being carried on, with gutta serena wires bent so as to form squares, of a side of ¼ mile length. Two such squares have been placed on the ground ¼ mile apart; and what is intrusted to a telephone inserted in the one closed circuit can be listened to in the other. If facts of this kind become known, the telephone will not gain in favor.

Cables are not much better, perhaps; signals given in the one cable to the Scilly islands have been heard in the other cable half a mile away. It is further intended to carry a special double line of copper wire to Wales. Professor Silvanus Thompson objected to the term induction, which has become the household explanation for a good many different troubles. As the earth was used in Mr. Preece's tests, and perfect insulation is a practical impossibility, the lines of force tapped at any two points must necessarily indicate current variations. Mr. Preece protested against having characterized the phenomena as induction phenomena. It was remarked that at the electrical tramway line at Giant's Causeway, a telegraph wire is only 25 feet from the conductor rail, and no induction effects have ever been complained of, although the postal authorities had to be satisfied about a great many points before agreeing to have the two lines so near one another. A test experiment was further suggested. Let us take three parallel wires, the one for the signals, the other two on the same side of the first for listening with the telephone at the one terminal; if we have to deal with conduction, it cannot make any difference whether or not we join the two other wires by auxiliary wires, so that they form one complete telephone circuit; if it is induction, a difference must result. There seems to be a wide field for research opened up in this direction, which, if properly followed up, as it no doubt will be, may lead to important results.

ICE RIVERS.—Ordinary glaciers are accumulations of ice descending along valleys from snow-covered elevations. They are ice streams, 200 to 5000 feet deep or more, fed by the snows and frozen mist of regions above the limit of perpetual frost. They stretch on 4000 to 7000 feet below the snow line, because they are so large that the heat of summer cannot melt them. Some of them reach down into open cultivated tracts, the extremities of the Grindewald and Chamouni glaciers, for instance, being found within a few hundred feet of the gardens and houses of the inhabitants of the valleys. The best known glaciers are those of the Alps—numbering 1150, as Prof. Heim has just ascertained, and covering a total area of more than 500 square miles—but important ones also occur in the Pyrenees, the mountains of Norway, Spitzbergen, Iceland, the Caucasus, the Himalayas, the southern extremity of the Andes, in Greenland, and on Antarctic lands. One of the Spitzbergen glaciers stretches 11 miles along the coast, and projects in icy cliffs 100 to 400 feet high. The great Humboldt glacier of Greenland, north of the 79th parallel, has a breadth of 45 miles at the foot, where it enters the sea. The glacier is but one of many in that icy land, in the interior of which, according to Nordenskjöld, one may pass over a vast ocean of ice and snow, 1200 miles long and 400 miles wide, without seeing a plant, a stone or a patch of earth.

A NEW USE FOR ELECTRICITY.—By means of electricity the most attractive leather surfaces are now completely imitated. The leather which it is destined to imitate is first well cleaned and coated with graphite, as in electroplating a smaller article. It is then placed in a copper bath, the tank of which is made large enough to easily receive a skin of any size. A powerful dynamo-electric machine furnishes the

current. The copper is deposited upon the coated surface of the hide to the thickness of one-sixteenth to one-eighth of an inch. The plate thus formed reproduces, but reversed, every mark and minute vein of the leather, so that a print taken from it is an exact copy of the original.

A NEW COAL/OIL BURNING WITH SPERM-FIRE TEST OF 480 DEGREES.—From the date when kerosene oil came into general use efforts have constantly been making to carry the manufacture of petroleum still further toward perfection. The desiderata have been for the purposes of illumination, a smokeless, odorless and non-explosive oil, or the equivalent of sperm oil, and, for the purpose of lubrication, an oil which shall have the qualities of stainlessness, durability or non-volatility. The problem thus presented, which so long seemed hopeless to chemists and other experts, says the *Boston Advertiser*, appears now to have been solved by Charles Tappan, of Salem. Laboratory experiments give full assurance that the new oil, which has not yet received a distinctive name, can be produced on a large scale at a cost not materially, if at all, greater than attends the manufacture of the corresponding oils now in use, and with a facility not less. The new oil, as used for illumination, ranks with sperm oil. Like that, it requires no chimney and burns best with the same sort of wick, that is, a loose wick moving easily in the tube or socket. It yields about the same amount of light as the best sperm oil, and, like that, is perfectly secure against explosion. For household use in hand lamps, for lighting street-cars and other railroad cars and for burning in portable stoves for cooking purposes, the new oil seems to be a decided improvement on the kerosene, and this in the three particulars of safety, absence of odor and economy. For, assuming the cost to be greater, it is certain not to equal the combined cost of the kerosene and its chimneys. For sleeping-car and oil-stove uses the gain is manifestly great in getting rid of odor and securing safety. The new oil, if spilled upon the floor of a car in case of collision, would be as safe against ignition as would sperm oil. In one point it seems to have a preference over sperm oil, namely, in less crusting of the wick.

THE SOUTHERN CALIFORNIA GEOLOGICAL SURVEY.—Mr. James Stevenson, the executive officer of the United States Geological Survey, has just returned to Washington from Southern California, where he has been for several weeks making some preliminary investigations regarding the character and resources of that portion of the State. The principal feature of his instructions was to ascertain the character of the climate and whether geological and topographical parties could work in Southern California during the entire year, and whether geological, topographical and other scientific researches were sufficiently important to warrant the establishment of such in the southern part of the State. The substance of Mr. Stevenson's report will be to urge the commencement of such work at once. He considers that portion of the Pacific Coast one of the most interesting and prosperous he has ever visited. He says that the recent introduction of the Atlantic & Pacific and the Atchison, Topeka & Santa Fe roads into San Diego has had a most marvelous influence. Thousands of people are now flocking to that coast, and the developments that have followed are unparalleled.

CRAYON PICTURES BY MACHINERY.—Not exactly chromos, nor lithographs, nor photoprinting, but the invention consists in throwing colors upon the surface in spray so fine and so perfectly that the sand blast for designing, etching and engraving is but an imperfect counterpart. As an example, a lady produced a portrait of Gen. Sheridan's bust life size, as handsome as anything in engraving or hand work, in an hour. It is claimed that these pictures, portraits, landscapes, etc., can be produced in this manner commercially profitable.

THE BOBOLINKS NORTH AND SOUTH.—There are likely to be some new views current in regard to the bobolink, if the ornithological reports from Washington are accepted. It is said that this little feathered glory costs the country between \$3,000,000 and \$4,000,000, that being the estimated damage he does to the rice crop in the Southern States. Part of the damage is in harm done to the crop, part in wages paid to large numbers of persons employed to protect the crop from the birds. In the North, on the contrary, he does no harm.

NOT NEW.—The use of sugar or a saccharine liquor for mixing lime and cements is not new. It has been known in some parts of the world from "time immemorial," and many of those whose business it is to make plaster molds or casts mix the plaster of paris with a solution of sugar in water. Attention is called to the fact that the practice of mixing jaggers or unrefined sugar with mortar is very ancient, and masonry properly cemented with such mortar is not easily removed without blasting.

LONG-DISTANCE INDUCTION.—According to W. H. Preece, the English electrician, the so-called induction sounds in telephone lines, caused by electric currents passing over other wires, have been produced in telephone lines not approaching nearer than 40 miles to the wire of the disturbing current.



## ENGINEERING NOTES.

## Progress in Electric Railways.

There are several electric railways in various parts of the world which have met with more or less success, but no one seems as yet to come up to that degree of practical success which will warrant anything like a general introduction of the system, even in street railways or others of short distances only. Electric propulsion is yet in its experimental stage.

There are several difficulties connected with all the various systems yet produced. It is conceded to be impossible to generate the electricity on the locomotive itself, hence in all systems the power is communicated to the car or train in something like the usual way of transmission. One of the most serious difficulties in the way is to have the conducting medium thoroughly insulated and at the same time in constant connection with the moving locomotive or car.

In the Siemens railway system the electricity is conducted by a third rail between the regular rail tracks, and the conducting rail is made massive so as to thus prevent accidents from any conductor casually coming in contact therewith, but still accidents of that kind do sometimes occur. The connection between the car and rail is maintained by metallic brushes. At Portrush, in Ireland, the rails themselves upon which the cars run are usually conductors. Overhead wires are also used as conductors, a moving carrier attached to the car being the medium of receiving the electricity from the wire.

Some very elaborate experiments have been for some time in progress upon one of the elevated railroads in New York City, but the expected success does not appear to have been as yet met with; very little information as to the progress made has been given to the public. But the experiments are still in progress, and much money and the best obtainable skill are being expended to perfect the same.

Some three or four months ago a series of experiments were initiated on the Ridge Avenue City Railroad, in Philadelphia. The progress of this experiment was made the subject of a paper recently read before the Franklin Institute of that city. It appears from that paper that the Ridge Avenue line differs from all preceding experiments in having its electric conductors in an underground circuit, presumably much after the manner of the cable system first devised in this city, from whence a collector passes from the car to the cable through a slot in the conduit, the connection being made in a manner similar to the grip in the cable cars. By this means there is no risk of danger from contact with the electric conductor; while all parts are compact and convenient. The electricity is conducted by ordinary wires from the dynamo to the conduit.

The collector consists of two firm steel springs, shaped somewhat like carriage springs, whose extremities press upon the channeled iron conductor. The position of the collectors may be readily changed to conform to the desired motion of the car, either forward or backward.

One of the chief difficulties with electric locomotives has been the difficulty and danger of intrusting the delicate and easily-disturbed mechanism of an electric motor to unskilled hands, such as must be trusted to run a street car.

The inventor of the Philadelphia system has, in a great measure, avoided this difficulty by providing a switch-board, entirely inclosed, and in which a single motion of a lever causes the motor to move forward or backward or remain stationary, and regulates the speed at which it shall run.

The working of the system, it was stated in the paper referred to, appeared to be all that could be desired. The road has several quite short curves, as well as several steep inclines. Each of these difficulties is readily overcome with a 7100-pound car and a fair complement of passengers. While the car is in motion the volt meter shows a constant pressure of about 100 volts, the ampere meter varying with the load from 5 to 25 amperes.

**THE PROPOSED FRENCH TOWER.**—The tower 1000 feet high, which it is proposed shall be erected in Paris for the Exposition of 1889, is likely to afford plenty of excitement to the Parisians before it is completed. The first step is about to be taken in ascertaining what curve should be given to its sides. A chain or cord suspended between two points forms a catenary curve corresponding with the weight of the chain or cord. Now it is supposed that something of the kind occurs when the suspension is approximately vertical. The engineers have therefore arranged to cause a balloon to ascend to the height of the proposed tower. From the boat, ropes will be hung to the ground and fixed there. From their curvature, the contour of the tower will be derived. It is a novel experiment, but, as there is some difficulty in arranging the slope of an ordinary lighthouse, we cannot expect that a colossal tower, made of iron plates, is to be designed without much deliberation.

**THE SWEDEN-DENMARK TUNNEL** is still seriously talked of. The depth of water in the channel under which it is proposed to tunnel does not exceed 60 feet. The Swedish ports on the sound have only shallow water, and much difficulty arises in the shipment of goods.

## USEFUL INFORMATION.

**LEAD-EATING INSECTS.**—A French architectural journal recalls an observation made by Viollet-le-Duc that lead plates for roofing and other purposes are often pierced by insects. He accused the wasps of being the authors of the little holes that he found gnawed in lead roofs, but later observers have discovered that both worms and flies often drill through heavy plates. Some 25 years ago it was found that the lead bullets of cartridges that had been stored in wooden boxes were badly gnawed, and a number of gall or saw flies were found in the act of working upon them. Why these little creatures should amuse themselves in digging out the tough metal with their jaws it is hard to say. Both males and females were found at work; and the only suggestion which our Gallic cotemporary can make is that they were, perhaps, sharpening their teeth. The first notice of perforations made by worms seems to have been made by M. Janniard, formerly official architect in charge of churches and public buildings, who observed that the lead covering of the steps on the roof of an old house in Paris was bored through in several places. Only one of the steps was attacked; and, on looking closely, he found that every hole in the lead corresponded to a wormhole in the oak planking on which it was laid.

**INCREASING THE HARDNESS OF BRICKS.**—For obtaining products that will offer greater resistance to humidity, etc., than ordinarily is the case, an improved process of manufacturing bricks has been brought forward in Germany. After drying and grinding the clay a mixture is made of 91½ parts of the latter, 3 parts of iron filings, 2 of table salt, 1½ of potash and 2 of elder or willow-wood ashes. The whole is heated to a temperature varying from 3362° to 3632° F. At the end of from four to five hours the argillaceous mixture is run into molds, then rebaked in the ovens—always protected from the air—at a temperature of 842 to 932 degrees F. The product may be variously colored by adding to the above quantity two parts of manganese for a violet brown, one part of manganese for a violet, one part of copper ashes for a green, one part arseniate of cobalt for a blue, two parts of antimony for yellow, and one and one-half parts of arsenic and one part of oxide of tin for white.

**COLD WATER PAINTS.**—A series of paints, which are made ready for use simply by the addition of cold water, have for some time past been successfully introduced abroad, the paint thus produced drying, it is stated, with a fine, hard surface, which, although mixed only with water, is impervious to rain and uninjured by frequent washings, even with diluted disinfectants; as oil and turpentine are also dispensed with, these paints have the additional advantage of being free from objectionable smell. They can be used for exterior work on wood as well as on brick, plaster, iron or stone, and for interiors they are of course peculiarly applicable. The paint can likewise be reduced by oil, which produces a hard and glossy surface. It is thought that non-poisonous and washable paints will prove of peculiar adaptation for tropical countries generally, where cleanliness and freedom from infection are particularly requisite, but where, it is well known, the application of the ordinary oil paints and distempers is neglected.

**SAWDUST FOR CLEANSING GARMENTS.**—Mr. Scott proposes to cleanse garments by submitting them to a uniform friction produced by sawdust from hard wood, and in connection with benzine, naphtha, or analogous solvents. The garments impregnated with any of the above solvents are placed in a revolving apparatus along with sawdust of mahogany or any other suitable wood. By the employment of this wood-powder it is stated that an economy is effected of 25 to 27 per cent of the cleansing material employed, and it is stated besides that the brightness of the colors is not impaired. The principle is not altogether a new one, since dyed skins, or rather skins the wool or fur of which has been dyed, are very often exposed with sawdust in a revolving cask, not only to remove any adhering particle of color which may not have been fixed on the fiber, but to give at the same time a kind of finish by the gentle rubbing action.

**DETECTION OF LEAKS IN WATER MAINS.**—The microphone is now being used in Germany for the purpose of detecting loss of water through leakage in the town mains. The apparatus consists of a steel rod, which is placed upon the cock in the neighborhood of which the leak is suspected, and a microphone attached to the upper end of the rod. A dry battery and a telephone complete the equipment. No sound is heard in the telephone if the cocks are closed and no leak occurs; but a leak of even a few drops through a badly fitting cock causes sufficient vibration in the pipe to affect the microphone, and to give audible sounds in the telephone. At the recent meeting of gas and water engineers in Eisenach, it was stated that the apparatus is so simple to handle that, with a little practice, ordinary workmen are able to detect and localize any leak.

**WHAT MAKES VINEGAR SHARP.**—George Adams, in 1747, said that some people have imagined that the sharpness of vinegar is occasion-

ed by the eels striking their pointed tails against the tongue and palate; but it is very certain that the sourest vinegar has none of those eels, and that its pungency is entirely owing to the pointed figure of its salts, which float therein.

**A TON OF COAL.**—There is more in a heap of coal than a thoughtless person may discover. Besides gas, a ton of gas coal will yield 1500 pounds of coke, 20 gallons of ammonia water and 140 pounds of coal tar. Destructive distillation of the coal tar gives 69.6 pounds of pitch, 17 pounds of creosote, 14 pounds of heavy oils, 9.5 pounds of naphtha yellow, 6.3 pounds of naphthalene, 4.75 pounds of naphthol, 2.25 pounds of alizarin, 2.4 pounds of solvent naphtha, 1.5 pounds of phenol, 1.2 pounds of aurine, 1.1 pounds of aniline, 0.77 of a pound of toluidine, 0.46 of a pound of anthracene, and 0.9 of a pound of toluene. From the last-named substance is obtained the new product known as saccharine, which is 230 times as sweet as the best cane sugar.

**INCOMBUSTIBLE LAKE.**—At a late meeting of the Applied Science Exhibition, at Paris, M. J. A. Martin, of Paris, exhibited a pair of muslin curtains to which a flame was constantly applied without consuming them. The composition he employs for rendering paper, wool and textile inflammable is the following: Pure sulphate of ammonia, 80 parts; carbonate of ammonia, 25 parts; boracic acid, 30 parts; pure borax, 17 parts; starch, 20 parts; distilled or pure water, 1000 parts. The materials are dipped in this solution while hot, so as to be thoroughly impregnated, when they are dried and ironed as ordinary starch fabrics.

**NEW PROCESS FOR RENDERING PAPER INSENSIBLE TO THE ACTION OF WATER.**—A new process of rendering paper insensible to the action of water and atmospheric changes has been patented in France. A sheet of paper is covered on the wrong side with a thin layer of gutta percha, which is afterward spread with paper, linen, thin pasteboard or similar matter. The whole is heated and pressed. Under the influence of heat the gutta percha becomes softened and unites firmly the two surfaces between which it has been placed. This prepared paper is of special value in art work.

**SCARPALOGY.**—*La Graphologie*, a French journal, describes a new method of reading character, known as "scarpology." It consists in a study of the heels and soles of shoes. If these are worn down evenly, the wearer is a good business man, energetic and quick in decision; if the outer side is worn more than the inner, he is of an adventurous turn of mind. Weakness of character is indicated by a heel and sole worn most on the inner side. An interesting paper might be written on the different methods adopted to test character.

## GOOD HEALTH.

## Insanity in California.

We have received the 34th annual report of the superintendent of the Stockton Insane Asylum, in which we find some interesting facts in regard to insanity in this State, as compared with that disease in other communities. We copy as follows:

Has our State more than its share of insane? There is a prevailing impression that mental disease is spreading among us at an unusual rate; indeed, I have heard the phenomenon explained on climatic and atmospheric as well as other grounds. A few considerations may here be presented to show that this impeachment of the mental stability of our people is unfounded.

First, let it be remembered that the aggregate number of the insane must ever be on the increase in any prosperous, growing community. So plainly is this so that the demand for additional asylum accommodation may generally be taken as an index of the advancement of a State, and a proof of its material and social development. But the repetition of these demands, with the frequent attraction of public attention to the subject, conveys to some the belief that insanity is inordinately active here. California, absorbing a large immigration yearly, yet with capabilities for great future numerical expansion, must expect to be called on to erect a new asylum every nine or ten years for perhaps the next half century.

No definite conclusion as to the prevalence of insanity in a community can be reached except on the basis of population. But what is the present population of California? The Federal census of 1880 placed it at 864,686. A comparison of this with former censuses fortifies the claim upon which most estimates of our numbers are now made, namely, that the State has for many years been steadily increasing at the rate of 100,000 every three years. Accepting this count as probably near the truth, the present population would be something over a million.

On this basis the proportion of insane here is not in excess of that of many other States. There are now 2922 inmates in our asylums, which gives us 1 to every 360 inhabitants. The ratio in New York is 1 in 365; in Massachusetts, 1 in 350; in Australia, 1 in 375; in Great Britain, 1 in 345; in France, 1 in 400; in United States, 1 in 545, excluding idiots, 1 in 300, including idiots.

Again, there is a gradual decrease in the

number of persons annually sent to the asylum, in proportion to the population. The number of those attacked with insanity is proportionately less now than it was three years ago, and three years ago it was less than it was six years ago. This progressive diminution in the ratio of those committed proves in the clearest manner the steady decline of insanity in our midst.

While, therefore, it cannot be said that California has a higher insanity rate than ordinary, there are certain peculiar and incidental conditions that tend to keep the rate higher than it would otherwise be. Foremost among them is our unusually large foreign-born population.

It is well known that Europeans coming to this country are much more subject to mental disorder than our native-born citizens. The reasons for this are various. The shock of separation and transplantation, the uprooting of old associations and habits of life, the homesickness, the inability in those who have hitherto always lived in the vicinity where they were born, to adapt themselves and find mental anchorage in new phases of existence—these are some of the explanations that have been offered. The fact was placed in a startling light by the census of 1880. It was found that while one-seventh of the whole population were foreign, of the insane, not one-seventh, as might have been expected, but one-third, were of foreign birth. Thus it appeared that while but one in every 662 of the native population was insane, the ratio among the foreign-born was one in every 250.

Turning to our own State, we find this significant showing repeated and intensified. No State in the Union has so large a proportion of foreign-born, except the neighboring State of Nevada. Over a third of the population of California, in 1880, were born outside of the United States. The number returned as insane in that year was 2503, of whom 1618, or two-thirds, were of foreign nativity. That is to say, one-third of our population (the foreign-born) produced two-thirds of our insane. Or, stated in another form, while one in every 646 of our native-born is insane, the ratio among our foreign-born is one in every 180. Giving these remarkable figures their weight, it will be seen that a low rate of insanity in our State would, under present circumstances, be akin to a miracle.

Another point closely affecting our insanity statistics may be found in the wide scope formerly embraced in the peopling of this asylum. Founded in 1850, it was for many years the only receptacle for the insane on the Pacific Slope. In the absence of other places for their reception, the insane of the Territories north and east of us naturally gravitated to Stockton, where they are to be found, many of them, to this day. They help to swell the large class of chronic insane who have accumulated in our wards, and who, carried on our books from year to year, contribute toward giving a wrong impression as to the prevalence of acute insanity in the State.

Idiocy, etc., in California.

Another fact should be considered in this connection. While in other States, imbeciles, dotards, simpletons, fools, etc., are kept in separate institutions, here they are all consigned to the insane asylums and counted in the reports as insane—another source of error into which many, not acquainted with the facts, naturally fall. When these classes of patients are separated, the statistics show that our proportion of idiots, etc., is far below that of other States, but the exact figures are not given in the report before us.

## The Increase of Bald Heads.

To a person who has a moderately well-supplied pocket-book and a thoughtful turn of mind, there can be no more fruitful theme for meditation than to go into our large halls, theaters, churches and other places of public resort, and, securing a seat in the gallery or in the rear part of the room, look at the heads of the audience, for no other purpose than to ascertain by actual count how many show signs of baldness. Unless the experimenter has been in the habit of counting for this object, he will be surprised to learn that in most of the Eastern cities fully 30 per cent of the men over 30 years of age show unmistakable signs of baldness, while nearly 20 per cent have spots on their heads that are not only bald but actually polished with the gloss that is supposed to belong to extreme old age alone. From my observation I find that bald-headed men are most plentiful in New York and Boston. After these come Philadelphia, Washington and the Western towns. I say "men" for two reasons: 1. Because women usually wear their hats or bonnets on such occasions, thus covering their crowns. 2. In case their hats are removed the hair is combed up so as to cover any possible bald spot, or else there is an artificial "switch" to hide the defects of nature. So, without indulging in any speculations regarding what may be, I will confine myself to what is to be seen.

Here are a few observations taken in Boston: Trinity church, 243 men; 71 actually bald, 46 indications of baldness. King's chapel, 86 men; 38 actually bald, 14 indications of baldness. Hollis Street theater, orchestra at performance of the "Mikado," 63 men; 27 actually bald, 10 indications. Boston theater—Jude, 126 men; 51 actually bald, 43 indications.—*Virgil G. Eaton, in Popular Science Monthly.*



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**SUTTER CREEK.**—Amador Ledger, Dec. 3: Thirty stamps of the Mahoney mill are in constant motion. The ore that is being crushed is reported to be paying very well. The South Spring Hill Co. has attached a water-power whistle to its mill. It is working satisfactorily, and is conceded to be the noisiest blower in the neighborhood.

**PLYMOUTH.**—Mining operations are taking a boom. Active preparations are being made by the Plymouth Consolidated to enlarge the Pacific mill by an addition of 40 stamps. Already they have commenced to excavate rock for the foundation. The New London Co. is still pushing ahead vigorously, having just completed fine hoisting works, and every one is predicting a splendid mine.

**VALPARAISO.**—This mine is situated near Middle Bar, and joins the Mammoth on the north. It is owned by Onocchio Bros., of Jackson. For some months past a few men have been employed in running a drift south, in the direction of the point where the rich deposit of gold-bearing black metal was discovered in the Mammoth ground. Recently they encountered a body of quartz, abounding in that peculiar "black metal" which has already made this district famous. It evidently carries a large percentage of gold. The miners are working by contract, having to run the tunnel a certain distance for a stipulated interest in the mine.

**MISCELLANEOUS.**—The Mellow Bros. have encountered a 4-foot ledge in their quartz claim, near Butte City. Samples of the ore which we have seen show plentifully in free gold, and the owners are confident that they have struck it rich at last. The Mellow gravel claim is being prepared for active operations this winter. Four hundred and seventy feet of 15-inch and 500 feet of 11-inch pipe has been placed in position, and a giant has been procured.

## Calaveras.

**FROM MURPHEYS.**—Cor. Calaveras Prospect, Dec. 3: The mercury in the mining thermometer is at a point above fever heat in this vicinity, and bids fair to rival in intensity anything ever inaugurated here. If the mining enterprises proposed here are carried out it will cause a boom such as was never known. The sale of the Moffitt & Barnes Gravel mine, in Balaklava hill, has been consummated and the purchasers will proceed to further develop the mine at once. The Vallecito Gravel mine owned by Mrs. Mitchell is said to have been sold. A party of mining men, who were here on the 26th of last month, examined the gravel diggings of Douglas Flat, Central Hill (Murphey's) and others in proximity, with the view of purchasing the entire area for mining. The conception is gigantic, and if carried out would bring wealth to both the coffers of the investors and our people in general. The proposition is to form a company and purchase the untouched acres of auriferous gravel in this locality, with the acres of surface gravel known to contain gold in remunerative quantities, and other adjacent mining property, including privileges, dumps, water courses, etc. There is a quiet movement in seeking mining property here pregnant with good results. A party has purchased a number of mining claims in connection with the Rogers ranch, two miles north of this place, and are about placing in position a Hurdy to run the arastras. The outlook is favorable for speedy development and a paying run. Work in the Oro Plata mine is progressing favorably and in a short time the management propose to increase their help. When the mill starts up we look for excellent results.

## El Dorado.

**EL DORADO.**—Cor. Republican, Dec. 4: The mining outlook in this vicinity is good, but we do not expect any great boom before spring. The Springfield is still running on rich ore. It employs about 30 men. The old El Dorado, which lies just north of the Springfield, is now being prospected with good results. We expect, in the spring, to see a large mill running on this claim. This mine now employs 12 men, and as opened up, it will employ a greater number. The McNulty mine, south of the Springfield, is now being prospected. About 15 men are employed in the mine and grading off a site for hoisting works. When the works are up, the old shaft will be cleaned out, and the mine thoroughly prospected. This mine pays its men, who work above ground, \$2 per day. A few weeks ago, most of the men working at this mine made a strike for an increase of 50 cents per day. The superintendent discharged the strikers, and filled their places with new men. The Starlight mine, which is situated west of Logtown, is running day and night, and is reported to be paying well. This mine employs from 25 to 30 men. We are informed that the Red Rover mine, near Logtown, will start up soon. When spring opens we expect that work will be resumed on many of the old mines in this vicinity, and old El Dorado will again be prosperous as of yore.

**QUARTZ.**—Placerville Observer, Dec. 4: Rich quartz is becoming a very common thing here as well as in Grass Valley. One Gabriel Beieria was in town last week exhibiting ore literally "lousy" with the bright and shining metal. The ore was taken from a ledge on Mathenas creek, two miles below the Springfield, which in itself is proof positive that this wonderful mining district is still in its infancy. Through an interpreter we were informed that the ledge is now four feet in width and contains rock that will readily mill \$1000 per ton.

## Inyo.

**MARBLE.**—Cor. Ter. Enterprise, Dec. 7: Steam was turned on the engine at the new mill of the Inyo Marble Co. on Thursday last. All the machinery is in good working order. The mill will not go into full operation until the superintendent, M. Luce, returns from San Francisco. He is making preparations for increasing the capacity of the mill. He will add a new set of gang saws to the one set now in the mill. Each gang will hold 40 saws and will saw 40 slabs of marble at once. A rubbing bed is attached, used for smoothing the slabs as they come from the saws.

## Mariposa.

**COULTERVILLE.**—Cor. Mariposa Gazette, Dec. 3: There is but little interest taken in the development of new mines. The only move that has been made in that direction for a long time is the purchase of the Crown Lead property by a San Francisco company. The company has repaired the dam so as to secure it against the winter and spring freshets. Its object is to convey the water in pipe or flume to Horseshoe Bend, so as to cover all the deep gravel diggings on both sides of the river and including Horseshoe Bend. The Red Cloud mine is still whacking away, turning out the bullion in large bars. The Banderita mine is still running.

## Nevada.

**PRESCOTT HILL MINE.**—Foothill Tidings, Dec. 2: The Prescott Hill mine is showing up in the best kind of way. The company (the Orleans) now has over 300 feet of backs, and in the north drift there is four feet between the walls, and nearly all of that is ledge. The Orleans people have a just reason to feel good, for they are almost certain to reap a rich reward for their long and hard labor.

**THE BRUNSWICK MINE.**—Articles of incorporation for the Brunswick Mining Co. have been prepared and it is cheering to think that the mine will soon start up. The Brunswick (old O'Connor or East Eureka) is in a rich district, and some of the very best kind of ore has been taken from the mine. There has been comparatively little work done on the Brunswick; but it has been demonstrated beyond a doubt that a good paying mine can be made there. The company is a strong one, and when the mine starts up it will be under the management of Mr. Geo. Fletcher, whose reputation for economy and judgment in management is too well known to be commented upon here. It is but reasonable to suppose that the Brunswick is an extension of the famous Idaho or Eureka lode.

**THE ROYAL METAL.**—Transcript, Dec. 4: About \$5000 worth of gold bars were holding down the bullion table at the Citizens' Bank yesterday. This is not mentioned because it is anything unusual, but simply to show that the quartz and drift mines around here are keeping up their lick in the matter of productiveness.

**GOLD OR AGATE.**—Nevada City Herald, Dec. 4: The discovery of rich deposits of gold in connection with agate ledges is a surprise to prospectors and miners. Yesterday we made mention of the rich strike made by the colored man, Geo. Joseph. We have since learned that others have been prospecting on the same ledge, and that the whole formation, including the genuine moss agate, carries gold. A species of granular quartz, underlying or overlying the agate ledge, gives assays running to \$17.50 per ton and the agate itself assays \$11 per ton. We have not seen the assays made, but have been informed by the parties claiming to have had them made by competent assayers. The deposit in question crosses the ridge between Deer creek and Rush creek, about one-half a mile west of the Indian Flat schoolhouse. In some places it crops out to considerable width, and the existence of iron in large quantities is everywhere manifest. On the surface the vein matter consists of moss agate and layers of granular quartz. Frequently feldspathic veins are found inclosed between the walls of the main deposit. Where the pockets have been found, the bedrock is soft and the vein matter decomposed resembling an ashy paste. The gold is found free, but frequently iron pyrites not oxidized is found in connection with it. At Rush creek, the vein runs into white quartz which continues northward to the Yuba. But from Rush creek south it has the character of an agate deposit, and no one heretofore has thought of looking for gold in it. This singular deposit, during the wearing away of the surface and the formation of soil, has furnished immense quantities of free gold. At the locality described, Rush creek was the richest surface diggings ever found in this district. What may be developed in this strange but rich mineral deposit, by the patient work of the prospector, remains to be seen, but certain it is that millions lie buried there.

**DIVIDEND 206.**—Foothill Tidings, Dec. 7: Yesterday afternoon at the office of the secretary, the directors of the Idaho Mining Company held their regular monthly meeting, and at this meeting declared dividend No. 206. We do not believe that mine will ever quit paying dividends, not at least for years to come.

**THE NORTH STAR MILL.**—One of the finest mills on the continent is now going up at the North Star mine, and is under the general direction of Mr. W. C. D. Body. The granite walls, battery blocks, roofing, etc., are complete, and it will be but a short time before the batteries, stamps, concentrators and all the inside workings of the mill will be in running order. The work has been done quickly and in first-class manner.

## Placer.

**IOWA HILL.**—Placer Republican, Dec. 4: J. B. Hobson has effected a sale of the Lion quartz mine, near Damascus, to a San Francisco capitalist for \$20,000 cash. In the Morning Star mine, since the upraise was completed, the air is good and the contractor will have the bedrock tunnel completed about the 1st of January.

## Plumas.

**GRANITE BASIN.**—Cor. Plumas National, Dec. 4: See & Jolly are now turning their attention to the mine, where they have struck the chimney in the lower tunnel on the Specimen, which will furnish work for men and teams when spring opens, to deliver the ore at the mill. Swan & Williams are at work on the old Homestake, taking out splendid milling ore. They have their mill filled with rock, which they will crush during the winter. Rockefeller & Co., the enterprising miners of the Basin, have placed one of Patten's concentrators in their mill which will make the rock yield a greater amount of the precious metal. They will run the mill night and day from now on. Mr. A. Christie has taken a number of tons of rock out since he finished his crushing that will at least go \$50 per ton. Next is the Morning Star mine, under the temporary management of Geo. Hurst, during Mr. Mankey's business trip below. The mine is yielding a fair dividend to its owners.

## San Bernardino.

**BONANZA HILL.**—Calico Print, Dec. 4: The interest manifested in the operations on Bonanza hill has assumed a different complexion from the excitement caused by hearing of frequent and rich

strikes of ore deposits by the lucky lessees. The property-owners of a large portion of the town, from like Noel's to the upper end of the main street, are manifesting a personal as well as anxious interest in the contest between the two parties claiming the property under the different names of Silver Monument and Jennie Lind. It is rumored about town that the Jennie Lind Company are preparing to make applications for a patent, and should they succeed in getting it, the property of about one-half of the town would belong to that company; but it is thought that the protests will be so numerous and strong that the parties who may be adjudged by the courts as the lawful owners of the property in dispute will fail to get a patent. Before there will be any existing cause for anxiety it will have to be settled in regard to the title which at present stands in about this shape: D. M. Harwood claims that he located the ground before the Jennie Lind locators did, but recorded it a day or two afterward. The prospects of lively and interesting litigations between the present claimants to the mining property and the numerous residents on the same and the lucky owners is quite promising.

**OLD BALDY PLACER MINING.**—John E. McCallum is in the city from the Old Baldy country. He has been engaged in placer mining on the Golden Eagle, situated on the dividing ridge between Old Baldy and Telegraph hill. He is in the firm of J. H. Benson & Co. They have been building a chute and reservoir which they have just finished. Next spring when the snows go and the swallows come, they will build a tramway of 400 feet in length. Their mine embraces 13 acres of gold-bearing surface. Even packing the dirt at great disadvantages large returns were obtained, which will be immensely enhanced when the dirt can be worked upon the ground. The "pay dirt" extends upward about seven feet from the bedrock and is very rich. Undoubtedly the gentlemen of this company have a very valuable mine, and one which, in the early future, will be a fortune to its owners. They deserve their good fortune because it is due to their industry and persistent enterprise.

## Shasta.

**NOTES.**—Republican Free Press, Dec. 4: Barney Conroy says that a depth of 360 feet on the Balaklava mine shows a large body of rich ore. L. J. Fader transported the old revolving furnaces at Copper City to Iron Mountain this week, which will be used by Magee, Camden & Co., in working the ore of their mine. Charley Butterfield has accepted a contract to haul 1000 tons of ore from the Flanagan mine, Old Diggings, now owned by Paul & Garlick, to their mill at the mouth of Spring creek. Jack Conant was exhibiting this week a fine specimen of gold quartz. The gold could easily be seen, but, unlike in most specimens, appearing in tiny specks and streaks, it was imbedded in the quartz in blotches as large as peas. This specimen came from a tunnel about 300 feet from the surface. Jack will have his 10-stamp mill in operation by January. Mr. Robt. Skinner was in town yesterday, and says that the works at Lower Springs are progressing as rapidly as the workmen can push things. It is expected that the mill and furnace will be in operation by the 15th of January. The firm has between 300 and 400 tons of ore on the dump, which will be taken in hand as soon as the works are completed. The ore is expected to yield from \$30 to \$60 per ton. Mr. Skinner says that the Lower Springs district is overrun with prospectors, some of whom have discovered some very promising leads. Further developments may prove this district to be one of the richest in the State.

**MILL.**—Shasta Courier, Dec. 4: The Fife mill, at Spring Creek, will prove a great boon to quartz miners in that vicinity, as it will enable them to prove their ledges by genuine working test, the only test that is worth a continental.

## Sierra.

**BALD MOUNTAIN EXTENSION.**—North San Juan Times, Dec. 4: E. K. Downer, of the Mountain Messenger, passed through this place en route for Sacramento Thursday. He gave us the following intelligence connected with the Bald Mountain Extension mine at Forest City. The company has now 84 men, and employs others as fast as required. Walter Lawry is superintendent of the mine. The receipts of the mine in the month of September were \$5040; in October, \$6000; November, about \$5000. Every inch of gravel taken from the mine contains gold. The main tunnel is 8213 feet in length. A blower is connected with the tunnel which supplies eight cubic feet of air per minute. Large dividends are anticipated in the near future.

**THAT NUGGET.**—Sierra Tribune, Dec. 4: The S. F. Examiner some time ago gave an interesting description of Stellman & Hayes' \$6000 nugget, but failed to relate the circumstances under which it was found. It occurred in this way: John Mackey, not of bonanza fame but of Stellman & Hayes' gravel claim, was removing boulders and rocks from the diggings when he espied under a clump of trees what he supposed was a good-sized boulder. It was deeply imbedded in the earth. Mr. Mackey, with several vigorous thrusts of his pick, succeeded in removing it from its position. He was about to dispose of it, as he had disposed of other boulders, viz., cast it into the river, when his attention was attracted to gobs of gold hanging from its sides. The nugget when found was literally covered with mud and clay, and it was only where the pick had struck it that the gold was exposed to view.

**PERRY CON. MINE.**—This mine lies about one-half a mile southeast of Sierra City and is owned by Joe Perry, John Henderson, Henry Knuthson and others. The tunnel is in 473 feet on the course of the vein. A contract has been let to run 100 additional feet. The ledge runs in a northwesterly and southeasterly direction, and is supposed by many to be a continuation of the Sierra Buttes ledge. Excellent water and wood privileges exist at the mine. The owners expect to erect a quartz mill next year.

**YOUNG AMERICA MINE.**—A mine pump has been purchased for the Young America mine, and will be used for pumping water from the upper lake to the mill. If the pump works satisfactorily the recently laid-off employes will immediately resume work at the mine. It is expected here to-day. Twelve men are now engaged in building a wagon road from the flume to the dam. President Busch states that the pump will be in running order by Monday.

**JEFFERSONIAN.**—This mine lies in the Sierra City mining district and is within a short distance of the

Young America. Two tunnels have been run. At the upper one, which is in 125 feet, a well-defined 3-foot ledge has been struck. The mine is under the management of the Jeffersonian Mining Co., a corporation with A. C. Busch as its president. Extensive developments will be made at the mine next spring.

**JIM CROW MINE.**—This mine is situated at the head of Jim Crow Canyon, about six miles southwest of Sierra City. A tunnel has been run 150 feet in length. The ledge varies from 5 to 12 feet in width. There is a raise on the vein from the end of tunnel to surface, a distance of 80 feet. The vein in the raise contains ore which will mill from \$6 to \$12 a ton. An improved Forbes mill is at the mine and works to perfection.

**HOG CANYON MINE.**—This mine is situated between Hog canyon and Whitney's mill, and is owned principally by D. L. Whitney & Co. The tunnel is in about 100 feet. There is a well-defined ledge 4½ feet wide and which prospects from \$15 to \$20 a ton. A 10-stamp mill will be erected in the spring.

**GOLD BLUFF.**—This well-known mine, situated about a mile from Downieville, is again being extensively worked. The lower tunnel is now in about 250 feet. Indications show that the ledge will soon be reached. Operations were first commenced here in 1853. A. Van Slyke is the present owner of the mine.

## Siskiyou.

**SCOTT RIVER.**—Yreka Union, Dec. 4: The Quartz Hill Co. is running its new mill with success. Campbell & Small are starting a tunnel on the Clay hill, two miles above Scott Bar. Peter Hansen is doing well at present in his claim on Skunk hill. Magoffey & Ingrin are still working their claim at Scott Bar. Bennet & Co. are still working away with success.

## Trinity.

**YET TO COME.**—Trinity Journal, Dec. 4: The season, as it is called in miner's parlance, is yet to come. Up to the present date, Dec. 3d, only 4.02 inches of rain have fallen since July 1st. A year ago considerable sluicing had been done prior to this time. It ought to storm long and well when it gets at it, but at the present there are no indications of even a beginning.

## NEVADA.

## Washoe District.

**CON. CALIFORNIA AND VIRGINIA.**—Enterprise, Dec. 4: The daily yield continues to be about 400 tons, shipped to the Morgan and Eureka mills, on the Carson river, for reduction. The assays from mill battery samples average about \$45 per ton. The new ore development shows greater size and quantity as further explored by winzes and drifts, and the average quality is very good, as evidenced by the bullion yield. Its extent is as yet unknown and undefined, but it is stated to show \$10,000,000 now opened out, ready for extraction. This, however, is unofficial, yet probably not very far out of the way. Whether it extends north and south into Ophir and Best and Belcher remains to be found out by practical explorations, yet both mines are very hopeful of a slice of the bonanza. 1650 Level—The south-west drift from the C. and C. shaft has a total length of 562 feet, 17 feet having been added during the week. The upraise from the east crosscut continues in good ore, and is being carried up directly beneath the good ore development on the levels above. 1600 Level—The drift running north from the north end of the mine was extended 50 feet, making a total of 450 feet. 1500 Level—The drift running north from the old Consolidated Virginia shaft is 265 feet in length, 54 feet having been added during the week. 1435 Level—A station has been cut out for a winze which is to be sunk to the 1550 level. 1300 Level—The drift running north from the station of the old Con. Virginia shaft is 420 feet, 52 feet having been added during the week. Some of the best ore of the new bonanza is found by this drift, the full extent and value of which is not yet defined. Some of it is of very high grade.

**SAVAGE.**—On the 500 level west crosscut No. 1 from the main south lateral drift shows good ore, the extent of which is not yet defined. On the 600 level the main south lateral drift is being steadily driven to connect with the main Savage shaft. The desired connection will be made in about a week or 10 days. A large double compartment winze is being sunk below the floor of this drift. It is now down 15 feet in excellent ore. On the 800 level the main south lateral drift is being steadily driven to its desired connection with the Savage shaft. This will be accomplished shortly, and crosscutting commenced westward into the body of ore on that level. On the 1640 or Suro tunnel level, where the incline intersects the tunnel, the ground is much caved, necessitating considerable repairs. Some very good ore exists at this point, and it has to be extracted.

**POTOSI.**—The southeast drift from the Chollar line, on the 250 or old Potosi tunnel level, shows about 80 feet in length of good ore, 25 feet in width. A station is being cut out for a winze, to be sunk below the floor of this drift, following the ore body to define its depth. The Lindsay drift, about 300 feet south of the Chollar line, shows 95 feet of good ore, and crosscuts are to be made to determine its width. A chamber is also being cut out for a winze, to be sunk below the floor of this drift, in the strongest portion of the ore vein, in order to ascertain how well it holds out in that direction. The above winzes will hereafter be known as the north and south winzes.

**HALE AND NORCROSS.**—The main vertical shaft has been repaired and put in complete order to the 1300 level, and the main incline from that point has been partially repaired to the 1640 or Suro Tunnel connection. The old second station has been reopened and repaired and a west drift extended therefrom 40 feet. The seventh station has also been reopened and a drift run west from it a distance of 25 feet. On the 1300 level (8th station), the southeast drift has been reopened, timbered and extended 60 feet.

**BEST AND BELCHER.**—600 Level—East crosscut No. 2 is in about 100 feet. Face is vein porphyry. East crosscut No. 2, which is 90 feet further north, is 645 feet in length, running in vein porphyry. 800 Level—The cross drift east from the end of the main north lateral drift at the boundary line between this and the Consolidated California and Virginia



mine has been advanced 39 feet, making a total of 77 feet. Material, porphyry, clay and quartz.

**ALTA.**—On the 725 level the north and south lateral drifts in Lady Washington and Benton ground, following along the Keystone vein, continue in vein matter carrying streaks and bunches of ore. The winze sunk below west crosscut No. 2 in the main Alta vein is now down 125 feet. The small seepage of water coming in at the bottom gives no trouble.

**ANDES.**—On the 330 level the main west drift was found to be in need of much repairing. This has been done to the distance of 50 feet from the shaft, and beyond that point it is thought to be in better condition, requiring less repairing. This drift is about 600 feet in length.

**GOULD AND CURRY.**—On the 425 level cleaning out and retimbering the old south lateral drift from the main west drift progresses well, as usual. The face is now in vein porphyry, clay and quartz. The surface hoisting machinery is being put in good working condition, and repairs to the main shaft are about being commenced.

**CHOLLAR.**—The cleaning out and repairing of the old shaft progresses well. It has been repaired to the depth of 350 feet. The strong flow of surface water at the 250 level, mentioned in last Saturday's report, is draining out and will soon give little or no trouble. No news of interest in any other part of the mine.

**BULLION.**—A donkey engine, with a good house over it, has been placed at the old Cross shaft, and the shaft cleaned out and repaired to the depth of 100 feet. Good ore results are anticipated from this working at the north end of the mine.

**QUINN MINE.**—Work will be resumed in the old Quinn mine, below Silver City, next Monday, with two shifts of 10 men each. The retimbering of the main shaft will be first in order, and two carloads of timber are already ordered for the purpose.

**YELLOW JACKET.**—Daily output, 150 tons of low-grade ore, from the 1300 level and other levels above. Good work continues to be done reopening the lateral drift north on the 1400 level.

**OVERMAN.**—At the old shaft of the mine the hoisting machinery, etc., is being overhauled and put in order for the resumption of work in the old upper levels.

**OCCIDENTAL.**—A few tons of low-grade ore are being taken from the upper tunnel for milling. The upraise to crosscut with the upper tunnel is still in very hard quartz.

**OPHIR.**—On the 1065 level a shaft station is being chambered out. About 300 tons of ore per day is being hoisted for the Consolidated California and Virginia Co.

**IMPERIAL.**—The statement that work is soon to be resumed in this mine, using the main hoisting works for this purpose, is denied by official authority.

**JUSTICE.**—Running the drift from the old Woodville shaft into the southern portion of the mine still progresses in low-grade ore.

**ALPHA AND EXCHEQUER.**—The grading and placing of the surface hoisting works at the old Alpha shaft goes steadily ahead, seven men being employed.

**CROWN POINT AND BELCHER.**—Daily yield, about 375 tons, principally from the 1600 and 1700 levels, supplying the Vivian, Santiago and Mexican mills.

**MONTE CRISTO.**—The progress of the upraise above the 150 level from the new shaft continues slow, the rock being very hard.

**UNION AND MEXICAN.**—On the 1300 level the joint north lateral drift is making good advancement; also, the crosscut east from it.

**UTAH.**—On the 472 level the main west drift is out about 445 feet, with the face in heavy clay, porphyry and quartz.

**KENTUCK.**—About 60 tons continue to be the daily output of low-grade ore, from the 800 level principally.

**NORTH GOULD AND CURRY.**—Two shifts of men are working night and day sinking the shaft.

#### Garfield District.

**A SMALL LEDGE.**—Virginia *Enterprise*, Dec. 4: B. McClane, owner of the Honest John, an extension of the Lotta mine in Garfield district, while doing the necessary assessment or holding work recently, uncovered a small ledge of 20000 ore which he is extracting for shipment.

**REOPENING THE LOTTA.**—Walker Lake *Bulletin*, Dec. 1: Brooks McClane and Harry Somerville have taken a lease of Fairmont property in Garfield, and will begin work immediately. This property includes the Lotta mine, where the first work will be done. Some years ago the richest rock ever mined in Garfield district was taken from this mine, and the present lessees are confident they can find continuation of the ledge, and uncover another rich body of ore.

#### Gold Mountain District.

**ORE.**—Virginia *Enterprise*, Dec. 4: Thirteen tons of ore from the Gladstone mine, Lone mountain, has been brought to the Reno reduction works.

#### Lone Mountain District.

**MILL.**—Virginia *Enterprise*, Dec. 4: At Gold mountain, Gay Thorpe has commenced the construction of a mill for his mine; several carloads of machinery and lumber having arrived on the ground.

#### Tuscarora District.

**BELLE ISLE.**—*Times-Review*, Dec. 3: Line crosscut west, 150-foot level, has been extended 18 feet. Line crosscut east, same level, has been advanced five feet.

**TORNADO CONSOLIDATED.**—We have extended tunnel 15 feet during the week, having had better breaking ground. Ledge in good quartz giving low assays.

**NAVJO.**—South drift from No. 5 crosscut, east vein, 350-foot level, has been extended a total distance of 81 feet. No. 1 winze on west vein, from east lateral vein has been sunk seven feet. On the 150-foot level, the north drift on east vein No. 2 has been advanced 10 feet; total length 67 feet. South drift on the old west vein, same level, advanced seven feet.

**NORTH BELLE ISLE.**—North gangway, 300-foot

level, extended 35 feet the past week. North drift, from No. 1 crosscut advanced nine feet; total length 54 feet. The usual quantity and grade of ore is being extracted in this drift. Nos. 2 and 3 winzes on this level continue to look well.

**NEVADA QUEEN.**—During the past week east crosscut No. 1 from the gangway, 150-foot level, has been extended 26 feet, the last eight feet being in vein matter, a portion of which is high-grade ore. No sign of the foot wall as yet. No. 1 shaft is down 109 feet, having been sunk 13 feet for the week. Water has increased some; rock continues hard. South drift from No. 2 shaft has been driven 10 feet; total length, 80 feet. Ore is not so wide, but is fine quality. Average grade of ore taken out during the week is over \$400.

#### ARIZONA.

**MOHAVE COUNTY.**—*Miner*, Dec. 4: Roe's team went out yesterday with a load of ore consigned to the Kingman Sampling Works. Ed. Thompson and Charley Kelley have shipped 40 tons of ore from the Rainbow mine last month. The pay-rolls of some of our mines for the month of November last were as follows: Oro Plata mine, \$2000; Rainbow mine, \$2000; Rural mine, \$1000. Tom Stinson has quit working on the Oro Plata mine, and has gone to work on one of his own bonanzas in the Todd basin. Messrs. Collins & Siedel left on Sunday afternoon for Hardyville, on the Colorado river, from whence they will proceed to the Rattan mine, in the San Francisco district if their grub holds out. Wm. Roe's and Wilson's teams took out a carload of ore last Sunday from Rural mine, owned by Messrs. Christie & Dunn. The ore was valued at \$20,000 or more. Who says that Mohave county mines are not coming to the front when their owners can make such shipments as these?

**CAVE CREEK.**—*Phoenix Gazette*, Dec. 1: From parties just in from Cave creek it is learned that a rich strike in the Phoenix mine is reported. The ore body is said to be 8 feet wide and of the same quality that the first millrun was made from that yielded \$73 per ton, free gold. In doing the assessment work on the Yellow Jacket mine a large vein was uncovered which upon being blasted into boulders were detached that would weigh from 100 to 200 pounds, showing free gold on every side, and upon being broken open they were literally honey-combed with that metal. The Chataqua showed almost as well. On Clam mountain the developments are rich. A gentleman recently took samples from those mines that assayed from \$4000 to \$5000 per ton. A later report says that a 20-stamp mill will be built on the mine in the next 80 days.

#### COLORADO.

**TISHOMINGO.**—*Georgetown Courier*, Dec. 4: The lode is being worked at the surface and through the Victoria tunnel by two sets of lessees, both of whom are taking out some ore.

**GETTYSBURG.**—Work has been resumed by Mr. Old on the tunnel back of Silver Plume. It is in nearly 200 feet and 120 remains yet to be driven to intersect the Gettysburg.

**ANGLO-SAXON EXTENSION.**—Morris & Edmunds have opened up four inches of ore in the heading of the adit, which mills two to two and one-half ozs. gold, 30 ozs. silver per ton, and 40 to 60 per cent lead. The adit is in 350 feet.

**BERTHA.**—Mr. O'Connell came down from the Bertha mine on Monday, with a millrun of ore that returned over 300 ounces in gold to the ton. The horseshoe leading to Gray's and Irwin's peaks promises to be one of our richest mining regions.

**CORRY CITY.**—The work of sinking and raising on the Corry City mine to connect the workings with the Diamond tunnel, is progressing as fast as the nature of the ground permits. The raise from the tunnel is in very hard rock and progress is slow. It is now 135 feet above the tunnel.

**MENDOTA.**—The last contract on the main shaft has been completed, and another is to be let. Tunnel level west has 100 feet yet to be driven to get under the shaft. Three stopes are being worked from this level, and each is in pay. Two stopes are in pay in the tunnel level east. About 35 men are employed.

**CENTENNIAL.**—This property now has a chance of becoming a large producer. The mine is well equipped with a hoisting plant which we are told is sufficient to do the work of sinking to the depth of 250 feet. The first and second levels, which are 50 and 100 feet from the surface, show for the distance of 80 feet in length, from two to six feet of concentrating ore running well in gold, silver and copper. The new ore body was discovered in sinking the shaft from the bottom of the second level. The ore body has increased in sinking 30 feet from 15 inches to three feet in width. This ore consists mainly of copper and iron pyrites, the former predominating, and nets about \$75 a ton. Every foot sunk so far on the new find has paid all expenses and left a nice surplus. In sinking a sump near the shaft two men in four shifts took out ore that netted \$350.

#### IDAHO.

**SAWTOOTH MINES.**—The Bidwell-Beaver mine is being worked by 14 men, who will continue under employment during the winter. The new hoisting works are completed and an incline shaft is being sunk. Supt. Venum is kept busily employed supervising the work, and proposes to have the property in fine working shape on the resumption of active work in the spring. The Silver King mine will keep 10 men at work during the winter. This property has given an excellent account of itself during the past season, having paid all expenses and a dividend to its Philadelphia owners. Supt. McHenry left his Eastern home some time ago, but proposes to return early in the spring and resume work on a more extensive scale than ever.

**MINE PURCHASES.**—Ketchum *Keystone*, Dec. 4: The bonding of the King of the West mine by Messrs. Haggin & Tevis, and its very probable sale to those parties before another month, is but the first of a number of purchases of Smoky property that will be consummated during the winter. The fine showing made by several of the mines of that district during the past summer has attracted the attention of many persons seeking mining investments, and next year the working of several mines in

Smoky will be commenced on an extensive scale. During the present week another sale was effected—that of the Mollie Bawn mine, which lies between the Silver Star and Carrie Leonard properties. The purchasers are J. M. Lamb, J. H. Huntton, A. L. Richardson and other gentlemen of Boise City, and it is their purpose to work the mine in a systematic manner. In addition to this sale another is on the tapis and will probably be consummated in another week. Wood River mines are to-day receiving more attention than ever before, both in the East and England, while mining properties of the adjoining districts are not being overlooked.

**WAGONTOWN.**—Owyhee *Avalanche*, Dec. 4: We hear that a good body of gold ore has been encountered in the Wilson mine in Wagontown. The chute was found at the connection of the upraise from the tunnel, and the winze. We understand that Capt. De Lamar will commence at once to run a drift on the lode into the hill. The winze is now about 168 feet deep. By running a drift east 100 feet, a depth of 200 feet will be attained. The prospect looks favorable for Wagontown to make a lively camp.

**THE DURANGO GROUP.**—Wood River *Times*, Dec. 2: Quietly—so quietly that it is hardly known outside of Bullion—Professor Jenney has caused work to be resumed on the Durango group, and is pushing developments with the utmost vigor. He has hoisting works, boarding-houses, blowers, and all the requisites of a first-class mine, and is working down from the surface, and horizontally on the 700 or 800-foot level. When the proper place is reached, a raise will be started to connect the surface with the deep workings, and when this is done the Durango will be as well opened a mine as there is anywhere, as it will have fully 700 feet of ground exposed and blocked out, ready for stopping above the tunnel level. This "tunnel level" is nothing more nor less than the Bullion-Ophir tunnel run by Col. Wall. Being started upon and run through the Durango group some considerable distance, both the Durango group and the Bullion-Ophir group owners have a right to use it jointly, either for development or exploitation, and Professor Jenney has availed himself of this right. Some 25 men are employed on the Durango group, and if, as is expected, a paying chute of ore is struck in the next few months, this force will be greatly increased.

#### MONTANA.

**THE BLACK PINE.**—The Black Pine Mining Co., consisting of Judge Barrett, Henry Williams, R. B. Wallace, J. A. Pack, and others, are said to have over \$150,000 in sight in their property on the head of Willow creek, 25 miles from Drummond.

**THE MIDLAND.**—The Bi-Metallic strike reported is not in the Bi-Metallic mine, but in the Midland, a vein struck in crosscutting from the Bi-Metallic works. The Midland was jumped by a man named Martin, who claims that the full amount of \$500 worth of improvements, necessary to secure a patent, was not performed, the company having included as a part thereof a stone house.

**POSSIBLY A COMING SALE.**—*Helena Independent*, Nov. 25: F. M. Chadbourne has taken a bond on the Bluebird and Hickey properties for \$55,000, extending to January 1st. He acts in the interest of English capitalists. Mr. Chadbourne is not able to say whether or not his principals will take the property under the bond.

**MINERAL DEVELOPMENTS.**—*Inter-Mountain*, Dec. 2: The Inter-Mountain noted from a reliable source this morning a few facts concerning some new and promising mineral developments in the Boulder and other localities near Phillipsburg. The reports continually reaching us from that growing country are verified by every visit of mining men, and those capable of judging of the merits of a new country. Here are a few new developments:

**ELKHORN.**—*Inter-Mountain*, Dec. 2: Reliable information comes from the Elkhorn that the owners of that mine will soon resume sinking the shaft from the 600-foot station and will go down 100 feet additional, introducing steam drills. They are experiencing some difficulty in securing competent men to be placed in charge of the new machines. The mine is in good condition and the water under control. Foreman Mahoney is in the city for the purpose of securing miners, and an additional force will be put upon the mine to open new ground and prepare for more extensive operations. For the past year the mill has been operating almost entirely on ore taken from parts of the mine before practically abandoned. The Clark Bros. have completed their new 10-ton smelter near Elkhorn, and are now running it on the product of a mine which they own and which gives promise of early prominence. The big ledge recently uncovered at a point about two miles from Elkhorn, and over which such a sensation was created about one month ago, is being actively worked. The ledge is 30 feet wide and carries galena in such form as to indicate a more compact body and depth. The general outlook at Elkhorn is good, and the camp feels the inspiration of the mineral developments.

#### NEW MEXICO.

**REVIVAL OF MINING.**—*Socorro Bulletin*, Dec. 4: We have no hesitation in stating that from one end of New Mexico to the other a revival in mining is taking place. The world is just awakening to the fact that this Territory is the repository of untold wealth of undeveloped rich mineral, awaiting the touch of capital to become productive. Mining property is in demand, and among the sales of property within the past week that of the Bremen mine for \$700,000 to St. Louis parties is notable, the owner reserving one-fifth interest in the property. Sales of interest in two Santa Fe county claims are also reported—one for \$15,000 in the Benton, and the other \$21,000 for an interest in a gold claim in the same vicinity. In Socorro county recent sales have been effected, and another is on the tapis, which involves a large sum. In Sierra county several important transactions have taken place and others are pending. From the Mogollons to the Ladrone in this county renewed activity is manifest and miners are confident and active.

**PUEBLO DISTRICT.**—Sep Louis is pushing down on his heavy galena lode, which holds out well at 65 per cent of lead, beside the silver and gold. Shipments are made regularly to the smelter at Socorro. J. D. Burchard and C. A. Barton are sinking down on the Hopeful lode with good results. They are

down 40 feet and are not going to stop until they get down to water level, the present working showing very well and getting good results from the ore sampled. The Hopeful lies north on Gold Hill, and is on the same vein as the Golden King lode, belonging to the Brittenstene boys. Edward and William Brittenstene are working the Morning Star mine, on Gold Hill, one-half mile from the stamp-mill. It is their intention to sink a working shaft of a depth of 300 feet before crosscutting the other lodes, which are opened out by three shafts, in depth from 75 to 125 feet. Said Morning Star lode is a cross lode and cuts three lodes in a rift, and all show plenty of ore of galena, iron and free gold, beside a good part of silver.

#### OREGON.

**QUARTZ AND PLACER.**—*Jacksonville Times*, Dec. 3: Considerable prospecting is going on in the Gold Hill region. Several miners have enough water to clean up ground that was left over last season. About 80 Chinamen are now in the Galice Creek district, and are taking out more or less gold dust. A scarcity of water still continues, which is quite discouraging to the miners, none of whom are at work as yet. Ray & O'Donnell are running a tunnel to tap the ledge they found on Gold Hill several months ago. They have progressed 50 feet. Legg & McDonnell have their hydraulic mine in Forest Creek district in good shape, and will make a big run if the winter is at all favorable. Work is now progressing on the tunnels of the parties who have bonded the Green ledge in the Galice Creek district, with favorable prospects. A. W. Sturgis, of Forest creek, is running another ditch, about a mile long, which will soon be completed and afford him a good supply of water. Jos. Goldworthy, of Footh Creek, came to town last Friday with a nice lot of gold dust which had been cleaned up at the mines in which he is interested. Nelson Hosmer, of Footh creek, an enterprising miner, is having several hundred feet of hydraulic pipe manufactured at K. Kubli's establishment in this place. Pomeroy & Co. are running a tunnel at their iron mines near Rock Point, and are piercing a vein of ore 15 feet wide, which has many indications of silver. Bauble, Klippel & Co.'s mill is running day and night and is doing good work. It is a first-class one and will prove a success if properly managed. Several clean-ups have been made, which proved satisfactory. Groh & Braendel have had several tons of quartz from their ledge on Jackson creek crushed by Bauble, Klippel & Co.'s mill, which turned out well. It averaged about \$15 per ton. There is a large quantity of this ore in sight. A Corvallis correspondent writes that John Riley, Frank Fisher, Geo. Kennedy, and N. L. Raber, inventor of the gold amalgamator, returned last Saturday from Gold Hill, where they have been for the purpose of testing their machine. They returned fully confident of its success, and will immediately commence the construction of two more larger machines.

#### UTAH.

**REVIEW.**—*Salt Lake Tribune*, Dec. 3: The eleventh month of the year closes with this week. For these 11 months the receipts of bullion in this city, excluding all ores, have been as follows, as per current weekly statements: January, \$328,852.66; February, \$456,024.03; March, \$469,722.63; April, \$519,666.08; May, \$387,891.49; June, \$527,036.97; July, \$585,644.38; August, \$480,141.49; September, \$491,129.32; October, \$377,104.59; November, \$369,601.04. Total, \$4,992,864.58. For the week ending December 1st inclusive the receipts of bullion were \$91,146.01; of ore, \$51,087.82; a total of \$142,233.83. For the previous week the receipts were \$129,240.88, of which \$105,867.38 was bullion and \$23,373.50 was ore. The Ontario product for the week was 16,176 ounces of fine bullion, and 19,603 90 from two lots of ore sold, a total of \$35,779.90. The usual monthly dividend of 50 cents per share, amounting to \$75,000, was paid in New York on the 30th, being the eleventh dividend of the year, \$5.50 per share, aggregating \$825,000. The full \$6 a share for the year, or \$600,000, will be rounded out this month. The daily output for the week was 13 bars of bullion, 18,570.47 fine ounces, and all goes well. The receipts of fine bars for the week were \$38,027.98; of base bullion, \$14,400. The Hanauer smelter produced during the week \$19,130 in bullion. On the 26th the Stormont sent up \$2840 in fine silver. The Horn Silver is said to be taking out ore and storing it in the drifts—good ore, too; but it is mere rumor that cannot be vouched for.

**MINING IN TINTIC.**—*Salt Lake Tribune*, Dec. 3: Mr. Matthews, of Tintic, reports the local outlook very encouraging. The Tintic M. & M. Co., owners of the Northern Spy, has struck the best body of ore it has yet found, which assays 80 ounces and upward, the proportion of gold being \$16 to \$35. The Beck-Champion and Eureka people have lately opened up new ore bodies from which great things are promised. The Keystone folks are all smiles over their prospects, and the Mammoth is turning out a fine lot of ore assaying \$10 to \$35 in gold. The Mammoth is shipping its ore, containing copper, silver and gold, to the Argo smelter in Denver, which some Gentle miners are claiming there is no necessity for, seeing there are facilities for doing the work in Tintic. Mr. Matthews believes Tintic to be the champion mining camp of the Territory, and that ere long it will rank among the first in the country. One hundred and fifty tons of ore daily are now being shipped out of the camp and there is employment for everybody who will work. The local mining companies would be glad to see the D. & R. G. Western run a branch to Tintic, as that would lower the present \$4 rate charged by the U. P., which is hard to bear. A miner stated the other day that the U. P. were charging \$5 per ton from Tintic to Denver; but this must be a special rate to shippers agreeing to send their bullion East from Denver over the U. P., as inquiry at the U. P. office failed to show that \$5 was a regular rate. The U. P. is charging Idaho miners \$18 to Salt Lake City and \$20 to Denver, which has occasioned more or less kicking in Salt Lake as discriminating so in favor of Denver; but one Idaho miner says he has no objection, as the bullion rates are \$8 higher from this city to the river than from Denver. A Bingham mining man states that the D. & R. G. Western has steadily refused, in making rates from there, to discriminate in favor of Denver.





## NOTICE TO GOLD MINERS!

# SILVER-PLATED AMALGAMATED PLATES

### For SAVING GOLD!

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER  
FULL WEIGHT OF SILVER AND BEST QUALITY OF WORK GUARANTEED.  
GET OUR PRICES BEFORE ORDERING ELSEWHERE. SAMPLES  
FURNISHED ON APPLICATION.

**SAN FRANCISCO NOVELTY AND PLATING WORKS,**  
No. 108 FIRST STREET.

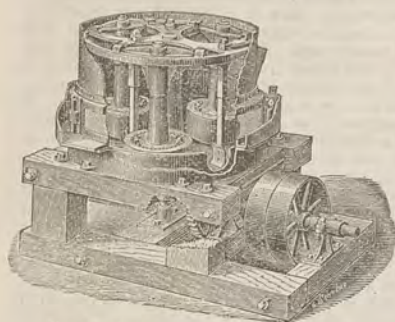
NOTICE.—All our plates are guaranteed to have the full weight of silver agreed upon, and are tested before leaving our works, thereby avoiding the complaints about light weight, made so often before we started in this branch of industry.

**JUSTINIAN CAIRE, Agent,**  
521 & 523 Market St., San Francisco,

—DEALER IN—  
Assayers' and Mining Material.

—MANUFACTURER OF—  
BATTERY SCREENS AND WIRE CLOTH.

Agent for HOSKINS'  
HYDRO-CARBON ASSAY FURNACES.



Centrifugal Roller Quartz Mill.

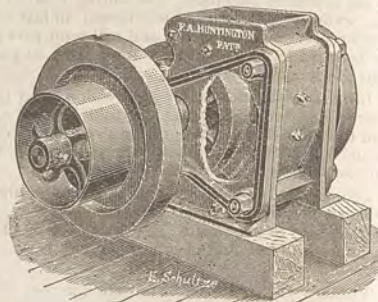
**F. A. HUNTINGTON,**  
MANUFACTURER OF

**Centrifugal Roller Quartz Mills,**  
CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,  
**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

## H. P. GREGORY & CO.

Nos. 2 and 4 California St., - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

# MACHINERY

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING  
MACHINERY.

FRANK & CO.'S WOODWORKING  
MACHINERY.

NEW HAVEN MANUF'G CO.'S MA-  
CHINISTS' TOOLS.

BEMENT & SON'S MACHINISTS  
TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM  
PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND  
EXHAUSTS.

SHIMER MATCHER HEADS.

BRAINARD MILLING MACHINES.

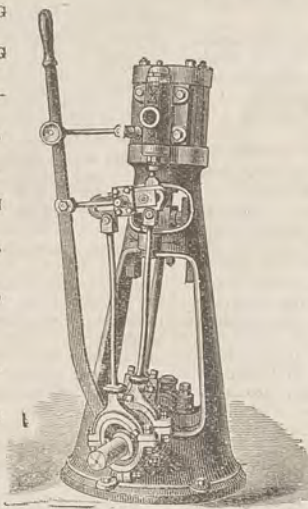
TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISH-  
ERS.



YACHT ENGINES.

WILLIAMSON BROS' HOISTING  
ENGINES.

ATLAS ENGINE WORKS ENGINES  
AND BOILERS.

PAYNE'S VERTICAL AND HORI-  
ZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS  
AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJECT-  
ORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACK-  
ING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACK-  
ING, PAINT, ETC.

## ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

## ROCK BREAKERS!

"DODGE."

"GIANT BLAKE."

STEAM ENGINES,

MINING MACHINERY, SHAFTING, PULLEYS.

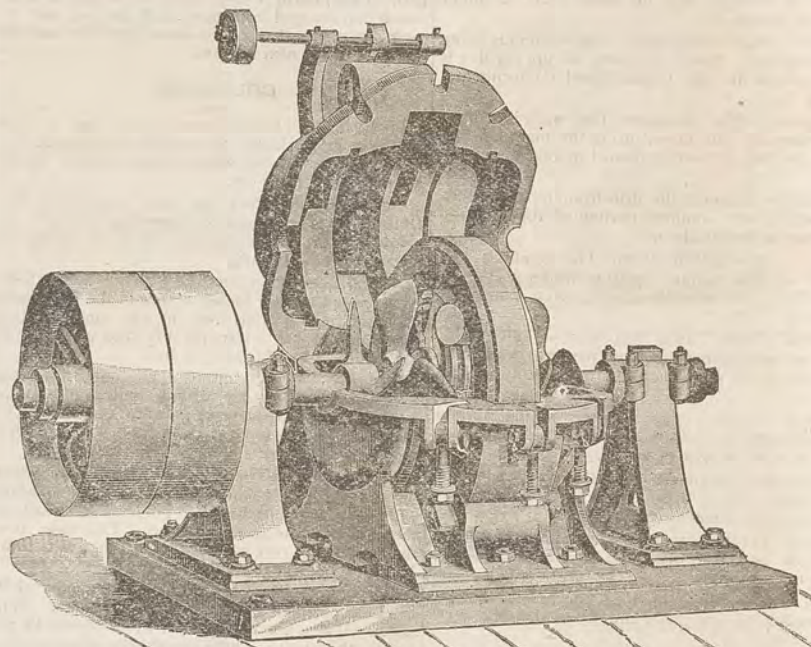
Machine Work to Order

SAVAGE, SON & CO., 135 to 143 Fremont St., San Francisco.

## SQUARE FLAX PACKING.

Finest Packing in the world. Trial Samples sent free. Send for circular. Best of ref-  
erences. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.

## THE FRISBEE-LUCOP MILL,



## A CENTRIFUGAL ROLLER MILL

—FOR WET OR DRY—

Reduction of Ores, Quartz, Phosphate Rock, Carbon, or  
other Mineral Substance to any degree of fine-  
ness in a rapid and economical manner.

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh  
dry, and from 3000 to 6000 pounds wet.

All wearing parts easily and cheaply replaced. May be seen in operation at the New York  
Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.

Certificates as to performance of the Mills, and any information required, furnished on  
application.

## THE FRISBEE-LUCOP MILL CO.,

Office, 104 & 106 Washington St., NEW YORK.  
OR PACIFIC IRON WORKS, SAN FRANCISCO.

Practical Treatise on Hydraulic Mining.  
By AUG. J. BOWIE, JR.

This new and important book is on the use and con-  
struction of Ditches, Flumes, Dams, Pipes, Flow of Water  
on Heavy Grades, methods of mining shallow and deep  
placers, history and development of mines, records of  
gold washing, mechanical appliances, such as nozzles,  
hurdy-gurdys, rockers, undercurrents, etc.; also describes  
methods of blasting; tunnels and sluices; tailings and  
dump; duty of miners' inch, etc. A very practical work  
for gold miners and users of water. Price, \$5, post-paid.  
For sale by DEWEY & Co., Publishers, 252 Market St., San  
Francisco.

**DEWEY & CO.'S** SCIENTIFIC PRESS PATENT  
AGENCY is the oldest estab-  
lished and most successful on the Pacific Coast. No. 259  
Market St. Elevator 12 Front St., S. F.

## COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published  
treating of Pacific Coast Coal Mining, have been obtained,  
and are for sale at this office for \$2.50 per copy. It was  
written by W. A. Goodyear, Mining and Civil Engineer,  
formerly of the California State Geological Survey.

This paper is printed with Ink Manufac-  
tured by Charles Eneu Johnson & Co., 500  
South 10th St., Philadelphia. Branch Offi-  
ces—47 Rose St., New York, and 40 La Salle  
St., Chicago. Agent for the Pacific Coast—  
Joseph H. Dorety, 529 Commercial St., S. F.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,  
JIGS and TROMMELS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

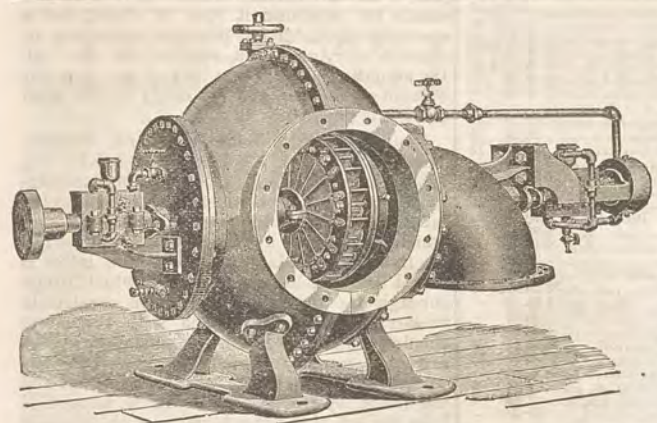
GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.

UTAH OFFICE—SALT LAKE CITY, UTAH.



## JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.  
Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.  
Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,  
Springfield, Ohio, or 110 Liberty St., New York.  
FRASER & CHALMERS, General Agents,  
Chicago, Ill., and Denver, Col.  
PARKE & LACY, General Agents, San Francisco, Cal.

## CALIFORNIA HAND ROCK DRILL,

—FOR—  
TUNNELING, DRIFTING,  
and SINKING.

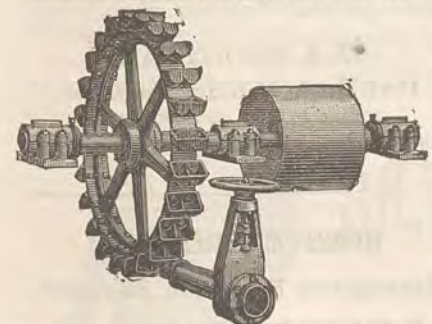
Buy the best and latest improved Hand Rock Drill; can be run by hand, steam, compressed air, or water power. Machine made entirely of crucible steel; light, compact and durable. Strikes 250 blows per minute with 7-lb. hammer. A perfect reproduction of hand drilling; will drill one inch per minute in the hardest rock, using one-quarter the number of drills required by hand labor.

Machines on exhibition at No. 32 First St., San Francisco.

Send for circulars.

GEO. T. EMERY, General Agent.

## PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90.2 per cent., distancing all competitors. Send for circulars and guaranteed estimates.

L. A. PELTON,  
Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

Engraving Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.

## THE CONSUMERS' COMPANY.

### VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.  
SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.  
218 California Street, San Francisco, Cal.



## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale. GENERAL AGENTS, SAN FRANCISCO, CAL.

## THOMAS PRICE'S ASSAY OFFICE,

CHEMICAL LABORATORY,

BULLION ROOMS and ORE FLOORS,

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

## Metallurgy and Ores.

### SELBY

SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY  
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,  
Under Chamberlin Patent.

## JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

## Nevada Metallurgical Works.

NO. 28 STEVENSON STREET,  
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the

most suitable Process for Working Ores.

Special attention paid to Examinations of

Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt, )

Mining Engineers and Metallurgists.

J. KUSTEL. H. KUSTEL.  
★ METALLURGICAL WORKS,  
318 Pine St. (Basement,  
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

C. H. AARON,

ASSAYER AND METALLURGIST,

NOGALES, ARIZONA,

Will attend to business in connection with mines in Sonora or Arizona.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

514 Kearny Street,

SAN FRANCISCO, - CALIFORNIA

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

H. M. RAYNOR,

No. 25 Bond St.,

NEW YORK.

ESTABLISHED  
1858.

FOR ALL

Laboratory

—AND—

Manufacturing Purposes.

Wholesale and Retail.

Native Platinum and Scrap purchased.

PLATINUM



## Mining Share Market.

The share market has been in a very excited state during the past week. The failures of several large brokers have caused other and lesser ones, all of which have been disastrous to holders of stocks. People who had counted their gains by thousands found that they could get neither their money nor stocks from the brokers with whom they had entrusted them. It is stated that some \$4,000,000 have been withdrawn from the savings banks in the last 10 days, most of which has presumably been invested in mining stocks.

The failures have had the effect of checking the steady advance in prices, and violent fluctuations have occurred. Toward the close of the week prices have dropped very materially. The main interest is centered in Con. California and Virginia, but other stocks have, of course, followed the fortunes of the leader. The excitement has been followed by a similar one in New York. Many mines are being listed on the stock boards, and retired brokers have gone into business again, being apparently assured that the stock market has "come to stay." When the final big break comes on those claims which have no merit, the poor people who are now investing will have cause to regret having gone into a business which only those who can afford to lose should touch. Con. California and Virginia is milling nearly 3000 tons a week of ore assaying about \$40 per ton. But whatever merit there is in this mine should not influence every other one on the lode. Yet it seems to, and people buy anything with a name and printed stock certificates.

## New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court Department 10, San Francisco:

**SWEDISH CO-OPERATIVE TRADING ASSOCIATION,** Dec. 8. Object, assisting natives of Sweden in buying and selling lands, etc. Capital stock, \$100,000 in \$10 shares. Directors—John Tillern, John O. Nordell, Nils Quist, J. Anderson and G. Wickford.

**JOHN WIELAND BREWERY CO.,** Dec. 8. Object, to carry on the Philadelphia Brewery business of the late John Wieland. Capital stock, \$720,000. Directors—Sophie Wieland, John H. Wieland, Robert P. Wieland, Olga M. A. Wieland and Alvin P. S. Sherman.

**PEN DAREN COAL CO.,** Dec. 8. Capital stock, \$1,000,000. Directors, Arthur F. Price, A. R. Green, H. W. Duncan, J. D. Sullivan and D. Gutman.

**PACIFIC DEVELOPMENT AND INVESTMENT CO.,** Dec. 8. Object, to construct railroads, bridges, telegraph lines and water-works for the supplying of cities, as well as canals for irrigating purposes. Capital stock, \$1,000,000. Directors, Louis J. Pouvert, New York, and John T. Davis, A. J. Rhodes, S. M. Holmes and James McMechan, of San Francisco.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Alice, Dec. 1, \$26,400; Lexington, 1, \$35,456; Richmond Con., 2, \$30,221; Eureka Con., 2, \$7863; Hanauer, 1, \$4950; Bannock, 1, \$3750; Queen of the Hills, 1, \$1120; Hanauer, 2, \$2450; Bannock, 2, \$1775; Silver Reef (for Nov.), \$24,285; Hanauer, 3, \$4025; Queen of the Hills, 3, \$2573; Overland, 3, \$750; Alice, 4, \$11,337; Stormont, 4, \$2250; Queen of the Hills, 4, \$1060; Bannock, 5, \$1700; Crescent, 5, \$8600; Hanauer, 5, \$6877; Queen of the Hills, 5, \$1110; Eureka Con., 5, \$10,184; Con. Cal. and Virginia, 5, \$99,250.

**CORRUGATED IRON WORK.**—Owners of saw-mills, planing mills, furniture factories, cotton gins, and in fact all manner of manufacturing establishments where there is great danger from devouring fire, and insurance is correspondingly high, should lose no time in adopting every means of protection from the destructive element. Among other things, iron roofing and siding is probably the most extensively used to protect from fire originating on the outside, and corrugated or crimped iron ceilings and interior linings to protect inside woodwork. Foremost among the manufacturers of iron roofing, siding, ceiling, lining, etc., in various styles is the Cincinnati Corrugating Co., whose mammoth works are located on Eggleston avenue, Cincinnati, Ohio.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.  
G. W. INGALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
R. G. HUSTON—Montana.  
GEO. McDOWELL—Fresno and Tulare Cos.  
J. C. SWERNEY—Sonoma and Mendocino Cos.  
O. F. BERGMAN—Yolo and Solano Cos.  
M. S. PRIME—El Dorado and Placer Cos.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Acme M & M Co.	California.	21.	Oct 25.	Nov 29.	Dec 20.	J. M. Buffington.	309 California St.
Aultman M & M Co.	California.	3.	Oct 26.	Nov 29.	Dec 20.	J. M. Buffington.	309 California St.
Alta S M Co.	Nevada.	34.	Oct 16.	Nov 20.	Dec 10.	W. H. Watson.	302 Montgomery St.
Benton Con M Co.	California.	16.	Oct 10.	Oct 27.	Dec 1.	W. H. Watson.	302 Montgomery St.
Centennial Gravel M Co.	Nevada.	27.	Oct 25.	Dec 1.	Dec 21.	W. H. Watson.	302 Montgomery St.
Columbus Con M Co.	Nevada.	4.	Oct 27.	Nov 29.	Dec 21.	J. M. Buffington.	309 California St.
Chollar M Co.	Nevada.	22.	Oct 27.	Nov 29.	Dec 21.	J. M. Buffington.	309 California St.
Caledonia S M Co.	Nevada.	41.	Nov 16.	Dec 29.	Jan 19.	A. S. Groth.	309 Montgomery St.
Champion M Co.	California.	23.	Nov 10.	Nov 29.	Jan 7.	T. Wetzel.	552 Montgomery St.
Diana M Co.	California.	6.	Oct 25.	Oct 22.	Nov 22.	P. J. Flannigan.	318 Pine St.
Exchequer M Co.	Nevada.	23.	Oct 20.	Oct 18.	Nov 24.	C. E. Elliott.	306 Montgomery St.
East Mt Diablo M Co.	Nevada.	4.	Oct 10.	Oct 30.	Dec 4.	G. W. Fisher.	318 Pine St.
Gori M & M Co.	California.	4.	Oct 26.	Nov 29.	Dec 31.	A. A. Enquist.	436 Montgomery St.
Golden Fleecce G M Co.	California.	7.	Oct 10.	Nov 22.	Dec 27.	W. J. Gleason.	Phelan Block
Mayflower Gravel M Co.	California.	35.	Nov 25.	Nov 19.	Dec 22.	J. Morizio.	328 Montgomery St.
Mountain Tunnel M Co.	California.	2.	Oct 27.	Nov 29.	Dec 20.	A. B. Paul.	328 Montgomery St.
North Sierra Nevada M Co.	Nevada.	4.	Nov 20.	Nov 25.	Jan 21.	J. L. Fields.	330 Pine St.
Peerless M Co.	Arizona.	9.	Nov 10.	Nov 12.	Dec 23.	A. Waterman.	309 Montgomery St.
Peer M Co.	Arizona.	6.	Nov 10.	Nov 12.	Dec 23.	A. Waterman.	309 Montgomery St.
Potosi M Co.	Nevada.	30.	Nov 10.	Nov 10.	Dec 14.	C. E. Elliott.	309 Montgomery St.
Polar Star M Co.	New Mexico.	3.	Oct 17.	Dec 2.	Dec 1.	J. C. Stump.	309 Montgomery St.
Benton Coal M Co.	Wash Ter.	7.	Oct 20.	Dec 6.	Jan 5.	J. H. Henderson.	24 Sansome St.
Spring Valley G M Co.	California.	1.	Oct 19.	Dec 3.	Jan 3.	H. Pichoir.	320 Sansome St.
Santa Anita M & M Co.	California.	10.	Oct 26.	Nov 29.	Dec 20.	J. M. Buffington.	309 California St.
Sierra Iron Co.	California.	5.	Nov 25.	Nov 18.	Dec 22.	H. P. Bush.	431 California St.
Summit G M Co.	California.	9.	Nov 10.	Nov 24.	Dec 29.	G. W. Sessions.	339 Montgomery St.
Scorpion M Co.	Nevada.	20.	Nov 10.	Nov 11.	Dec 17.	G. E. Spinsky.	318 Montgomery St.
Tyrol M Co.	California.	7.	Oct 23.	Nov 31.	Dec 25.	W. J. Gleason.	121 Battery St.
Tallulah M Co.	California.	21.	Oct 30.	Dec 3.	Dec 29.	G. A. Hill.	634 Market St.
Utah S M Co.	Nevada.	54.	Nov 20.	Dec 24.	Jan 19.	A. H. Fish.	399 Montgomery St.

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Gould & Curry S M Co.	Nevada.	A. K. Durbrow.	309 Montgomery St.	Annual.	Dec 20.
Gorilla M & M Co.	California.	A. A. Enquist.	436 Montgomery St.	Annual.	Dec 18.
Mt Diablo M & M Co.	Nevada.	R. W. Heath.	318 Pine St.	Annual.	Dec 20.
Ophir M Co.	Nevada.	E. B. Holmes.	309 Montgomery St.	Annual.	Dec 15.
Ontario S M Co.	Nevada.	J. C. Stump.	309 Montgomery St.	Annual.	Dec 18.

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Martin White M Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	30.	Oct 11.
Paradise Valley M Co.	Nevada.	W. Letts Oliver.	328 Montgomery St.	10.	Nov 30.
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Dec 15.
Young America M Co.	California.	J. Nash.	328 Montgomery St.	40.	May 20.

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Nov. 18.	WEEK ENDING Nov. 24.	WEEK ENDING Dec. 2.	WEEK ENDING Dec. 9.
Alpha.	1.75	2.85	1.25	1.75
Alta.	1.05	2.60	1.40	2.10
Andes.	.70	1.25	.70	.95
Argenta.	.30	.30	.15	.15
Belcher.	1.50	3.00	1.35	2.40
Best & Belcher.	4.20	6.87	4.55	5.12
Bullion.	1.00	1.85	.80	1.35
Bonanza King.	.35	.40	.30	.40
Belle Isle.	.35	.40	.30	.40
Bodie Con.	2.30	5.00	2.55	3.40
Benton.	.35	.45	.20	.35
Bodie Tunnel.	1.50	2.00	1.65	2.00
Bulwer.	1.10	2.00	1.65	2.00
California.	11.62	20.17	18.18	20.32
Challenge.	.65	1.20	.35	.95
Champion.	1.60	6.62	4.40	5.50
Chollar.	1.60	6.62	4.40	5.50
Confidence.	5.37	7.00	3.00	5.75
Con. Imperial.	.50	.50	.50	.50
Con. Virginia.	11.62	20.17	18.18	20.32
Con. Pacific.	.80	1.00	.20	.30
Crown Point.	2.50	3.10	2.00	2.50
Day.	2.50	3.10	2.00	2.50
Eureka Con.	4.25	4.50	5.00	10.75
Eureka Tunnel.	.55	.85	.85	2.35
Exchequer.	.25	.75	.50	.50
Grand Prize.	1.90	5.00	2.65	3.50
Gould & Curry.	1.90	5.00	2.65	3.50
Goodshaw.	1.70	3.95	2.25	3.40
Hale & Norcross.	2.25	2.50	2.25	3.75
Holmes.	.05	.05	.05	.05
Independence.	.20	.60	.30	.45
Julia.	.70	1.90	.95	1.70
Justice.	2.30	2.35	2.35	2.65
Mono.	2.45	6.35	3.35	4.80
Mexican.	2.50	3.00	2.75	3.00
Mt. Diablo.	.80	.95	.85	.90
Northern Belle.	5.75	7.00	6.25	6.87
Navajo.	1.50	2.00	1.65	2.00
North Belle Isle.	1.50	2.00	1.65	2.00
Occidental.	.60	1.00	.50	.75
Ophir.	.60	1.50	.65	1.75
Overman.	.90	4.25	3.00	3.60
Potosi.	2.85	8.25	7.00	8.50
Pinal Con.	1.95	4.00	1.75	1.75
Savage.	.15	.35	.25	.30
Seg. Belcher.	.15	.35	.25	.30
Sierra Nevada.	.15	.35	.25	.30
Silver Hill.	.15	.35	.25	.30
Silver King.	.15	.35	.25	.30
Scorpion.	.15	.35	.25	.30
Syndicate.	.20	.30	.20	.35
Tioga.	1.50	3.50	1.90	3.10
Union Con.	1.70	4.80	2.00	3.80
Utah.	2.40	8.75	2.50	8.75
Yellow Jacket.	2.40	8.75	2.50	8.75

## Sales at San Francisco Stock Exchange.

THURSDAY Dec. 9.	2285	Hale & Nor.	33@44
500 Alta.	2.90@23	600 Justice.	2.75@3.00
300 Andes.	1.60@1.75	810 Julia.	1.10@1.20
50 Alpha.	1.60@1.75	1355 Lady Wash.	1.20@1.35
550 Argenta.	.40c	900 Mexican.	.50@.60
800 B & Belcher.	13@14.62	200 Mono.	4.50
450 Bullion.	3.00	50 Mt. Diablo.	3.50
1100 Belle Isle.	.50c	250 N. Belle Is.	41@42
300 Bodie Con.	3.00@3.05	100 Navajo.	1.10
500 Bulwer.	1.75	100 Ophir.	14@16
1400 Benton Con.	70@80c	350 Overman.	2.40@2.50
300 Belcher.	4.00	100 Occidental.	.50
1900 Bodie Tun.	1.00	1100 Peerless.	.60c
450 Con. Pacific.	.45@.50c	1150 Potosi.	6@8
1250 Chollar.	.40@.50	950 Savage.	9@11
610 Con Va & Cal.	35@38	450 Scorpion.	.50c
100 Confidence.	1.00	100 Silver Hill.	1.25
325 Crown Point.	4@4.10	100 Sierra Nevada.	1.25
450 Challenge.	2.90@3	350 Trojan.	70@90c
250 Exchequer.	2.00	300 Union Con.	5@5.50
50 Eureka Con.	8.00	215 Utah.	8@9
800 Gould & Curry.	4@7	900 Yellow Jacket.	7@8

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

**FRANG'S HOLIDAY CARDS.**—L. Frang, of Boston, is again ahead of all other art publishers in the originality and rare perfection of design and finish of his large variety of Christmas and New Year's cards. Every lover of true art will find pleasure in examining Frang's American holiday presents for this season. Their real merits guarantee the purchaser lasting satisfaction.

## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING NOVEMBER 30, 1886.

353,345.—CAR STARTER.—S. Baker, San Jose, Cal.  
353,347.—REVERSIBLE PLOW.—Benson & Hollis, Boulder creek, Cal.  
353,286.—CAR TRUCK.—Thomas Carter, S. F.  
353,295.—MOTOR.—T. Duffy, S. F.  
353,489.—ANGLE HANGER FOR TELEPHONES.—Michael Gerst, S. F.  
353,565.—CAR COUPLING.—W. H. Keen, Woodbridge, Cal.  
353,310.—DYNAMO ELECTRIC MACHINE.—N. S. Keith, S. F.  
353,500.—CONCRETE MOLD FOR SUBWAYS, ETC.—E. L. Ransome, S. F.  
353,501.—BRICKS.—E. L. Ransome, S. F.  
353,518.—CAR COUPLING.—A. N. Towne, S. F.  
353,519.—CAR COUPLING.—A. N. Towne, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

**CAN TOP AND COVER.**—Frederick A. Robbins, assignor to W. W. Montague, S. F. No. 353,160. Dated Nov. 23, 1886. The object of the invention is to provide a cover and means for retaining it open or closed, and is specially applicable for packages containing articles in a dry condition, such as tea, etc. All the actuating parts of the cover are upon the outside of the can, and are easily applied after the can is finished.

**CAR COUPLING.**—John J. Bogard, Tehama, Tehama Co. No. 353,118. Dated Nov. 23, 1886. This is one of that class of car couplings in which a latch is held forward under the influence of a spring and sustains the pin, which is dropped by the contact of the entering link with the latch, whereby the latter is forced back, relieving the pin, which drops through the link. The invention consists in the arrangement of the latch with respect to the draw-head, the means by which it may be retracted from the side of the car when it is wished to uncouple the car from below, and the means by which the device is uncoupled from the top of the car, together with details of construction relating to the link and its attachment to the car, and a removable shoe for the draw-head. The use of this coupling avoids the necessity of passing between cars to couple them together.

**BRICK.**—Ernest L. Ransome, S. F. No. 353,501. Dated Nov. 30, 1886. This invention consists of bricks or like molded articles manufactured from aqueous or volcanic tufas or tuffaceous earths, such as are found in the State of California and elsewhere. These tufas vary in composition, some being silicious, some silicious and aluminous, some silicious, aluminous and calcareous, some silicious and calcareous, and some calcareous. The invention relates to the whole class of tufas, inasmuch as they all have the common properties desirable in the manufacture, as being in a comparatively soft and friable condition, easily pulverized and granulated, and possessing more or less chemical activity when properly treated either alone or with the addition of a small percentage of lime. Mr. Ransome, by his peculiar method of treatment, patents a new article of manufacture in the form of an unburned brick made from tufa or tufa and lime. Some of the bricks are enameled, and any of them can be beautifully colored. The bricks made by this process are hard, durable, hydraulic and impervious to water.

## MINING ENGINEERS.

**W. A. GOODYEAR,**  
Civil and Mining Engineer,  
MINING EXPERT AND GEOLOGIST.

Address "Business Box A," office of this paper, San Francisco.

**ROSS E. BROWNE,**  
Mining and Hydraulic Engineer,  
No. 307 Sansome St., San Francisco.

## California Inventors

Should consult DEWEY & CO. AMERICAN AND FOREIGN PATENT SOLICITORS, for obtaining Patents and Caveats. Established in 1860. Their long experience as Journalists and large practice as Patent attorneys enables them to offer Pacific Coast Inventors far better service than they can obtain elsewhere. Send for free circulars of information. Office of the MINING AND SCIENTIFIC PRESS and PACIFIC RURAL PRESS No. 252 Market St., San Francisco, Elevator, 12 Front St.

## San Francisco Metal Market.

[WHOLESALE.] THURSDAY, Dec. 9, 1886.

ANTIMONY—French Star.	91 @	8
BORAX—San Bernardino.	— @	5
Attaguosa.	— @	25 00
Iron—Glenbrook ton.	— @	22 00
Eglinton, ton.	— @	24 00
American Soft, No. 1, ton.	24 00	@24 50
Oregon Pig, ton.	21 00	@23 00
Clippert Cap, Nos. 1 & 4.	22 00	@23 50
Clay Lane White.	21 50	@
Shotts, No. 1.	23 50	@
Copper.	25 @	—
Bolt.	18 @	23
Sheathing.	12 @	13
Ingot.	4 75 @	—
LEAD—Pig.	5 25 @	5 50
Bar.	— @	—
Pipe.	8 @	—
Sheet.	1 65 @	—
Shot, discount 10% on 500 bag.	Drop, 3 bag.	1 85 @
Black, 3 bag.	2 05 @	—
Chilled, do.	8 @	9
ZINC—German.	38 50	@39 00
Sheet, 7x3 ft, 7 to 10 lb, less the cask.	1 05 @	—
QUICKSILVER—By the flask.	1 05 @	—
Flasks, new.	4 90 @	4 95
Flasks, old.	4 90 @	4 95



## Delinquent Notices.

## DELINQUENT NOTICE.

**Tallulah Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Sierra District, Humboldt County, Nevada.

NOTICE.—There are delinquent, upon the following described stock, on account of Assessment No. 21, levied on the 30th day of October, 1886, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Am't.
Fargo, J. B.	231	14	\$ 4 20
Fargo, J. B.	229	20	6 00
Fargo, W. M.	170	20	6 00
Carr, J. F.	187	5	1 50
Dun, J. A.	185	50	15 00
Cowan, Wm C.	224	5	1 50
Knowles, C. C.	134	11	3 30
Knowles, C. C.	183	58	17 40
Cullen, Elizabeth	226	7	2 10
Hallcock, J. Y.	172	53	15 90
Le Roy, Charlotte O.	234	50	15 00
Coe, S. Q.	221	1	30
Melackey, David. (Certificate not issued.)	10	3	00
Heller, Thomas	196	5	1 50
Booker, W. Lane	158	53	15 90
Johnson, Robert C.	193	100	30 00
Johnson, Robert C.	246	111	33 30
Johnson, Robert C.	247	112	33 60
Johnson, George C.	152	103	30 90
Johnson, Kate	307	50	15 00
Penoyer, A. H.	213	1	30

And in accordance with law, and an order of the Board of Directors, made on the 30th day of October, 1886, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the sales-room of Maurice Dore & Co., 412 Pine street, San Francisco, on Wednesday, the 29th day of December, 1886, at the hour of 12 o'clock noon, of said day, to pay said Delinquent Assessments thereon, together with costs of advertising and expenses of sale.

GEORGE A. HILL, Secretary.

OFFICE—With Estate of Samuel Hill, 634 Market Street, San Francisco, California.

## DELINQUENT NOTICE.

**Aultman Mill and Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Georgetown Mining District, El Dorado County, California.

NOTICE.—There are delinquent, upon the following described stock, on account of Assessment No. 3, levied on the 26th day of October, 1886, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Am't.
Aultman, C.	2	20,000	\$500 00
Aultman, C.	3	10,000	250 00
Aultman, C.	19	9,800	245 00
Wheeler, R. J.	9	10,000	250 00
Wheeler, R. J.	14	2,000	50 00
Wheeler, R. J.	15	2,000	50 00
Wheeler, R. J.	16	2,000	50 00
Wheeler, R. J.	17	2,000	50 00
Wheeler, R. J.	18	2,000	50 00
McKinley, J.	20	200	5 00

And in accordance with law, and an order of the Board of Directors, made on the 26th day of October, 1886, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, 309 California street, San Francisco, California, on Monday, the 20th day of December, 1886, at the hour of 2 o'clock p. m., of said day, to pay said Delinquent Assessments thereon, together with costs of advertising and expenses of the sale.

J. M. BUFFINGTON, Secretary.

OFFICE—309 California Street, San Francisco, Cal.

## DELINQUENT NOTICE.

**Acme Mill and Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Volcano Mining District, Amador County, California.

NOTICE.—There are delinquent, upon the following described stock, on account of Assessment No. 9, levied on the 25th day of October, 1886, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Am't.
Aultman, C.	241	1000	\$25 00
Aultman, C.	242	1000	25 00
Aultman, C.	243	1000	25 00
Aultman, C.	244	500	12 50
Aultman, C.	245	500	12 50
Aultman, C.	246	500	12 50
Aultman, C.	247	500	12 50
Aultman, C.	255	5000	125 00
Miller, Jacob.	254	5000	125 00

And in accordance with law, and an order of the Board of Directors, made on the 25th day of October, 1886, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, 309 California street, San Francisco, California, on Monday, the 20th day of December, 1886, at the hour of 2 o'clock p. m., of said day, to pay said Delinquent Assessments thereon, together with costs of advertising and expenses of the sale.

J. M. BUFFINGTON, Secretary.

OFFICE—309 California St., San Francisco, Cal.

## DELINQUENT NOTICE.

**Santa Annita Mill and Mining Company.**—

Location of principal place of business, San Francisco, California. Location of works, Nevada County, California.

NOTICE.—There are delinquent, upon the following described stock, on account of Assessment No. 10, levied on the 26th day of October, 1886, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Am't.
Aultman, C.	245	5000	\$75 00
Aultman, C.	246	2000	30 00
Aultman, C.	247	2000	30 00
Aultman, C.	248	2000	30 00
Aultman, C.	249	2000	30 00
Aultman, C.	250	2000	30 00
Aultman, C.	251	1000	15 00
Aultman, C.	252	1000	15 00
Aultman, C.	253	1000	15 00
Aultman, C.	254	1000	15 00
Aultman, C.	255	1000	15 00
Aultman, C.	256	500	7 50
Aultman, C.	257	500	7 50
Aultman, C.	258	500	7 50
Aultman, C.	259	500	7 50
Aultman, C.	260	500	7 50
Aultman, C.	261	500	7 50
Aultman, C.	262	100	1 50
Aultman, C.	263	100	1 50
Aultman, C.	264	100	1 50
Aultman, C.	265	100	1 50
Aultman, C.	266	100	1 50
Aultman, C.	267	100	1 50
Aultman, C.	268	100	1 50
Aultman, C.	269	100	1 50
Aultman, C.	334	4500	67 50
Aultman, C.	335	500	7 50
Harter, M. D.	279	500	7 50
Harter, M. D.	280	500	7 50
Harter, M. D.	281	500	7 50
Harter, M. D.	282	500	7 50
Harter, M. D.	283	100	1 50
Harter, M. D.	284	100	1 50
Harter, M. D.	285	100	1 50
Harter, M. D.	286	100	1 50
Harter, M. D.	287	100	1 50
Raff, G. W.	288	250	3 75
Raff, G. W., Trustee.	289	500	7 50
Raff, G. W., Trustee.	290	500	7 50
Raff, G. W., Trustee.	291	500	7 50
Raff, G. W., Trustee.	292	500	7 50
Raff, G. W., Trustee.	328	500	7 50

And in accordance with law, and an order of the Board of Directors, made on the 26th day of October, 1886, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, 309 California street, San Francisco, California, on Monday, the 20th day of December, 1886, at the hour of 2 o'clock p. m., of said day, to pay said Delinquent Assessments thereon, together with costs of advertising and expenses of the sale.

J. M. BUFFINGTON, Secretary.

OFFICE—309 California Street, San Francisco, Cal.



**H. H. H. HORSE LINIMENT.**  
THE H. H. H. Horse Liniment puts new life into the Antiquated Horse! For the last 14 years the H. H. H. Horse Liniment has been the leading remedy among Farmers and Stockmen for the cure of Sprains, Bruises, Stiff Joints, Spavins, Windgalls, Sore Shoulders, etc., and for Family Use is without an equal for Rheumatism, Neuralgia, Aches, Pains, Bruises, Cuts and Sprains of all characters. The H. H. H. Liniment has many imitations, and we caution the Public to see that the Trade Mark "H. H. H." is on every Bottle before purchasing. For sale everywhere for 50 cents and \$1.00 per Bottle.

For Sale by all Druggists.

**SPENCERIAN STEEL PENS**  
Are The Best  
Established 1860.  
USED BY THE BEST PENMEN  
Noted for Superiority of Metal, Uniformity, and Durability.  
20 Samples for trial, post-paid, 10 Cents.  
IVISON, BLAKEMAN, TAYLOR, & CO.,  
253 and 755 Broadway, New York.

**HEALD'S BUSINESS COLLEGE,**  
24 Post St. S. F.  
Send for Circular.

**JOHN A. ROEBLING'S SONS CO.**  
**WIRE ROPE**  
GALVANIZED SHIP RIGGING, MINING, TILLER, ELEVATOR, TINNED, & COPPER ROPE, SASH CORDS. LARGEST WIRE ROPE WORKS IN THE WORLD.  
**IRON & STEEL WIRE OF EVERY KIND.**  
TELEGRAPH WIRE, HARD & SOFT COPPER WIRE INSULATED FOR ELECTRIC USE. WIRES OF IRON & COPPER. FENCE WIRE, SWEDISH IRON WIRE, CRUCIBLE STEEL WIRE.  
TRENTON, N. J. & 14 DRUMM ST. SAN FRANCISCO, CAL.

## CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and

## HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

**No. 1 (XX) is the Strongest Explosive Known.**

**No. 2 is superior to any powder of that grade.**

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street - - San Francisco, Cal.

## CALIFORNIA VIGORIT POWDER CO.,

No. 40 California Street, San Francisco,

—MANUFACTURERS OF—

## NITRO-GLYCERINE BLASTING POWDERS.

Vigorit "LOW" Powder,

FOR REMOVING STUMPS AND TREES, HAS NO EQUAL.

WORKS: California City, Marin Co., Cal.

ED. G. LUKENS, Manager.

**CINCINNATI CORRUGATING COMPANY.**

JOHN F. HAZEN, Prest.

JAMES HICKS, Treas.

J. G. BATTELLE, Sec'y.

**Over 1500 Tons Iron in Stock!**

FOUR WIDTHS OF CORRUGATIONS MADE!  
**STANDING SEAM PLAIN ROOFING!**  
**All Paint Re-ground in Pure Linseed Oil!**



# IMPORTANT TO GOLD MINERS!

## SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

BEST SOFT LAKE SUPERIOR COPPER USED.

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.

E. G. DENNISTON, Proprietor.

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

SEND FOR CIRCULAR.



**NOTICE TO  
MINING MEN,  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.**

**Engineers' Tables of Progress**

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, Etc. address:

**INGERSOLL ROCK DRILL CO.,**

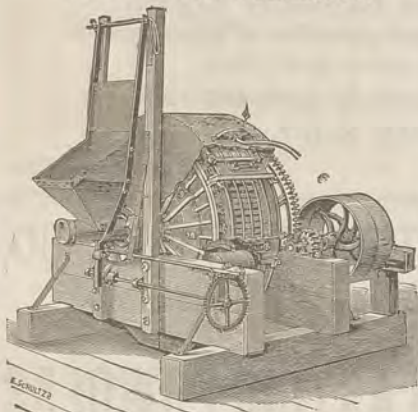
REPRESENTED BY

**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

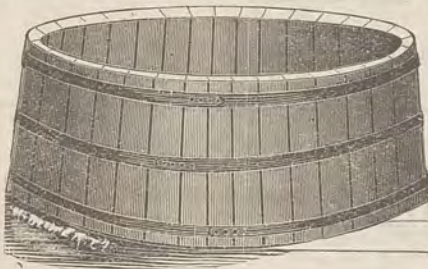
**Tustin's Pulverizer  
WORKS ORE WET OR DRY  
FULTON IRON WORKS, S. F.**



MANUFACTURED BY

**HINCKLEY, SPIERS & HAYES,**

**Mining Vats and Tanks.**



**LEACHING VATS with FALSE BOTTOMS.**

**PRECIPITATING VATS,**

**SOLUTION and WATER TANKS**

For Mining Purposes.

**WELLS, RUSSELL & CO.,**

Mechanics' Mills

San Francisco.

**MACHINISTS, ATTENTION!**

AN OUTFIT FOR A MACHINIST.

**Good Tools, Patterns and an Es-  
tablished Business**

**FOR SALE AT A BARGAIN,**

If applied for immediately.

Address, B. A. W.,  
Care of this Paper.

**INVENTORS, TAKE NOTICE**

**L. PETERSON, MODEL MAKER,**

258 Market St., N. E. cor. Front (upstairs), San Francisco,  
Experimental machinery and all kinds of metal, tin,  
copper and brass.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**

316 California St., San Francisco.

## FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

(ESTABLISHED IN 1855.)

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries

OF EVERY DESCRIPTION.

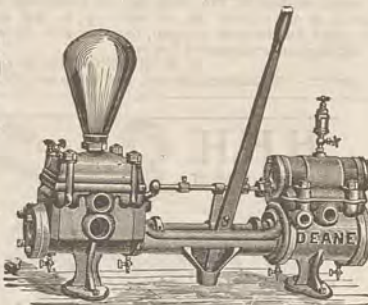
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

**GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.**

— ALSO —

## HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR

### LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
Beams, Angle, Channel, and T Iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**

## FRASER & CHALMERS.



PERFORATED METALS FOR

REVOLVING and SHAKING-SCREENS,

JIGS & STAMP-BATTERIES.

UTAH OFFICE—SALT LAKE CITY, UTAH.

## Iron and Machine Works.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

BUILDER OF

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines

Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. **ORDERS SOLICITED.**

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

**Mold-Board AMALGAMATORS,**

**Golden State Pressure Blowers.**

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON

THORNTON THOMPSON

**THOMPSON BROTHERS,**

**EUREKA FOUNDRY,**

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

## N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

**Saws.**

SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Cata-  
logue. 17 and 19 Fremont St., San Francisco.

**RICHARD C. REMMEY, Agent,**

**Philadelphia Chemical Stoneware Manufactory,**

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of

all kinds of

Chemical Stoneware

— FOR —

Manufacturing

Chemists,

Also Chemical Brick

for Glover Tower.

## American Exchange Hotel,

SANSOME STREET.

Opposite Wells, Fargo & Co.'s Express, one door from  
Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion  
of the city. The traveling public will find this to be the  
most convenient as well as the most comfortable and  
respectable Family Hotel in the city.

**Board and Room, \$1.00, \$1.25 and \$1.50**

PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging  
white labor employed. Free Coach to and from  
the Hotel.

**MONTGOMERY BROS., Proprietors.**

## NATIONAL ASSURANCE CO., OF IRELAND.

## ATLAS ASSURANCE COMPY, OF LONDON.

## BOYLSTON INSURANCE COMPANY, OF BOSTON, MASS.

**H. M. NEWHALL & CO.,**

GENERAL AGENTS,

809 & 311 Sansome St. San Francisco, Cal.



## RÜPTURE!

A New Invention! The "Perfection"  
Belt Truss, with Universal Joint Move-  
ment and Self-adjusting Spiral Spring.  
Worn with perfect comfort night and day.  
Gives universal satisfaction. Price, from  
\$3 to \$45. Call or send for descriptive  
circular. Address, J. H. WIDBER,  
(Druggist) 701 Market Street, cor. Third,  
San Francisco.

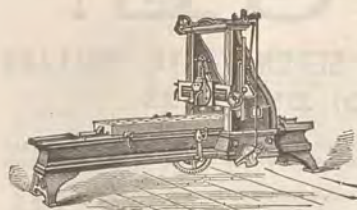
BACK FILES of the MINING AND SCIENTIFIC PRESS (un-  
bound) can be had for \$3 per volume of six months. Per  
year (two volumes) \$5. Inserted in Dewey's patent bind-  
er, 50 cents additional per volume.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.

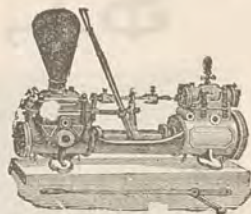


Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Knowles Steam Pump  
The Standard.

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

### Mining Machinery, Steam Pumps, Wood and Iron Working Machinery ENGINES and BOILERS.

SEND FOR CIRCULARS.

## PACIFIC IRON WORKS

1850. 1885.  
**RANKIN, BRAYTON & CO.,**  
.....BUILDERS OF.....  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

### WATER JACKET SMELTING FURNACES

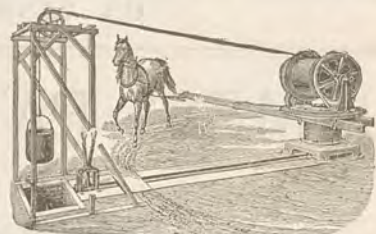
For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.

### WATER JACKET SMELTING FURNACES

### THE DUNCAN CONCENTRATOR

Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE of OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH of the YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



### BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a FIRST-CLASS HOIST, and affording means for the CONTINUOUS OPERATION of a BLOWER, WITHOUT interfering with the HOISTING APPARATUS. It is made ENTIRELY OF IRON, no piece WEIGHS OVER 300 POUNDS. At the ORDINARY SPEED of a horse, a 700 pound BUCKET OF ORE may be raised 75 feet per minute. The HOISTING-DRUM is under the COMPLETE CONTROL of the man of the shaft, and is CAPABLE of CARRYING 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.

### HOISTING WORKS.

L. C. MARSHUTZ.

T. G. CANTRELL.

## NATIONAL IRON WORKS

N. W. Corner Main and Howard Sts., San Francisco,

—MANUFACTURERS OF—

Stationary and Compound Engines, Flour, Sugar, Saw and Quartz Mill Machinery.

AMALGAMATING MACHINES. CASTINGS AND FORGINGS Of Every Description.

ALL WORK TESTED AND GUARANTEED.

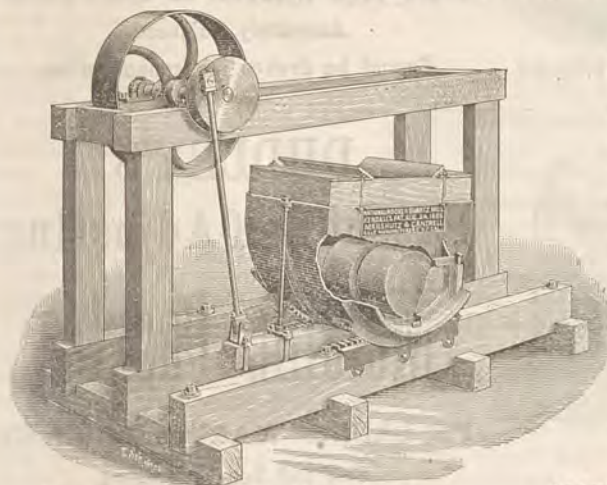
IMPROVED PORTABLE HOISTING ENGINES.

## NATIONAL ROCKER QUARTZ MILL.

KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY, 12 Tons in 24 Hours. 8 H. P.

MARSHUTZ &amp; CANTRELL, Sole Manufacturers.



Send for Circulars and Price List.

MARSHUTZ &amp; CANTRELL.

The Patentee and Manufacturers cordially invite miners to critically examine and pass judgment upon this improved system of milling and amalgamating ores in the following particulars:

1. The cost is less than one-half of stamps of same capacity.
2. The freight to mine is less than one-half of stamps.
3. The cost of erecting is less than one-fourth of stamps.
4. The power to drive it is less than one-half of stamps.
5. The wear is less than one-quarter of stamps.
6. There is no wear except on shoes and dies.
7. In point of amalgamation it is superior to any other machine in use.
8. In its simplicity of construction.

We challenge competition with Stamps, Ball Pulverizers or any other ore crushing machines now before the public.

### THE RUSSELL PROCESS COMP'Y.

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

### San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarrad Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice

TUBBS &amp; CO.

611 and 613 Front St., San Francisco

GEO. W. PRESCOTT, President.

IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.

J. C. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market &amp; Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

—BUILDERS OF—

### STEAM, AIR, AND HYDRAULIC MACHINERY.

### Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

### UNION IRON WORKS.

Successors to PRESCOTT, SCOTT &amp; CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

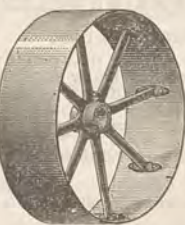




**Chicago Prices Beaten!**  
ESTABLISHED 1860.  
**S. F. PIONEER SCREEN WORKS,**  
221 & 223 First St., cor. Tehama, S. F.  
**J. W. QUICK, Prop'r.**

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 fine.

Orders Promptly Executed



PAT. OCT. 25, 1881.

## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

### CLOT & MEISE,

Sole Licensed Manufacturers of the

### Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

### SHAFTING, HANGERS AND APPURTENANCES.

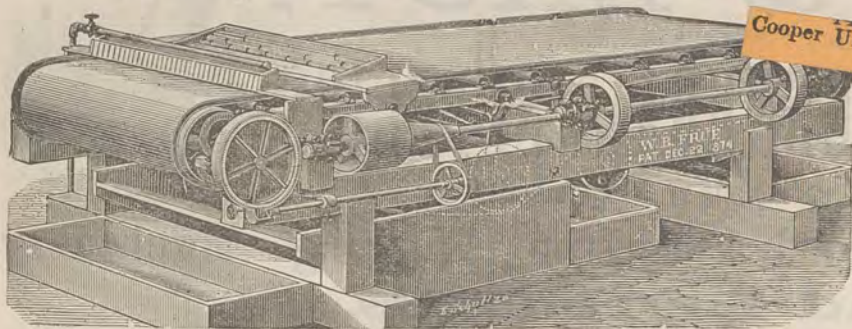
Send for Circular and Price List.

Nos. 129 &amp; 131 Fremont Street,

San Francisco, Cal.



# \$1,000 CHALLENGE!



Cooper Union Institute  
January 1 '85

PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS  
(\$575.00) F. O. B.

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

**THE FRUE ORE CONCENTRATOR  
OR VANNING MACHINE.**

**ADAMS & CARTER, Agents Frue Vanning Machine Co.,  
Room 7, No. 109 California Street, SAN FRANCISCO, CAL.**

## JAMES' PATENT RECIPROCATING STAMP MILL.

(PATENTED AUG. 16, 1881.)

Weight of Boss and Shoes (1200 pounds) acts on each Shoe separately. It is practically the same as the regular Stamp Mill.

Capacity, 6 Tons in 24 Hours. 4 H. P.

Parties wishing to test the Mill with any ore they may bring, will find one in operation at our works in this city.

### PRICES:

Reciprocating Stamp Mill,	\$350 00
Rock Breaker, - - -	100 00
Automatic Ore Feeder, -	50 00
Single Track Ore Car, - -	40 00

SEND FOR CIRCULAR.

**TATUM & BOWEN,**

34 & 36 Fremont St., San Francisco.

91 & 93 Front St., Portland, Oregon.

WM. H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

## RISDON IRON & LOCOMOTIVE WORKS

Location of Works, S. E. Cor. Beale and Howard Sts., San Francisco.

Manufacturers and Sole Agents for the Pacific Coast for

### HEINE SAFETY WATER TUBE BOILER.

HAS THE FOLLOWING  
ADVANTAGES:

**SAFETY,  
DURABILITY,  
ECONOMY,**  
AND

Facility of Inspection and Repairs.

**60,000  
HORSE POWER NOW IN USE.**

Boilers can be seen working in San Francisco at Palace Hotel, Spring Valley Water Works, Hueter Bros. & Co., California Jute Mills, and other places.

**GUARANTEED MORE EFFICIENT  
than any other Boiler made.**

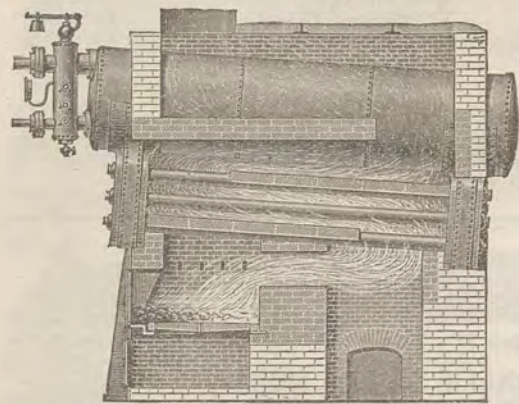
Sole Agents Pacific Coast for

### FOX'S CORRUGATED FURNACE FLUES,

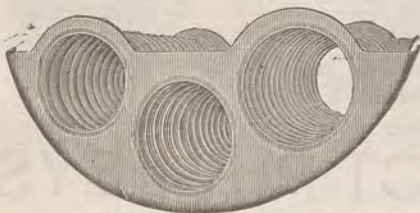
For BOTH LAND & MARINE BOILERS.

Rapidly Replacing Old Style.

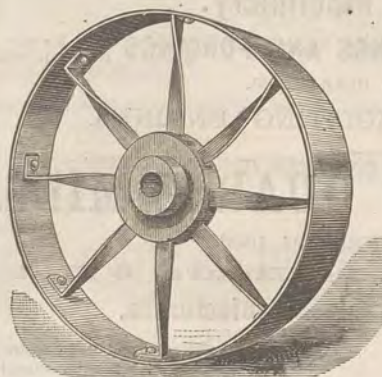
Over 10,000 now in use. Have just fitted 12 furnaces in Oceanic S. S. Co.'s Steamer Zealandia. Send for Circular of comparative tests.



HEINE SAFETY WATER TUBE BOILER.



FOX'S CORRUGATED BOILER FLUES.



MACBETH'S PATENT PULLEY.

Also Manufacturers and Sole Agents for the Pacific Coast for

### MACBETH'S PATENT PULLEYS.

STEEL RIMS,

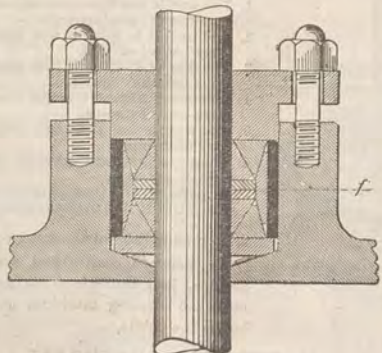
WROUGHT IRON ARMS,

LIGHTEST, STRONGEST AND  
BEST PULLEY IN THE MARKET.

HALF THE WEIGHT OF CAST-IRON

Accurately Balanced.

Cannot be Broken in Transportation.



### DUDLEY'S Patent Self-Adjusting Metallic Packing

For LAND & MARINE ENGINES.

Call and See It Working.

### BUILDERS OF

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.

Send for Circular and Price Lists.

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. NOTE.—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, DECEMBER 18, 1886.

VOLUME LIII.  
Number 25.

## The Acme Engine.

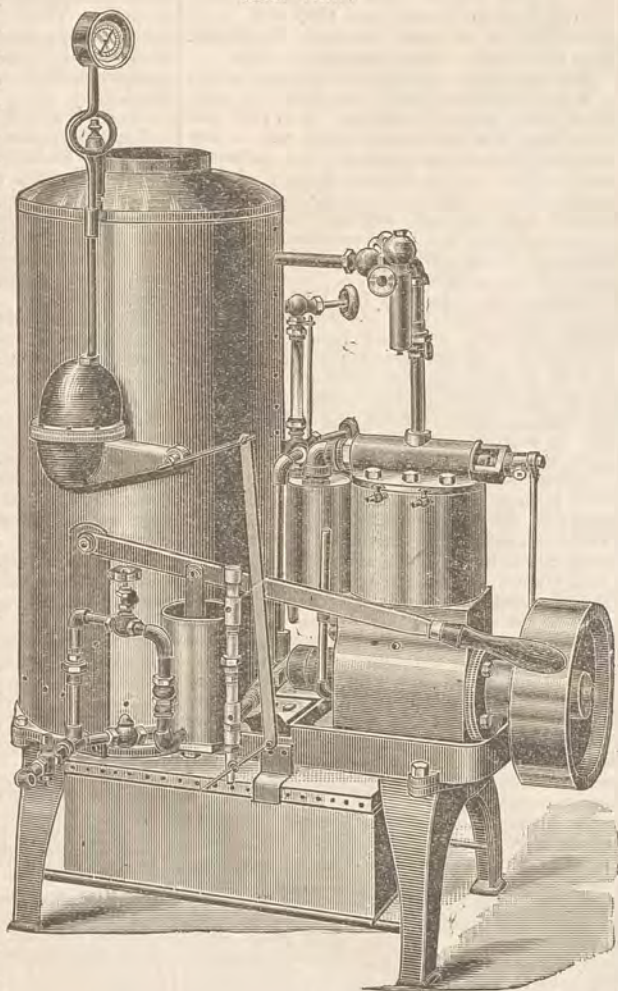
There has been quite a demand of late for small engines and boilers for boat and launch propulsion, which would admit of the use of liquid fuel, so as to get rid of the necessity of carrying a heavy weight of coal. Of these, the latest is the Acme automatic safety engine, engravings of which we show on this page. We examined a pair of these engines this week at the Joshua Hendy Machine Works, in this city, agents for this coast.

These engines are upright, double cylinder single acting, with cranks 180° to each other. The pistons, being one and one-half times the stroke in length, form their own guides. The wrist-pins are slightly below the center of the pistons, and the steam rings above the wrist-pin. The cranks are of steel, of large size, both in diameter and length. The main bearings are two and one-half times the diameter of shaft, and are bushed with bronze, which bushings are made on the interchangeable system and can be renewed when worn. The cylinders are directly over the center of the shaft, so that the engine may be run either way, as may suit convenience.

The valve is of the balanced rocking type, of extra large and long-wearing surfaces, and is placed on the top of the cylinders, the valve-case forming the cylinder head. This arrangement gives opportunity for long ports and gives quick admission and release, and makes the action of the cut-off governor sensitive to the slightest change in speed or load. The fly wheel is of cast iron, turned true all over; is perfectly balanced and has within its periphery the automatic governor, which regulates the admission of steam to suit the varying loads by changing the throw-off of the eccentric that actuates the valve. This automatic governor is very simple, consisting of only four pieces, and is positive in its action and peculiarly adapted to a high-speed engine in all places where an even speed is essential. Lubrication is accomplished by carrying in the crank-case a mixture of oil and water, into which the cranks dip at every revolution, and are not only flooded themselves, but throw the oil to every part inside the case, the wrist-pins on the hollow pistons getting a good supply at each stroke, also the lower part of the cylinders, whence it is wiped by the pistons. As this oil cannot escape, it is used over and over, and the oil supplied to the main bearings is all caught by wipers, and returned to the crank-case at last. The eccentric rod-strap and bearing, and the outer bearing of the valve stem, are the only earings not constantly flooded while engine is

running. The boiler is of the sectional type of extra strength; an economical steam generator, and has a very rapid and natural circulation, increased in its rapidity by the intensity of the fire, and all sediment is deposited in the water space below the fire, where it can readily be blown out or removed when boiler is cold. The water being carried in a series of rings connected by inclined tubes that break joints, the fire is compelled to reach every part in its passage through them. The boiler is double

REAR VIEW.

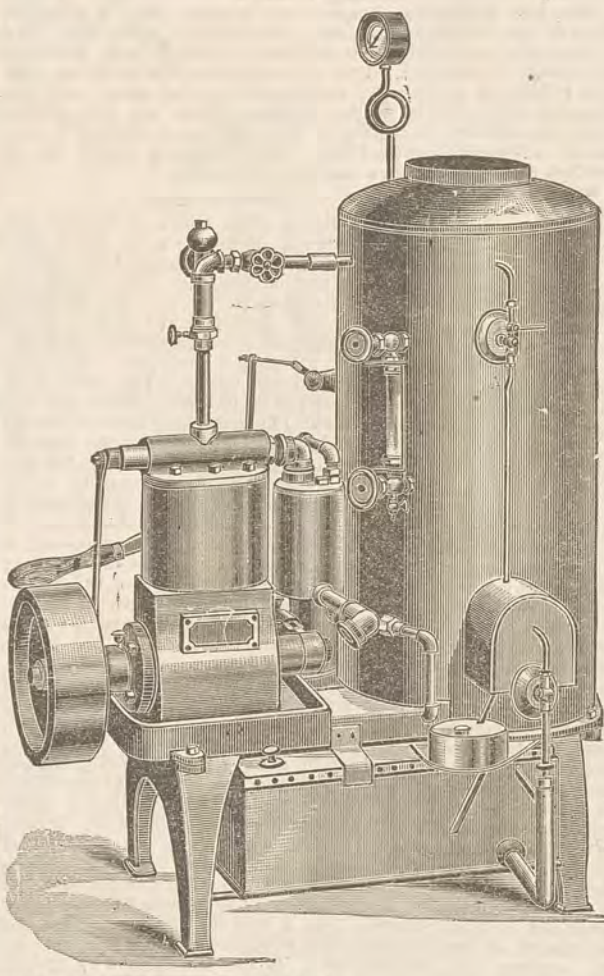


fuel is constant, may be run for an indefinite period with little attention and no noise or jar from lost motion, as all the labor is done in one direction.

The marine or boat engines are supplied with a link motion and lever for reversing, hand-wheel, and flange-coupling for connecting the propeller shaft, and are capable of being run at high rates of speed and high steam pressure.

These engines are adapted to all purposes where a light power is required, are almost

FRONT VIEW.



THE ACME AUTOMATIC SAFETY ENGINES AND BOILERS.

jacketed to prevent loss of heat by radiation.

The fuel used is kerosene oil of 110° to 150° fire test (this grade giving best results), atomized by a steam jacket and controlled by an automatic fire regulator that reduces or cuts off entirely the supply of fuel when the steam pressure reaches the limit at which the regulator is adjusted. The fire gives an intense flame and heat, is easily controlled, and makes an even and constant supply of steam. The fuel is clean, there being no dust, ashes or smoke when the fire is properly adjusted, and is cheaper than coal. As it is not subjected to any heat or flame until it enters the fire tube, it is as safe as an oil lamp.

The agents state that from 4 to 4½ gallons of this grade of oil will on a one-horse power give a brake horse-power for ten hours, at a cost in accordance with the price of oil in the locality used.

The stationary engines and boilers are fitted with steam gauge, reading to 160 pounds, water-glass gauge, pop safety valve, and automatic fire regulator; and if the supply of water and

noiseless in their operation, and can be easily managed by any person of ordinary ability. The workmanship of these engines is of the best, all parts being made to a system of gauges and templates. And each engine is set up and fully tested under steam before shipment.

These engines and boilers are especially adapted for use as the motive power for yachts, small harbor, river and ferry boats, for running printing presses, sewing machines, small electric dynamos, and for any mechanical work where light but steady powers may be required.

ADDITIONAL reports confirm the news that valuable silver mines have been found near Stein's Pass, on the Southern Pacific, in New Mexico. People are leaving Benson, A. T., daily for that place. A claim was recently sold for \$75,000.

THE ore worked at the Consolidated Virginia mine last week assayed \$34.35 as a whole. A shipment of \$69,320 was made on Saturday, of which \$30,299 was gold and \$39,021 silver. This is the first shipment on December account.

## The Signal Service in California.

Although there has been a branch office of the U. S. Signal Service in San Francisco since the service was started, it has up to a few years since been in charge of a sergeant, whose sole duty was to collect meteorological data and forward it to Washington. A couple of years since, however, a lieutenant in the service was sent here who took hold of the matter in earnest, and began to make the service of local

value. He was removed after a short stay and Lieut. W. M. Glassford sent in his place. Lieut. Glassford has been most energetic in the conduct of the service here, has given us regular weather predictions, and largely benefited the fruit-growers of the State especially. Aside from the scientific value of his observations, the economic value has also been proven. Now the telegraph brings information that Lieut. Glassford has been removed for some reason known only to the Chief, Signal Officer, and transferred to Arizona, and Lieut. J. E. Maxwell is to take his place.

It is greatly to be deplored that such a removal is to take place. Lieut. Glassford seemed the right man in the right place. He has made a special study of the peculiar climatic features of this coast, so different from other sections of the United States. He has made public his observations and conclusions so all could have the benefit of them. Now a new man is to come, who will have to go over a great deal of the same ground.

In this particular service of the Government local experience should count for a great deal, and when one of the officers gains this experience and utilizes it to the satisfaction of the public, he should be retained in his place and not be removed here and there for no apparent reason. That Lieut. Glassford's services are appreciated is shown by the numerous telegrams from influential persons and corporations here, asking that he be retained in his present station. He is regarded as one of the most energetic and efficient men in the service, and the community will regret his removal to other scenes.

AFTER being shut down for three months, the Nogales smelter started up on Tuesday last. During the time it was shut down several needed side-tracks and other improvements were made. The company starts up with over 100 carloads of ore on hand.

THE first mining company to pay the \$1000 (late \$250) for listing at the San Francisco Stock and Bond Exchange is the Hayward Gold and Silver.



## The Minting of Gold and Silver.\*

NUMBER 6.

[By ALBERT WILLIAMS, JR.]

## Coiner's Department, Continued.

**Pressroom.**—After the whitening process, and having been reweighed, the blanks are delivered to the foreman of the pressroom and coined. The pressroom is at the southwest corner of the first floor. It contains six coining presses, four of which are used in making double-eagles and standard dollars. These larger presses turn out 80 pieces per minute, and exert a pressure which is stated at 175 tons or more. One of these, known as Black Boss, was taken to San Francisco before the construction of the first mint there, and was used by private coiners. It has been in operation very steadily, and is said to have coined over \$400,000,000 gold. Another press is of the Ajax model, previously described. The smaller presses coin subsidiary silver or small gold pieces. They strike from 120 to 140 pieces per minute, exerting a pressure of from 30 to 60 tons, according to the denomination made, and have brass levers. The lubricant for the presses is refined sperm oil. From the pressroom the coin is returned to the weighing-room. After coining, the dies are taken from the presses and stored in a vault.

The "making-up" of coins.—The legal weight of \$20,000 in double-eagles is 1075 ounces. The number of pieces requisite to represent that sum are placed in a steel pan upon the scales. In case the weight is too great, some of the pieces are withdrawn and are replaced by "lights" until the legal weight is obtained. The coin is then put into boxes, 1000 pieces in each, and the superintendent is notified that an amount of coin is ready for delivery. The cashier of the mint, representing the superintendent, selects the number of coins provided by law from each box and weighs them with his standard weight. If the weight is within the legal limit, the delivery is accepted and a receipt is given. The assayer's representative also takes one piece (which he replaces by another), to be disposed of as the law directs. The condemned blanks and coins are delivered to the superintendent in the same manner as the clippings. The dust and filings are retained until the annual settlement.

**System of accounts.**—As an instance of the care taken in the mints to prevent loss or error, and to keep a complete and intelligible record of all operations, an outline of the system of bookkeeping practiced in the coiner's department of the mint is quoted below from a report made by Mr. Cicott. In the other departments of the mint, and indeed throughout all the branches of the mint bureau, a similar system is observed. It would be well if the same care were taken in all mining and metallurgical establishments, for comparisons and improvements in practice can best be made by means of accurate records of daily results. A few of the mining companies pursue the plan of recording their operations in some detail, and it is noteworthy that in precisely such cases the closest and most successful working is to be found. This is to be expected, if for no other reason than that a detailed system of accounts involves constant and minute inspection. The books containing the accounts with the different branches of the coiner's department in the San Francisco mint are the journal, ledger, working book, cash book, abstract of coinage and delivery book. The journal shows a complete record of all receipts of ingots and delivery of coin, clippings and "condemns" by days, and fully specified. The ledger contains the same in daily totals. The working book contains in different columns: (1) The number of the melt; (2) the weight of the melt and the number of ingots composing it; (3) the roller's account, setting forth the weight of strips, chips and dust returned, and also stating the amount of loss; (4) the cutter's account, setting forth the weight of planchettes, clippings and dust returned, and also stating the amount of loss; (5) the adjusting account, setting forth the weight of adjusted blanks condemned, blanks and filings returned, and also stating the loss; (6) the milling and cleaning account, showing the weight of blanks (annealed) returned, and stating the loss; (7) the pressroom account, setting forth the weight of coin turned out, and also stating the weight of blanks injured by accident and condemned; (8) the recapitulation column, showing the amount of coin, "condemns," condemned coin, clippings, chips, dust and filings, and the amount of loss on the total workings. The cash book contains the amount of coin daily made, in ounces, on the debit side. On the credit side it shows the amount delivered, in ounces and dollars; also the number of the delivery. The abstract of coinage shows the weight of ingots received monthly, and the amount in dollars of the several denominations (in separate columns) of coin delivered. The delivery book shows the number of the delivery, the number of drafts, the amount in dollars, the actual weight, the legal weight, the variation, and the denomination of all coin deliveries made to the superintendent. Statements of the entire workings of the coiner's department are rendered to the superintendent weekly, monthly, quarterly and annually. The pay-roll is made out monthly.

\*From the census report on the "Statistics and Technology of the Precious Metals" by S. F. Emmons and G. F. Becker, special agents. The description of the mints and the processes applies to the year 1881, at which time the mints were examined.

The roll-book also sets forth the name, date of appointment, and all particulars regarding the resignation or removal of each employee. The supplies are procured upon a printed requisition to the superintendent, and copies of all such requisitions are kept in the coiner's office. When bills are presented, they are certified to by the officer in charge and are sent to the superintendent for approval.

## Assayer's Department.

The assay department occupies seven rooms at the south end of the second floor, consisting of the office, gold-weighing room, laboratory, fire-assay room, humid assay room, humid assay weighing-room, and the furnace and dissolving room. The assay force is 21, including the assayer, assistant assayer, second assistant, foreman, seven weighers, two cupellers, three dissolvers, two chippers, engineer, fireman and porter. Ten Oertling and two Becker balances are in use.

**Sampling.**—The chips from deposit assay gold bars are taken in the assay department. They weigh 0.27 ounce each. The silver granulations weigh several ounces, of which 0.45 ounce is taken for each of the pair of top and bottom samples. With large melts of gold the samples are diagonal corner chips from alternate bars cast. The chips of mint-fine gold weigh 0.30 ounce each, and those of mint-fine silver 0.25 ounce.

**Assaying.**—Duplicate assays are made for gold and for base metal. All assays of silver in silver bullion are made by the humid method of Gay-Lussac. The gold in silver bullion is determined by the synthetic method, sufficient gold being added to keep the cornet from breaking. All silver assays are reported in tenths of thousands fine.

**Apparatus.**—There are two muffle furnaces in the furnace-room. They have three muffle doors, of which the upper is used for annealing cupels and the two lower for cupelling. There is one assay furnace in the same room. It is 13 inches square, and holds six No. 12 crucibles. The laboratory contains two sand-baths. The boiling is done over a series of large gas-burners. Four pairs of power-rolls are in use—one for lead, one for gold, one for silver, and one for rolling cornets. There are two shaking machines for the humid assay, similar to that at the Carson mint. They are driven by rod from a small upright engine.

## Miscellaneous.

**The building.**—The mint is on the west side of Fifth street, occupying a lot which has a block front between Mission and Jessie streets. It is of Portland freestone, with granite and concrete foundations. It has two stories, a basement, and an attic. The girders are of iron, and the roof is of galvanized and corrugated iron, except in a small part, which is of wood sheathed with copper. The extreme dimensions are 296 by 163 feet. There are two stacks, about 130 feet high, one used for the boilers and whitening-rooms and the other for the refinery, though the two can be used in connection. The building was designed by A. B. Mullett, [architect, and upon its completion, in 1874, the old mint building was abandoned.

**Boilers.**—There are four boilers, arranged in pairs, but so connected that one or more may be used independently. They are 48 inches in diameter, 15 feet long, and have 38 3/4-inch flues each. They consume about three tons of coal per day, when all are in use. The boilers are on the ground floor.

**Engines.**—There are five engines in this mint. The largest, known as No. 1, drives the rolls only. It is a parallel motion beam engine, with vertical cylinder 20 by 45 inches, has Myers' cut-off, and is rated at between 150 and 200 horse-power. The speed is 45 strokes per minute, and is regulated by a Gardiner governor placed five feet from the steam-chest. It was made in San Francisco, and is a fine example of workmanship. No. 2 drives the coining presses and draw-benches, and is in constant use. It is a direct acting 12 by 24-inch 50-horse power engine. No. 3 runs the elevator and the machinery of the sweeps-room (Chili mill, amalgamators, etc.). It has a vertical 8 by 12-inch cylinder, mounted over the crank-pin, and is rated at 15-horse power. No. 4 furnishes power for the hydraulic press. It has a 7 by 10-inch cylinder, and develops 10-horse power. No. 5 is a small vertical eight-horse power engine in the assay department. Its cylinder, six by eight inches, is over the crank-pin.

**Pumps.**—Two steam pumps are used in connection with the artesian wells. There are two of these wells on the ground, one 200 feet and one 250 feet deep. The pumps raise from 40,000 to 60,000 gallons, the amount required by the mint, in eight hours. They take steam at 65 pounds pressure. The water is decanted before being fed to the boilers, but no chemicals are used.

## Personnel of the San Francisco Mint, June 30, 1886.

Superintendent.....	1
Melter and refiner.....	1
Assayer.....	1
Coiner.....	1
Chief clerk.....	1
Cashier.....	1
General department.....	63
Assay department.....	21
Melting and refining department.....	53
Coiner's and adjuster's departments.....	114
Total.....	257

[CONCLUDED.]

The San Francisco Mint is the largest in the world, having a coinage capacity of twice that of Philadelphia and thrice that of the English mint.

## The Granite.

## A Very Profitable Mining Operation.

The annual report of the Granite Mountain Mining Co., Montana, for the fiscal year ended July 31, 1886, contains a full statement of the affairs of the company. The mine commenced paying dividends April 8, 1885. At that date it had only 20 stamps in operation. Ten stamps were added to it—making 30 in all—Oct. 22, 1885. On the 21st day of that month, or the day before the additional 10 stamps commenced dropping, the tenth dividend, aggregating \$440,000, was paid, as the six months' product of a 20-stamp dry-crushing chloridizing mill.

Up to August 4th of the present year, the company declared 11 more dividends, aggregating \$860,000, the product of its 30-stamp mill for the 10 preceding months, making a total of \$1,300,000 paid in dividends from April 8, 1885, to August 4, 1886, an average of \$81,250 per month.

Last May the company contracted for the machinery for another addition to the mill of 40 stamps, which it is expected will be in operation by the first of next January, thus more than doubling its output, bringing it up, say to \$175,000 per month, or \$2,100,000 for the year 1887. This is a very low estimate, and will probably fall far short of the actual yield. President Rumsey, who is in a position to know whereof he speaks, places it much higher. In his report he says: "We expect the product of the new 70-stamp plant will be fully 240,000 ounces of silver, and not less than \$2500 in gold per month. In addition to the above, all our extra first-class ore will be sent to smelters, thus considerably increasing our monthly output." Taking these figures, and rating silver at \$1 per ounce, we find—not including extra first-class ore shipped—that the total output of the Granite mine for the year 1887 will reach \$2,910,000, or, in round numbers, \$3,000,000. This is certainly a most gratifying exhibit.

The company is erecting new hoisting works of sufficient size and power to work the main shaft to the depth of 3000 feet. It is also putting in a new compressor plant and a new pumping plant of the latest and best patterns, the whole to be run by one battery of four steel boilers of 300-horse power capacity, all erected under one roof, and so arranged as to be handled with the least possible amount of expense. These will also be completed about the first of next January.

For the year ended July 31, 1886, the company milled 8388 tons of ore which gave \$1,384,127.54 in gold and silver. The total expense of every nature and kind in Montana and St. Louis—except the purchase of property for the same period of time—was \$280,811.39, showing a net profit for the year of \$1,058,098.63. Is there a mine in the world that can make such a flattering exhibit?

Speaking of the plans of the company, President Rumsey says: "The plans of our company, as far as at present determined, are: First, to continue the sinking of the big shaft (now called Ruby shaft), and at proper intervals, say not less than 100 feet, to crosscut to the vein, and start thence new levels east and west on the vein. By this means we hope to develop our property so as to ascertain not only the value of the mine but also the character of the ore, so that, should it be necessary to treat our ores at depth by some process other than that employed in our present mill, we shall have ample time to erect a suitable plant of sufficient capacity at a convenient locality; and secondly, we propose to push our developments eastwardly by tunnels as rapidly as possible, hoping to develop still greater bodies of ore to supply our present milling plant with work for years to come, and to ascertain the value of the remaining 8000 feet of undeveloped property which we own on the ledge."

Beside the Granite Mountain mine, the company has taken up 10 claims, upon all of which ore veins are found. It has made applications for patents upon five others, and has purchased three, making a total of 19 claims owned by it. It owns 200 acres of land in Flint Creek valley, upon which to build tailings' yards, flumes, etc., when necessary, and has about 10,000 cords of wood on hand.

**THE UNITED STATES TREASURY.**—The United States treasurer has submitted to the secretary of the treasury his annual report, from which it appears that the net receipts of the Government during the year ending June 30, 1886, were \$336,439,727, and the net expenditures \$242,483,138. The excess of revenue over the expenditures was \$93,956,589.55. The receipts were \$12,749,020.68 greater, and the expenditures were \$17,743,796.61 less than last year, making an increase in the net receipts for the past fiscal year over that of 1885 of \$30,492,817. The receipts on account of the Postoffice Department, not included in the above statement, amounted to \$52,997,135, an increase of \$5,687,399 over those of the preceding year. The expenditures increased from \$50,326,314 in 1885 to \$50,682,585 in 1886. The treasurer, then, at great length, describes the operations of the department and makes many important suggestions.

The Belmont Courier says the large smelting furnace built in Eagan canyon, White Pine county, by General Rosecrans 12 years ago, is being taken down and will be brought to Reno and added to the plant of the reduction works.

## Southern California Marble.

One of the most interesting discoveries of the present era of rapid development in Southern California, says the Los Angeles Herald, has lately been recorded. That it will have much to do with the future prosperity of this section there can be no doubt, and in a short time it will create an industry which will employ thousands of men and materially build up and beautify the cities of Southern California. Reference is made to the recent discovery in the Mojave desert of an immense deposit of

## The Finest Marble

And building stone, a supply exceeding any other known deposit in the world. This important discovery was made about two months ago by E. A. McDuffee, a practical mineralogist, who, in connection with several other gentlemen, quietly organized a company and took possession of this grand accumulation of mineral wealth. The location of the quarry is in San Bernardino county, near the station of Victor, on the Atlantic & Pacific Railroad, and the company was formally organized and incorporated October 13, 1886, under the title of the

## Victor Marble Company.

The quarry, to which reference has been made, covers 900 acres, 600 of which consists of a solid bed of marble, having 11 different colors and shades, so far as yet discovered. There will not be the slightest difficulty in getting marble of any shape required, and without flaw. This great bed of marble, practically inexhaustible, has been examined by a number of prominent mineralogists who pronounce it one of the most important discoveries ever made in America.

The other 300 acres, owned by the company, are covered with granite and an excellent article of limestone—both well suited for building purposes. When the expense of lumber, and the enormous quantity annually imported to Southern California for building purposes, is considered, the importance of this will be understood.

## Some Facts and Figures.

The present price of granite in Los Angeles is from \$1 to \$1.50 per cubic foot, Italian marble \$6 per cubic foot, Vermont marble \$5 per cubic foot. The marble from the quarry at Victor can be laid down in this city in any shade or color at \$1 per cubic foot. At these figures, as will readily be seen, it will soon become a favorite building material in the cities of Southern California.

The immense deposit of the Victor Marble Company is located only three miles from the railroad and 100 miles from this city. The railroad company is manifesting a lively interest in the enterprise and will shortly build a side-track to the quarry so that the stone can be loaded directly on the trains. The company proposes also to build a handsome depot of marble at Victor. This will be a curiosity to the numerous overland passengers, as it will be the only railroad depot built of marble in the world.

When the arrangements of the company are completed the builders of Los Angeles, San Bernardino, Colton, Riverside, San Diego and other cities can enjoy the luxury, at moderate cost, of marble-front buildings with tilings and sidewalks of marble.

## The Supply of Lime.

Mention has been made of the quality of lime which is found at this great quarry. There is no finer limestone in the world. The company has now a large kiln with a capacity of 1000 barrels per month, and is building another of equal capacity. The discovery has also been made that hydraulic lime can be manufactured at this quarry. This lime is a very rare article, and is the best lime known. Mixed with other lime, an article is produced equal to Portland cement. From every point of view it is apparent that this enterprise is to become one of the most noteworthy in Southern California. Already several orders have been given in this city for Victor marble for trimming purposes, and estimates are being prepared for its use for other building purposes.

**A TENDERFOOT PROSPECTOR.**—A recently-retired prospector, attracted hither by the improved mining outlook on the Comstock, in conversation with acquaintances last evening said: "I arrived on the Comstock in 1859, blazed trails, run tunnels, prospected and mined on the lode for a score of years. I left, and after hoofing it through Arizona, Mexico, Montana and every mining district west of the Missouri river, I come back here and find more men than I know in the graveyard than on the streets, and youngsters who were not born when I left, call me a tenderfoot."—*Virginia Chronicle.*

**A REVIVAL IN MINING MATTERS.**—The Salt Lake Democrat says: Here in Utah there is a marked revival of interest in mining matters. It can be felt in the air rather than measured by extraordinary figures. Winter has set in early with unusual depths of snow in the mountains. Shipments of ore will fall off, but accumulations upon the dumps will await the opening of spring. Money from the States and the Old World is evidently moving in the direction of the mines, and the presumption is that developed properties or prospectively valuable prospects will be in demand at fair prices from this time on.



# Parry's Native Jujube or Lote Tree (Zizyphus Parryi).

[Written for the Press by Dr. A. K. Kellogg, of the State Board of Forestry.]

"The trees around them all their food produce,  
Lotos their name divine—nectareous juice!  
Hence *Lotophagi* called, which whose tastes  
Insatiate riots in their sweet repasts.  
Nor other home, nor other care intends,  
But quits his house, his country and his friends."  
*Homer's Odyssey.*

Although mention is made of this native fruit in the State Forestry catalogue of trees and shrubs desirable for culture, nevertheless such a compiled list must needs be very brief to come within due limits assigned; hence further details may become desirable from time to time.

Common perception recognizes the truism that where native families, genera and species of trees, shrubs and plants abound, they furnish the best basis of presumptive evidence—if not always proof—that other kindred and choicer sorts will suit similar situations, climatic conditions and soils, often vastly widening in their range.

With our intelligent culturists and nurserymen, it seems needless to urge that the almost universally preferred practice is to resort to the wilds for the strongest seedlings as stocks for propagating purposes. Therefore, with this in view, as in duty bound by our forestry relations, we offer a short description, with pen and ink sketch, of our own native *Lotos*, in order to facilitate ready recognition and to designate the best-known localities for procurement of the home seed supply. Withal summary suggestions of a few foreign sorts that might well supersede the native *Jujube*, and here and there intersperse a practical hint or so to profit, or of economic and commercial value.

Parry's *Lotos* is a zigzag, branching, thorny bush or small tree, 4 to 16 feet high, seldom over 4 to 6 inches in diameter. The leafy spines are long, stout and straight, leaves entire and small—less than one inch—blunt or notched at the top, wedge-narrowing into a slender, short leaf-stem, 1 to 3-flowered, recurved in fruit, and this 1 to 3-seeded, mealy and nearly dry, oval, one-half to three-fourths of an inch long, apex short-pointed on a curved stem of one-half an inch or so. Mostly a shrub well suited for more eminently useful hedges; abounds in gravelly ravines near San Felipe, San Diego county, also at Rock House Summit, of the same region, and east of San Bernardino.

Before inviting specific attention to the most commendable species for culture it seems requisite to make a few concise remarks on jujubes in general; for out of half a hundred or more we can now only refer to a few, but, if deemed desirable, others may be noticed hereafter.

Jujubes are among the most feasible, if not the best, of fruits in the world for jellies and various preserves, or dried, and for a sort of bread or cakes, pies, or served as desserts like dates and figs; in short, one way or another they are eatable and mostly excellent. "It would be safe to say that 400 to 500 trees to the acre—of almost any soil—could be planted, that at two or three years old would yield five to ten pounds to each bush. With any market at all, the fresh fruit would be cheap at a dime a pound for jellifying in the rural way; they would thrive well with less care than a common corn-plant—would double, quadruple and quintuple in four or five years at the furthest, and thence onward for ages; would pay better than strawberries, with half the labor and not a tithe of the trouble in harvesting, nor risk of loss; would even utilize the worst land; have the world for a market, of the dried fruit and jelly, with other uses to be noted further on.

Classic Lote Tree (*Z. lotus*). This is a small tree common to Persia, Africa, Sicily and Spain, and is now cultivated in all regions of the olive, the vine and the fig. Tunisia was the ancient land of the renowned people known as *Lotophagi*. This sweet fruit is of the size of sloes, with large stones, and is borne on every part of the plant like gooseberries, purple-tinged; the farinaceous pulp—separated from the pits and sun-dried—is set aside for winter use; has the flavor of dates and figs. A kind of wine or beer-drink is made by expression, diluted with a little water, but will keep only a few days; doubtless immoderately appropriated together in this or some similar way may have led to a devoted dissipation akin to the poet's conception.

It should be observed, in a general way, that this and all the species are eminently adapted to the borders of deserts—delight in arid sands, gravelly ravine-sides, and rocky ridges—would preserve embankments and prevent fearful washouts without serious obstruction to railroads or casting a length of blighting shadows; but they will grow in any soil—fruit described of delicious taste in the fresh state; also, after exposure to the sun a few days, they are pounded and made into bread. These paste-cakes are only sun-dried so as to well evaporate the little moisture used in making; it resembles, both in color and taste, what we designate as "gingerbread," noted as excellent food for long journeys.

From the horrent, thorny nature of the *Lotos* one might well wonder how the fruit could be collected with facility; but as it is neither tender nor watery and somewhat farinaceous and

leathery-like, and the shrub hardiest of the hardy with tough and elastic twigs, a cloth is spread on the ground and the bush beaten with a stick.

This *Lotos* of the *Lotophagi* must not be confounded with the Egyptian *lotos* (*Nymphaea lotus*), nor with the *Lotos* of Homer and Dioscorides, which is a species of (amatory?) *Trifolium*, inciting, if not causing, a similar infatuation, as the one eaten by the natives of the Pacific in their season; nor with the *Lotos* of Hippocrates (*Celtis australis*), nor with the Italian (*Diospyros lotus*).

Common Jujube (*Z. vulgaris*). This is a small tree of 20 feet, fruit blood-red or saffron, with a sweet granular pulp. In the south of Europe it is mostly served up in the dried state, as a choice sweetmeat of the winter season, known as *Jujube*. The Turks plant these with other trees in front of their coffee-houses that they may enjoy shade, shelter and fruit together.

East Indian Jujube Tree (*Z. jujuba*). Also a small tree of 16 to 20 feet, cultivated in China and Cochinchina, bears fruit of the size of a large cherry, smooth and yellow when ripe. There is, however, a variety of this or perhaps another species that produces an excellent fruit of oblong form, of the size of a hen's egg, known by the name of *Narikellekool*.

Pear-wood Jujube (*Z. xylopyrus*). This tree abounds everywhere in the forests of Comandul. Cattle eat the leaves, young twigs and fruit; the kernel has the fine flavor of fil-



PARRY'S NATIVE JUJUBE OR LOTE TREE (*Zizyphus Parryi*.)

berts, of which the natives are very fond. The timber of the largest trees is also highly esteemed, is of yellow orange color, very hard and durable, and withal very light. Most timbers combining such rare qualities for many uses prove too heavy.

A kindred shrub (*Paliurus*) or ore of this genus both equally common in Judea, The Christ Thorn (*Z. Spina-Christi*). Former, cap or crown-fruited; the latter, doubly-thorned with fruit like a *Sloe*. Rival authors refer to the plausible pliability of their exceedingly flexible twigs—being readily wrought into any form—as having been the one put upon the head of our Savior. But in the light of this New Age would it not be wiser, more worthy, and much more magnanimous to inquire if the evil and the false alike in us, and all mankind, were not wont *non*—as ever of old—to crown the good and the true with thorns?

Lote trees may be multiplied by cuttings from roots or ripe twigs, with care, from layers and root slips, suckers and seeds. These budded or grafted from a few choice foreign parent trees would soon yield a progeny of many millions, adding to the wealth of the Pacific, and an annual income to California alike counted by unnumbered millions.

Our readers would do well to consult the enterprising Chairman of the State Board of Forestry, of Santa Monica (A. Kinney), himself a cultivator and manufacturer of the fruit product for the market. It is to be hoped the public may also hear from so competent a writer furthermore on this or some kindred topic.

Our pen picture is from a specimen contributed by Dr. Parry, whose name it bears, and by the liberality of the California Academy of Sciences, this picture is furnished the patrons of the Press.

THE monthly operating expenses of the Consolidated California and Virginia mine average about \$125,000, including the sum disbursed to employees, while the present bullion shipment is nearly \$330,000 per month.

## A Big Mining Sale.

A mining sale of great importance to Silver City and the southwestern country in general was this week fully consummated, whereby the '76 and Baltic group of mines, 11 in number, passed into the hands of a powerful St. Louis syndicate. The deal comprises the mines above named, the Bremen mill and millsite, teams, wagons and in fact all of M. W. Bremen's mining property except one claim. The consideration is \$700,000.

The new company has organized under the laws of the Territory of New Mexico, under the name of the Bremen Mining and Milling Company.

The new company will immediately commence the development of the '76 mine by sinking a new shaft near the porphyry dyke, 150 feet east of the present main shaft. This shaft will be sunk to the depth of 500 feet, with drifts and levels running out at convenient distances for stopping. A new battery and 15 stamps will be put in place at the mill as soon as the changes can be made. There is little doubt, however, that in the near future the new company will erect an extensive milling plant at the mines, as this would save the expense of transportation from the mine to the present mill, a distance of something over two miles.

For the past 12 years M. W. Bremen has steadily continued the development of these

## American Progress in the Iron and Coal Industry.

English iron and steel masters, at their recent gathering, spent much time in discussing the wonderful progress which is being made in this country in our iron industries. The great advance which has been made in the production of Bessemer steel was particularly dwelt upon. It was considered "simply astonishing" that America should, in the short space of two years, increase her annual ingot capacity from 2,490,000 tons to 4,102,000 tons. The fact was considered still more astonishing that such increase should have occurred during a period of unusual trade depression. When such progress is made under the most unfavorable circumstances, the question was asked, what may be expected of the consumptive and productive capacity of the country when business once more assumes its normal condition of prosperity? The answer seems to worry the British mind in regard to the future of both her home and export trade, in this line of business.

This fear is somewhat mitigated, however, by the expectation that the increased activity on this side will not only keep up but greatly increase the recent demand for billets, blooms and railroad iron from England, and that the calls from the United States will soon put the now idle English mines, forges and blast furnaces once more into active operation. We trust and fully believe that our friends over the water will be disappointed in this respect, and that our own mines, furnaces and mills will soon be able to fully meet the home demand for iron and steel. High wages and labor troubles generally have seriously interfered with our industries of late, but such things are usually mere temporary hindrances. If neither legislation nor a cessation of labor troubles comes to the aid of our iron and steel producers, there will soon be a large movement in the way of a transfer of the iron industries of the North to the South, where at least unskilled labor is more reliable and cheaper. Whatever may be the need, however great may be the demand, and despite of all labor troubles, the United States will soon prove to the world that her domestic mines and furnaces are fully able to meet all home demands upon them.

Notwithstanding the recent rapid progress of our iron industries, there is every reason to be hopeful of a still greater advance in the near future. Mr. Swank, in his recently published history of "Iron in All Ages," indulges in some remarks which are pertinent to what we are writing. He says:

"Our resources for the increased production of iron and steel for an indefinite period are ample, and all other essential conditions of continued growth are within our grasp. We are to-day (1884) the second iron and steel-making country in the world. In a little while we shall surpass Great Britain even in the production of steel of all kinds, and we are destined eventually to surpass her in the production of pig iron. We already consume more iron and steel than any other country. These conditions and results are certainly gratifying to our national pride. They mark wonderful industrial achievements by a young nation in a space of time so brief that we may almost say it dates from yesterday. They are also prophetic of other and still greater achievements. \* \* \* The saying of Bishop Berkeley, 'Westward the course of empire takes its way,' has already received a new interpretation, for the iron industry, the source and badge of material power, which had its beginning in Asia, and afterward passed successively to the countries along the Mediterranean, upon the Rhine, and in the east and west of Europe, and thence crossed the Atlantic ocean, now finds a home in the shadow of the Rocky mountains and by the Golden Gate of the Pacific. It has made the circuit of the world."

Of pig iron the British produced in the first half of 1886 3,536,774 tons (of 2240 lbs.), while in the same period the United States produced 2,637,687 tons. The difference is about 900,000 tons in favor of Great Britain, but the significant fact which does not appear on the surface is that the figures representing the production of this country show an increase of 480,000 tons over those of the corresponding period of 1885, while those of Great Britain are 295,674 tons less than in the first half of last year. This rate of increase will place us ahead of Great Britain before the close of the coming year.

NORTHERN PACIFIC SHOPS.—Work has been commenced this week on the shops for the Northern Pacific Terminal Company in Albina. A start was made on the work in 1883, but Villard's failure stopped proceedings. The buildings will now be completed upon plans slightly modified from the original. The main machine shop will be the largest building in Oregon. The cost of the buildings and machinery will be about \$750,000, and the work will give employment to 500 men. The contract requires the buildings to be finished June 1st.

MECHANICAL EXPOSITIONS PAY.—We have it upon good authority that the proprietor of a large manufactory at Philadelphia made a quiet examination and test of the steam engines displayed at one of the industrial expositions last year. Since the exposition closed he has purchased seven large improved steam engines from one exhibitor to replace old ones. Oh, yes, expositions pay; they pay exhibitors.

PREMIUMS FOR PROSPECTORS.—The Carson Index says: A movement is on foot to induce the coming law-makers to offer a premium for the discovery of mineral-bearing lodes in any part of the State of Nevada, the amount to be contingent on the known value of the ore. It must seem to every one a good proposition, and nothing could add more to the benefit of the State, for whenever prominent mines are discovered, railroads will extend thereto and the taxable property of the State be enhanced in value.

T. A. FRASER, of the Lick observatory, is in Washington and will superintend the removal of the big lenses for the new observatory from Boston to San Francisco.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrearages must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month. Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Dec. 18, 1886.

## TABLE OF CONTENTS.

**EDITORIALS.**—The Acme Engine; The Signal Service in California, 389. Passing Events; The Neglected Gold Fields of California; Annual Expenditures on Claims, 392. Evading the Mining Laws; Furnishing Power; Copper Deposits in Veins; Gold Bullion and Coin; Wires Underground, 398.

**ILLUSTRATIONS.**—The Acme Automatic Safety Engines and Boilers, 389. Parry's Native Jujube or Lote Tree, 391. Vein-Structure in the Longfellow Mine; Approximate Map of Longfellow Mining Claim, Clifton Mining District, Arizona, 393.

**MISCELLANEOUS.**—The Mining of Gold and Silver; The Granite; Southern California Marble, 390. Parry's Native Jujube or Lote Tree; A Big Mining Sale; American Progress in the Iron and Coal Industry, 391.

**MECHANICAL PROGRESS.**—Breaking of Crank and Propeller Shafts; Charcoal vs. Anthracite; A Hand Saw; Transmission of Power by Belts; Mechanical Skill Shown without Mechanical Appliances; Friction and Speed; A Valuable Patent, 394.

**SCIENTIFIC PROGRESS.**—Magnetic and Electrical Forces; Meters for Electric Currents; Utilizing the Expansion and Contraction of Metals as a Motive Power; Men of 240,000 Years Ago; The Great French Tower to be a Huge Lightning Rod; The Earth as an Electrical Conductor; Volcano Dynamics; Cleansing the Atmosphere by Electricity; Heat Under Colored Glass; The Earth's Revolution, 394.

**USEFUL INFORMATION.**—Making Hard Wood Out of Soft; Foreign Matter in Bread; Fire Smothered with Sand; Anomalies of Smell; Powdered Glass; Kerosene Oil; Making Sulphur Joints; A Non-corrosive Lubricant for Brass, 395.

**GOOD HEALTH.**—Art and Science of Eating; Hints for Fat Men; To Remove a Speck or an Eyelash from the Eye; The Diet of Strong Men; In the Elevator; Milk in Arsenic Poison; Lemon for the Hands; Pasteur's Cure for Rabies, 395.

**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 395-97.

**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 400.

## Business Announcements.

Hoisting Engines—Lidgerwood Mfg Co., N. Y.  
Electric Belts—Dr. Pierce & Son.

See Advertising Columns

## Passing Events.

The unfortunate occurrences resulting from the strike of conductors and gripmen on the Sutter and Geary street cable car lines have been the principal local topic for the past week. The cars continue to run, guarded by policemen, new men having taken the places of those who struck. A noticeable feature brought out by the strike is the fact that there must be large numbers of unemployed in the city, since it is said the railroad companies received upward of 1000 applications from men desirous of obtaining situations on the cars, at \$2.25 per day.

During this week the northern counties of California exhibit their citrus products at a fair in Sacramento. Many of these counties are best known for their mineral products, and few supposed that they were able to produce such magnificent citrus fruits. The fair gives but another illustration of the varied capacity of the soil and climate of this State.

We give in another column a statement of the Director of the Mint, showing the increase of the gold deposits at San Francisco for the past year. This proves the assertions made in the Press of late that our gold mines are gradually increasing their product, and that quartz mining in California, so long neglected, is an industry which is profitable to the owners of the mines and the country at large.

## The Neglected Gold Fields of California.

If the people who are now dabbling in stocks would withdraw their money from that business and employ it in actual mining, it would be much better for them in the end. For so employing their means the opportunities in California are at this time exceptionally good, better perhaps for the industrious and patient than ever before. To this class, provided they have money enough to procure suitable outfit and make a fair start, the chances of ultimate success are nearly as good now as they were in the early days of mining. In some respects the conditions were better then, while in others they are better now. There were more sick and destitute men to be seen in the mines 30 years ago than there are at the present time; and, although it was much easier to find a paying claim at that day than it is at this, the earnings of the miners were even then very unequal, the average having been much less than is generally supposed. If a young man capable of performing a fair amount of hard work were now to go out into the gold mines of California determined to spend there a term of 8 or 10 years, he would be as likely to raise a comfortable stake within that time as he would have been had he done the same 35 years ago. Then it was, to be sure, a comparatively easy matter for the miner to get hold of a paying claim, nor did it cost much to put it in working shape. But then it was soon worked out, compelling him to pull up stakes and hunt for new diggings, in searching after which much time was unavoidably lost. The cost of living was great, and the miner, suffering many deprivations and discomforts, was so impaired in health that much time was also lost through this cause.

Now all this is changed. The mining regions of California are notoriously healthy. The necessities, comforts, and even the luxuries of life are there to be had at a minimum of cost. A vein mine once opened is apt to prove permanent, the expense of exploiting and outfitting this class of deposits being, in this age of cheap machinery and general low prices, small, compared with what it once was. This expense, unless the lode to be developed is a masterly one, involving the necessity for extensive exploratory work and plant of large capacity, need not exceed the sum of \$6000 or \$8000, and in many cases may be brought within half that amount. While we have in California many quartz lodes of large size, the majority of them are of such moderate dimensions that they can be easily opened and equipped, there having lately been invented and brought into use a variety of mills and ore-crushing devices, which, while they cost but little, do their work well. Few persons are aware how many of these cheap contrivances are being operated in the State, the number being especially large in the more northern counties, where these small veins are numerous and where long wagon transportation would make the cost of getting in heavy machinery somewhat onerous.

As to the extent and the resources of our California gold fields, suffice to say they surpass those of any other country of which we have any knowledge. They cover millions of acres occupying both slopes of the Sierra Nevada and portions of several ranges situate on either side of the main Cordillera, reaching south into various detached groups of mountains and stretches of desert lying off that way. As they are thus vast in extent, so are our gold fields rich beyond compare. That they should be so, the primitive wealth of our placers sufficiently denotes. For the most part these auriferous districts are easy of access. Into more than half of them the San Francisco morning papers reach the day they are issued. Railroads skirt our main gold belt on the west, running in close proximity to it from one end to the other, branch roads extending into several of the more important mining centers. First-class wagon roads traverse these districts everywhere, the rivers on all the leading routes being bridged. Travel and transportation throughout the whole country is, therefore, safe, cheap and expeditious. In short, the conditions here are vastly superior to those existing in any other gold region extant.

Why a field like this, so broad and inviting, so open to all and so easily reached, should have been so long and so generally neglected, is a matter difficult of explanation, seeing how little encouragement there has been for our

people to engage in manufacturing or other industrial enterprises, except in farming and kindred pursuits, some of which have already been, or are likely soon to be, overdone.

If California offers extra inducements for embarking labor and capital in any one branch of business more than another, that business is mining for the precious metals, more especially gold. The producer of this commodity has nothing to fear from bad times, a dull market or fluctuating prices. For what he has to sell there are always eager buyers—everybody wants it. He does not have to advertise his product, peddling it about and importuning people to buy, as the vender of patent medicines does, his nostrums. The miner does not have to store his gold as the farmer does his wheat, exposing it to the depredations of the rats, while he awaits a rise of half a cent on the bushel; neither does he have to doctor it like brandy nor age it like wine to fit it for the capricious taste of the connoisseurs. The concern of the gold miner is not of bull-butter, adulterated liquors, false labels, imitation trademarks or other of the numerous base and misleading devices bred of overproduction, excessive competition and the tricks of trade. For marketing his wares he is not obliged to have recourse to these or other methods of questionable morality and distasteful to the independent mind.

It will be a fortunate day for California when her people, following the example of the English, shall not only pay increased attention to mining, but pursue the business with something of the system and care bestowed upon it by that more patient, methodical and painstaking race. While we have neglected the gold fields so lying at our doors or worked them in only a partial way, the English-investing public have thought it worth while to go abroad and even explored the remotest corners of the earth in search of this, the more precious metal, there being no notable mines of gold within 5000 miles of London, the metropolis and great financial center of the United Kingdom. They send their experts and agents to all parts of North, Central and South America; to Australia, India, Africa, in short, to all countries that offer or seem to offer favorable openings for inaugurating a gold-mining enterprise, and which, when found, are speedily availed of, these English investors never failing to advance all the money needed to effectually prove anything they take hold of. While many of these ventures have resulted in failure, a fair proportion have been attended with success, many of those more recently embarked in having proved eminently so.

Our English brethren while they evince such greater readiness and even eagerness to engage in gold mining, after having done so are apt to take a much more lively interest in the business than is done by our people. The English companies organized for its prosecution arrange to have regular annual, with sometimes special, meetings, attended usually by most of the shareholders, and whereat a detailed report on the condition and prospects of the mine is submitted to the shareholders, this report including progress of work, expenditures and production made during the previous year. At these meetings, shareholders desiring additional information or enlightenment on any particular point are permitted to seek it from the chairman or others possessed of the requisite knowledge, prolonged and lively discussions sometimes growing out of the interrogatories and answers incident to this interlocutory method of seeking and imparting information. But all the same it answers the end of bringing to light whatever is obscure and keeping the affairs of the company well ventilated. The proceedings had at these meetings, being afterward published in the leading mining journals, both the shareholders and the general public are kept duly posted as to what has been done.

While it is the custom of the incorporated mining companies in this country to hold annual meetings and to report their proceedings at the end of each year, few of the shareholders ever attend these meetings, nor do they know much about the affairs of the company other than can be gleaned from these annual reports, many of which are lacking in detail and otherwise meager enough. As tending to promote greater care, system and economy in the conduct of mining affairs, and to keep themselves more fully posted in regard to the same, it might be well if shareholders would more generally attend these annual meetings.

## Annual Expenditures on Claims.

There are not many days left of the year in which miners may do the assessment work, required by the United States laws, to prevent their claims from being legally taken possession of by other persons. For the past few weeks those who have neglected their annual work until late have been on the claims making the necessary expenditures. A great deal of this work is left to the last week of the year.

In order that miners may refresh their memories in the matter of assessment work, we here reproduce from Copp's Manual, Sec. 392 of the U. S. Mining Laws:

Section 392. The miners of each mining district may make regulations not in conflict with the laws of the United States, or with the laws of the State or Territory in which the district is situated, governing the location, manner of recording, amount of work necessary to hold possession of a mining claim, subject to the following requirements: The location must be distinctly marked on the ground, so that its boundaries can be readily traced. All records of mining claims hereafter made shall contain the name or names of the locators, the date of the locations, and such a description of the claim or claims located by reference to some natural object or permanent monument as will identify the claim. On each claim located after the tenth day of May, eighteen hundred and seventy-two, and until a patent has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year: *Provided*, That the period within which the work required to be done annually on all unpatented claims, so located, shall commence on the first day of January succeeding the date of location of such claim. On all claims located prior to the tenth day of May, eighteen hundred and seventy-two, ten dollars' worth of labor shall be performed or improvements made by the first day of January, eighteen hundred and seventy-five, and each year thereafter, for each one hundred feet in length along the vein, until a patent has been issued therefor; but where such claims are held in common, such expenditure may be made upon any one claim; and where a person or company has or may run a tunnel for the purposes of developing a lode or lodes, owned by said person or company, the money so expended in said tunnel shall be taken and considered as expended on said lode or lodes, whether located prior to or since the tenth day of May, eighteen hundred and seventy-two, and such person or company shall not be required to perform work on the surface of said lode or lodes in order to hold the same as required by said act. Upon a failure to comply with the foregoing conditions of annual expenditure, the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made: *Provided*, That the original locators, their heirs, assigns, or legal representatives, have not resumed work upon the claim after failure and before such location. Upon the failure of any one of several co-owners to contribute his proportion of the expenditures required hereby, the co-owners who have performed the labor or made the improvements may, at the expiration of the year, give such delinquent co-owner personal notice in writing, or notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days, and if at the expiration of ninety days after such notice in writing or by publication such delinquent should fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his co-owners, who have made the required expenditures.

It may be remarked, that in reference to the amendment made in January, 1880, and which is incorporated in the above section, relative to the time when assessment work is to begin on a newly located claim, the Land Office holds that labor performed or money expended upon a mining claim prior to the first day of January succeeding the date of location thereof, will not be considered as a part of or applied upon the first annual expenditure required by law. Thus, upon a claim located at any time during the year 1886, the period within which the labor must be performed commences January 1, 1887, and during the calendar year 1887, the expenditure must be made, or the claim will be subject to relocation on and after January 1, 1888.

In order to apply the law to a claim located prior to the year 1880, it will be necessary to calculate from the date of location. For instance, upon a claim located in 1876, the first expenditures would be reckoned as due within one year from January 1, 1876, to wit: January 1, 1877, and annually thereafter by the calendar year.

With these extracts from the laws, miners can see for themselves exactly how they stand. Of course they know that expenditures may be ordered from the surface or by tunnel. They



may also be made by an agent and not the owner himself. It must be remembered, too, that a large expenditure in the past does not excuse the required annual expenditure.

Any co-owner who contributes his share of the annual expenditure can retain his interest. The Land Department offers no remedy where a party fails to contribute his share of the actual expenditure; the courts must decide that. Failure to pay, or work a claim, indicates abandonment. The local laws may prescribe a larger annual expenditure than is required by Congress. A relocation of abandoned ground can only be made at the expiration of the year succeeding the one for which the last annual expenditure was made.

### Evading the Mining Laws.

The mining laws of the United States are more liberal than those of any country in the world. The mineral regions are declared open for exploration, and any one who is a citizen or intends to be one can take up mineral ground and work it. He is not even compelled to pay for it until he has proven it of sufficient value to patent. The only thing required is that he must do a certain amount of work each year to hold his ground—a very good provision indeed, which was designed to prevent men holding ledges for an indefinite period without working them.

This feature of the law was designed specially to protect *bona-fide* miners, as against speculators. Yet, strange to say, we find these very miners themselves trying all sorts of ways to evade the annual assessment work. They do not do the required work, and are then on hand at midnight of the last day of the year and relocate the claim again themselves as a new claim.

Another method of evasion carried out in the mountains is this: They put up a location notice on a claim on the last day of the year, and the local laws require, for instance, that all locations must be recorded within 60 days. They do not record the location, but at the end of about 40 days tear down the old notice and put up a new one dated the day it is written, which is then, within the specified time, recorded.

The first notice has prevented any one taking up the claim until the second one is put up. The recording of the second one puts off any assessment work that year. This is because the law provided that the year within which the annual assessment work must be done begins with the 1st of January after the location is made. A man taking up a claim any time in 1886, for instance, holds the claim without work the rest of that year and has any time between Jan. 1, 1887, and Dec. 31, 1887, to do his first annual expenditure work.

We are assured that this method of evading the law is being carried out in a number of places. It is unfortunate that it is so, since we are all aware of the evils of holding mining ground without working it.

### Furnishing Power.

A number of years ago efforts were made by gentlemen connected with the Risdon Iron Works to form a company to put down pipes to convey compressed air for power. The plan was to have central stations for compressing air to be furnished to certain sections of the city where factories, small shops, etc., were located. On examination it was found that there were not consumers enough to warrant the expenditure for plant, etc., so the project was abandoned.

Recently, P. T. Dickinson, David McKay and N. W. Spaulding applied for a franchise to lay down and maintain and operate in this city a system of pipes for the conveyance of steam, hot water, or fluids other than gas or electricity. The supervisors passed an ordinance granting the franchise, but the mayor vetoed it. At the last meeting of the board, however, the order was passed over the mayor's veto, all but two supervisors voting in favor of it.

There is great need in this city of some such system. There are many establishments in certain sections of the city where small power is needed, which have to maintain steam or gas engines to supply it, when they would prefer to purchase power from a central system if possible. Other large cities have such systems, and they have proved satisfactory. It is to be hoped that the new company will go at once to work to carry out their plans.

### Copper Deposits or Veins.

In last week's PRESS we gave a geological sketch of Clifton copper district, Arizona. The principal mine in the district is the Longfellow. The Longfellow mines, and also those of Bisbee, those of Globe, and those of the Verde district in the Black Range, are invariably found in conjunction with great bodies of clay. Very often near the surface clay only is found, and to all appearance every vestige of rock has been removed. Great stress is laid on this fact by those claiming these veins to be deposits. A close examination of the clay, however, invariably proves it to be a decomposed rock, entirely due to the thermal action which has taken place during the deposition of these copper ores. The copper ore has a true intrusive origin, and has

Fig. 1.—Horizontal Section.

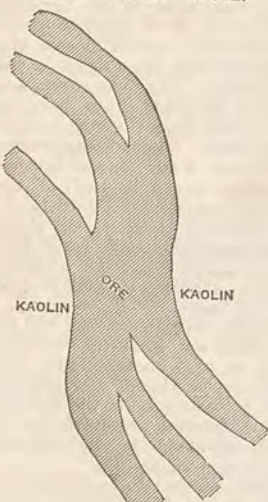


Fig. 2.—Vertical Section.



VEIN-STRUCTURE IN THE LONGFELLOW MINE.

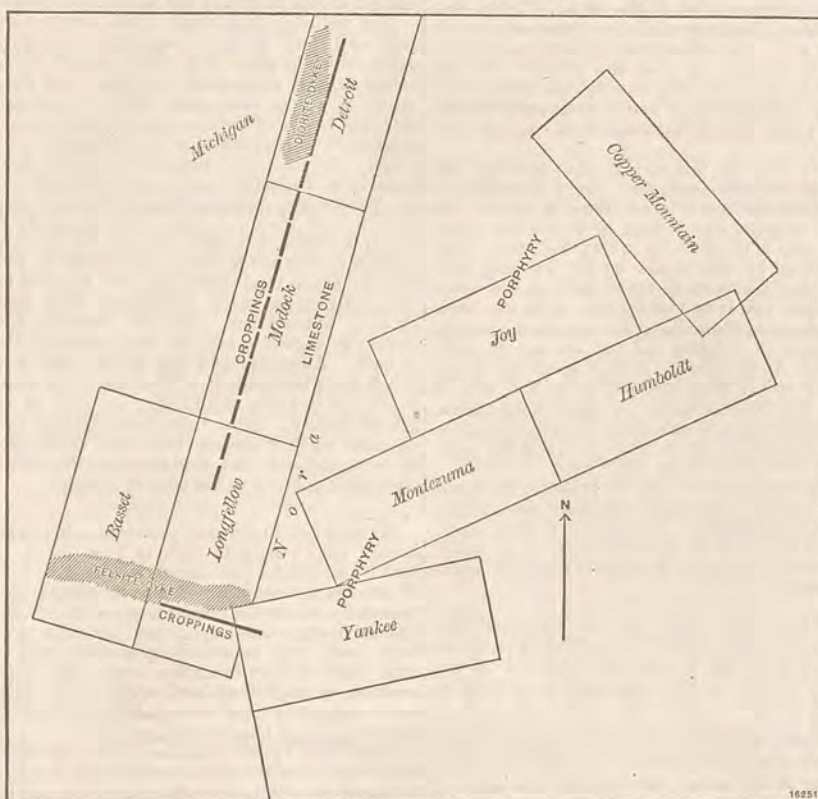


Fig. 3.—APPROXIMATE MAP OF LONGFELLOW MINING CLAIMS, CLIFTON DISTRICT, ARIZONA.

come from the deep. Figs. 1 and 2 of the accompanying cuts show a vein structure common in the Longfellow mine, and illustrate the true vein origin of the ore. The illustrations are from Mr. Wendt's paper on the copper ores of the Southwest, read before the Institute of Mining Engineers. The author, with Dr. Julien, of New York, and J. P. Iddings, of Washington, made microscopic examinations which led to the discovery that the eruptive rocks found even at considerable distances from the veins are all kaolinized or decomposed by thermal action. The surface decomposition of all rocks in Arizona has been very great, and this decomposition, jointly with the thermal action, has produced great masses of clay which have led many examiners to a wrong conclusion as to the character of the veins.

In the Longfellow mine this decomposition of the walls has been very marked. Both walls are often pure kaolin. At Clifton this kaolin, mixed with two parts of sand, has done good service as a fire-resisting material in reverberatory furnaces.

Referring to the accompanying map of the

Longfellow claims, Fig. 3, the strike of the two veins is seen to be across the Longfellow and into the Yankee mine. The pitch of the ore is into the Yankee. The bulk of the ore on the Longfellow claim proper has been extracted, but in depth the Yankee still holds good ore. The claims called the Longfellow, Modoc and Detroit are on the crest of a hill, all composed of horizontal sedimentary limestone, either of dolomitic or shaly character.

On the Detroit claim there is a dyke of a fine-grained green rock, probably a diorite, running parallel with the long axis of the claim, and at right angles with the original Longfellow vein. At the contact of this green rock with the bedded limestone a small string of ore was followed down some years ago and led to the discovery of a great body of manganiferous ore similar to

tonnage still continues, and the outlook intimates that the present asking rates will not decline for some time, as present selling prices of their products fully justify colliery agents in sustaining current rates.

### Gold Bullion and Coin.

The Director of the U. S. Mint, in his official report to the Secretary of the Treasury, calls attention to the very marked increase of the deposits of gold bullion at the mint at San Francisco. The total value of the gold, exclusive of redeposits deposited at this institution during the fiscal year 1886, amounted to \$27,319,837.25, against \$20,774,252.86 in the preceding year, an increase of six and a half millions. This is the first year since 1882 that there has not been a marked decline in the deposits of gold at this institution, the marked decline since 1881 having amounted in the four years ended June 30, 1885, to \$8,072,438.07. The fact that a decided increase of deposits of bullion is taking place is pretty good evidence that the gold-producing mines of this coast are doing better than ever. Those who have paid any attention to the subject know that for the past year the quartz-mining industry of this State has increased its importance and yield. While the total gold deposits of the country have fallen off, as stated below, in California we show a decided increase.

The total value of the gold deposited at the U. S. mints and assay office for the fiscal year 1886 amounted to \$49,606,534.65, of which amount \$4,696,785.46 consisted of bars redeposited, leaving the net value of the gold deposited \$44,909,749.23, against \$52,894,075.09 in the preceding year, a falling off of \$7,984,325. Of the deposits of gold at the mints and assay offices for the year, \$32,456,493.64 is classified as of domestic production, \$4,317,068.27 as foreign bullion, \$397,545.28 old U. S. coin remelted and \$5,673,565.04 of foreign coin. The rest is old plate, jewelry, etc.

A marked falling off in gold deposits during the year was shown at the assay office at New York, where the value of gold deposited, exclusive of redeposits, amounted to only \$13,791,632.29, against \$26,419,503.11 in the preceding year, being a falling off of about one-half.

The coinage of gold, performed exclusively at the mints at Philadelphia and San Francisco, amounted during the fiscal year to 5,050,814 pieces, of the value of \$34,077,380, against 1,748,158, valued at \$24,861,123.50, in the preceding year. Of the gold coinage of the year, the mint in this city executed \$27,080,000; the rest was at Philadelphia. Of the gold coinage, \$4,871,680 was in double-eagles; \$10,428,470 in eagles; \$18,758,145 in half-eagles; \$303 in three-dollar pieces; \$10,215 in quarter-eagles, and \$8567 in dollars.

### Wires Underground.

Many large cities are now compelling the telegraph and telephone companies to remove their poles from the streets and put the wires underground, and the matter has been under consideration here for some time. At the last meeting of the Board of Supervisors of this city an order was passed to print providing for the removal of all poles and wires from the streets before January 1, 1888, and that all privileges to erect poles, heretofore granted, or to be granted, will terminate on that date; the wires to be run underground through conduits. Failure to comply with the order to be punished by a fine not exceeding \$1000, or imprisonment not to exceed six months.

In the meantime, however, on our principal thoroughfare—Market street—the old poles are being removed, and very much higher and larger ones are being put up. These poles are unsightly, and one in front of a finely-designed building is apt to mar all architectural beauty. The fire department complains of the presence of the wires, which interfere with their ladders when fighting fire. The experience of other cities will no doubt be continued here, however, and it will not be many years before the wires will all be placed underground out of sight.

THE owners of the Alcerman mine in Sonora, Mexico, are searching for the whereabouts of the relatives of Edward Jones, who was blown to pieces at that mine a few days ago. The unfortunate man was 46 years old and is supposed to have hailed from Illinois.

PACIFIC COAST COALS.—Arrivals of foreign coals have been falling off, and this has caused an increased inquiry for coast coals, and quite a number of ships have been recently rechartered to carry cargoes from the northern mines to this port and San Pedro. The market is steady in consequence. The demand for coast



## MECHANICAL PROGRESS.

## Breaking of Crank and Propeller Shafts.

The recent breakages of screw shafts on Atlantic steamers, which occurred in rapid succession, have drawn more than usual attention to such occurrences on the part of both ship-owners and mechanical engineers. Accidents of this character are becoming alarmingly frequent of late years. The matter was made the subject of an able and lengthy paper read by J. F. Hall, Esq., before the Twenty-seventh Annual Session of the Institute of Naval Architects held in April last. We collate a few facts from that paper as follows:

The chief object of the paper was to direct the attention of the members of the Institute to an improved method of constructing the crank and screw shafting of steam vessels, so as to enable them to escape the multitude of strains and contortions that such shafting is compelled to undergo either from the incorrect placing of the shafts, or from the imperfect construction of the hulls in which they are placed.

The writer held that it is not altogether through defective material that crank and propeller shafts break. The cause of the breaking is quite as often due to being unduly bent or strained in an irregular line of bearings, which get out of line with each other. Under such circumstances unequal wear and strain take place. This condition of things is often set up when the hull of the vessel slightly alters its shape through the action of the sea, temperature or unequal distribution of cargo. These evils are, moreover, often intensified by the natural flexibility of the hulls, due to the quite common mistake of building them too light. There is no wonder that a shaft should break when so bent at its bearings, for it has to endure not only torsional strains but cross-bending strains as well, alternating with every revolution of the shaft. These strains, coupled with the great vibrations which they produce, distress and fatigue the iron until it becomes crystallized and its molecular arrangement so disorganized that its strength and vitality are well-nigh exhausted.

It is under such conditions that sudden and unexpected breaks occur, in good weather, and when no unusual strain is placed upon the shaft.

Some vessels acquire the reputation of being "crank-shaft breakers"—requiring a new shaft every two or three years—in the majority, seven years is considered a good life for a shaft; while there are a few in which the breakage of a shaft is no more nor no oftener looked for than the bursting of a boiler. The great difference in vessels, in this particular, may be attributed to the weakness in hulls, above alluded to, by which their shafts are thrown out of line and thus unduly strained.

The failure of shafts is quite too often attributed to imperfections in the iron which never existed; and it is said by advanced engineers to be really astonishing how very little attention has heretofore been given to any attempt to rectify the *real* causes of the trouble.

This matter was fully discussed at the April meeting of the Institute of Naval Architects, where it seems to have been conceded that shafts rarely break through mere overwork, but that such accidents almost always occur through something radically amiss in ship construction.

When it is borne in mind that at a single passage across the Atlantic a shaft ever so little out of line will be bent and unbent over a million times, it will not be considered in any way strange that it should give way even upon a single voyage. It is really wonderful that under the circumstances as above rehearsed shafts do not break much oftener than they do.

To meet these difficulties a system of flexible cranks and shafting is proposed, as the most ready means of securing relief from the expense, annoyance and danger entailed by those now used. On a small scale their merits have been already practically tested, not sufficiently, however, to warrant definite conclusions as to their fitness for all cases where rigid shafts have hitherto been found in some way objectionable. Still their performance has been such as to lend encouragement to further trials, and the desirability of these is day by day becoming more apparent. Special couplings, among other means of permitting appreciable deflections of shafts without injury, also offer a partial or possible solution of the problem, and their study is to be recommended.

**CHARCOAL VS. ANTHRACITE.**—The *Iron Age* makes the following notes from the lately issued directory of the American Iron and Steel Association: All the furnaces in New England now use charcoal. The furnace at West Stockbridge, Mass., was the last to use anthracite, and it has been out of blast for several years. Vermont, which once had several active furnaces, has not had a furnace in blast since 1882. There is not now one charcoal furnace in New Jersey, where formerly there were many.

**A NOVEL HANDSAW** has been introduced by a Kansas firm, which practically embodies two saws in one, making not only a great saving of material, but of storage room, and which affords a ready means of either ripping or cross-cutting without being obliged to keep two separate saws lying within reach. The saw has teeth cut in at both edges, one set being designed for ripping and the other for crosscut-

ting. The utility of this tool will be seen at once; and a large field exists in which it will come in use, as, for instance, carpenters in framing timbers must be continually alternating between the crosscut and rip saw, while they only have to turn this one over to make the change. The cost of constructing this saw will not exceed that of the ordinary one, as there is no necessity of grinding it thin at the back, which omission would more than make up for cutting the extra row of teeth. A very neat arrangement in adjusting the handle is provided by which it can be tilted so as to bring the line of push at a considerable angle with the tooth line, and thus cut rapidly. This shifting can be done to either side.

## Transmission of Power by Belts.

A correspondent of the *American Engineer* writes to that journal as follows: I wish to call your attention to a peculiar case of transmission of power by belts that was brought to my notice a few years ago by the superintendent of a large manufacturing establishment in Southern Ohio—his name now escapes me. He affirmed that two eight-inch belts, one running upon the other, will transmit more power than the same belts placed side by side, or a 16-inch belt, on a pulley of the same size and running at the same speed. This is a demonstrated fact, though many of our mechanical friends may doubt it. I have as yet heard no explanation of the fact from any one, and after giving you some account of my experience, I will give you what I think is one reason for it. Something more than two years ago, I was belting up a blast fan for a foundry, and I was overruled by the owners in the question of the size of belt to be used; I wished to put on a 14-inch double belt, but they said that a 10-inch single belt was large enough, and it was put on. The works were new, and they wished to take off the first heat on the fortieth anniversary of the founding of the establishment. Everything being ready for the blast, it was started, but the belt proved unequal to the work put upon it, and could not drive the fan; there was no time to make a change of belts and pulleys and get off a heat that day, and I suggested the double belt, one upon the other. There was no other alternative and they consented to the trial of it. An old eight-inch belt was at hand and it was put on over the 10-inch belt; on starting again the two belts did the work, melting over eight tons of iron in little more than an hour; this arrangement has been in use ever since.

Now why is this so? is the question the thoughtful mechanic asks. My explanation of the extra amount of work done is this: The inner belt has all the work to do and the outer belt only holds it to its work; the inner belt, creeping by the strain on its working side, makes a tension on the outer belt on the opposite side, and it by this tension holds the inner belt down to the pulley; the increased pressure increases the friction and the amount of work done. A belt running at high speed has a tendency to lift from the pulley on the side it goes on. This is caused by centrifugal action, and diminishes its attractive force by diminishing the pressure on the pulley; this is all overcome by the use of the outer belt.

A greater benefit may be expected to result from its use on perpendicular than on horizontally running belts. The theory of this latter action can only be demonstrated by a model showing the friction of belts on different kinds of pulleys.

**MECHANICAL SKILL SHOWN WITHOUT MECHANICAL APPLIANCES.**—It may be a cause of proper pride for a mechanic who has all the materials and the tools necessary to succeed in constructing a machine that shall yield good results; but if one not possessed of the skill obtained by long practice, and unsupplied with proper tools and materials, can attain the same result, to him should be accorded the name of the best mechanic. Referring to this subject, the managers of the *Scientific American* patent office remark that many of the models sent to them to show the principles of an invention, or the points of an improvement, tell of the difficulties which surround the inventor. They are frequently whittled out by the pocket-knife with great expenditure of care, time and labor, the materials not being adapted to the work; yet they bear indisputable evidences of close calculation, mechanical skill and inventive talent. Such facts as these prove that enterprise and natural talent may do much unaided by the appurtenances with which civilization enriches the mechanic.

**FRICTION AND SPEED.**—I have been asked the question, "Does friction increase with speed or decrease?" Both. Where the speed is slow, increasing it may decrease the friction per turn; but where the speed is fast, it may be found that increasing speed increases the friction per turn also. There are two sides to almost every question, and particularly so in this case. The more viscous the lubricant, the greater pressure can be carried upon the bearing.—*Grimshaw.*

**A VALUABLE PATENT.**—The *Age of Steel* understands that \$80,000 has been offered for a patent just issued to a Pittsburgh gentleman for a rod-rolling mill. The mechanism is simple, and combines both the drawing and rolling processes, accomplishing the work in a rapid and most satisfactory manner.

## SCIENTIFIC PROGRESS.

## Magnetic and Electrical Forces.

The following matter is copied by permission in advance from a work called "Human Culture and Cure" by E. D. Babbitt, M. D., the first number of which is soon to be issued. This work aims to develop the science of therapeutics and of human upbuilding based on the great underlying laws of the chemical, electrical, magnetic, luminous, physiological and psychological forces of nature.—*Hall's Journal of Health.*

Magnetism, as Ampere has shown, is merely electricity thrown into curves. A magnet has countless millions of electrical streams drawn around and around into whirlwinds of force by the tremendous suctional power of the vortexes in the atoms of steel through which they pass, and has also a series of streams that are not thus deflected into curves, the strongest of which currents enter at the negative or south pole and emerge at the positive or north pole, while other and weaker grades of electrical ethers pass through the magnet in just the opposite direction. The greatest magnetic tension is at or near the poles, there being no force in the middle of a magnet strong enough to control iron filings. The horseshoe magnet is more powerful than a bar magnet because the suction of both poles can be used. If the positive poles of two magnets are placed together, their powerful streams of ether will strike against each other, and drive each other apart. This is the philosophy of repulsion and explains the well-known expression, similars repel. If a positive and negative end are placed together the electrical currents of both will flow in the same direction and intensify each other, causing them to rush together with great force. This is the explanation of attraction and exemplifies the law expressed by the words, contrasts attract. A hundred mysteries are explained by this etherio-atomic law of force, which thus far has not been understood.

All substances contain some grade of magnetism, or at least of diamagnetism, in which latter the ethers pass through objects transversely instead of longitudinally and work more feebly.

The ordinary magnetism which works with iron and steel is ferro magnetism; another grade which is connected with animal life is called animal magnetism; a higher and finer grade of ethers connected with the mental, spiritual and intuitional nature is called psychomagnetism or psychaura, which is literally soul force. The term vital magnetism may be used to include both animal and psycho-magnetism. In woman the forces are more influx or negative; in man they are more efflux or positive. For this reason, according to the law, already explained, it is conducive to the harmony and activity of the vital forces for the sexes to be frequently in the same atmosphere with each other in schoolrooms, churches, societies and social circles, and is also for the greater purity of both. All monastical and ascetic exclusion of the sexes is founded on ignorance, and leads in the end to lower conditions, as well as to greater misery. Solar magnetism animates and develops much of the vegetable and animal life of the world, and like psycho-magnetism has a wonderful potency in the cure of disease.

**METERS FOR ELECTRIC CURRENTS.**—It is well known that a metallic disk or fork, fitted so that it can rotate, and placed within the field of an electro-magnet, will be rotated if a portion of the electric current traverses the forks. Electric meters based upon this principle have been made and improved upon from time to time until a very accurate meter has been evolved, which, it is claimed, will measure with great regularity and always in proportion to the intensity of the current. Indications can be easily read by the consumer, since the electric energy is indicated in a continuous manner by hands on a dial; thus, the consumer can be aware, in each instance, of the intensity of the current being used. The instrument occupies very little space, is purely mechanical and its indications are correct at all times. A new instrument of this kind has recently been patented in Switzerland, which is said to be very superior in its action and indication. The whole mechanism is an arrangement of parts, consisting of a combination with main and branch circuits, of a helix in the branch circuits, an armature and shaft rotated by the current passing through the helix and armature, a solenoid in the branch circuit and a lever and circuit-closer operated by the solenoid. There is also an electro-magnet or solenoid in a shunt of the branch circuit, together with a shaft carrying the index hand with mechanism for varying the speed of the index shaft according to the variations of current in the branch circuit.

**UTILIZING THE EXPANSION AND CONTRACTION OF METALS AS A MOTIVE POWER.**—A very effective apparatus for utilizing the expansive power of metals, caused by the changes in the temperature of the air, has been patented by Messrs. Hainley & DeLashmuth, of Martinsville, Ill. The device consists of a framework supporting a power generator and another framework supporting a storing device, the two frames being arranged so as to maintain a fixed relation to each other. The first—the power generator, consists of bars of steel and brass, properly supported, so that they may have free thrusts in opposite directions—the expansion of the brass

in one direction compensating for the expansion of the steel in the opposite direction. The frame thus never elongates by changes of temperature, but maintains a normal dimension. Both the thrusts and contractions are taken up by properly arranged crossbars, which in turn are connected by levers with racks and cog-wheels, with ratchet and pawl arrangements, by which the motion is conveyed to a shaft to be rotated. The shaft is connected with a strong coiled spring. By means of this ingenious, yet simple apparatus, any change of temperature will either contract or expand the bars and develop a great power which is stored in the coiled spring through the action of the intermediate parts. Since the temperature of the atmosphere is continually varying, the action of this apparatus produces a continuous power without the least outlay for fuel, an effect that cannot be produced by any other apparatus yet invented. The invention is said to be perfectly adapted to operating all kinds of light machinery up to eight or ten-horse power, and the construction is such that it will continue to give first-class results for a great length of time without repairs.

**MEN OF 240,000 YEARS AGO.**—If the claims of old descent were a justifiable source of pride, the human race would feel elated on being assured by the wise men of the British Association that authentic proof had been discovered in some Welsh caves that men, sufficiently developed from the ape to manufacture flint implements, existed on this planet 240,000 years ago. To us it is a melancholy reflection that we should have taken so prodigious a time to attain so small a result. Even when the duration of the race is limited to the 6000 years of history, the outcome can hardly be considered as satisfactory, and there is something profoundly depressing in the sudden addition of a series of ancestors who spent 234,000 years in marking time, indeed, but in making no other mark in the world.—*Pall Mall Gazette.*

**THE GREAT FRENCH TOWER TO BE A HUGE LIGHTNING ROD.**—A committee of French electricians, to which was referred the question of protecting from lightning the high steel observatory tower at the Universal Exposition soon to be held in Paris, decided that it would itself be a gigantic lightning rod, and that if only care were taken to maintain adequate metallic connection with earth deep enough to be permanently moist, not only would those inside it be perfectly safe during the most violent thunderstorm, but everything near it and for a considerable distance around it would be protected. The earth plates will be of copper, and will be connected with each angle at the base of the tower by substantial cables. The top is to have a tall copper rod with a gilded point.

**THE EARTH AS AN ELECTRICAL CONDUCTOR.**—The establishment of electrical communication, using the earth alone as a conductor, says the *Electrical World*, may be said to be a philosopher's stone to electricians. Not that such a method has not been hit upon and tried with some degree of success, for such is the case, but there is one great drawback to such systems, and that is, their uncontrollability. Following its natural course of seeking the path of least resistance, the current passing through the earth as the only conductor does not discriminate between two instruments, upon only one of which it is intended to act, causing interference, and hence any extended application on this plan seems futile to attempt.

**VOLCANO DYNAMICS.**—In a recently published account of an inquiry into the origin and character of the terrible volcanic outburst in the straits of Sunda two years ago, it is calculated that the matter ejected was equal to at least 10 cubic miles, and that the velocity with which this matter was thrown into the air exceeded the projecting power of the largest guns. The ejected matter must have reached a height of 30 miles, or about six times the height of the loftiest mountain in the world. The explosions were heard over a fourteenth part of the earth's surface; and an atmospheric wave traveled from the scene of disturbance, and spread over the surface of the globe in 36 hours.

**CLEANSING THE ATMOSPHERE BY ELECTRICITY.**—Prof. Oliver Lodge, in a recent lecture before the Royal Institute, of London, illustrated the recently discovered fact that smoke and dust are removed by electricity, by exhibiting a couple of glass jars, filled with dust and smoke, which were instantly rendered clear by discharging a current of electricity through them. He then suggested that a similar discharge of electricity on a large scale into the dust and smoke-laden air over London would produce a like effect. He is desirous of making experiments of sufficient magnitude to test the correctness of his view.

**HEAT UNDER COLORED GLASS.**—Notwithstanding the long-time collapse of the blue glass theory, it is still contended that blue glass exerts a marked influence, at least in the matter of reflected sun heat. Experiments have shown that when from one-quarter to one-half the glass in a hothouse is blue, the heat inside is so greatly augmented that the thermometer will rise to 100° F. inside while outside only 36° is indicated. This is said to be a difference much in excess of hothouses where glass is colorless.

**THE EARTH'S REVOLUTION.**—The equatorial surface portion of the earth moves in its daily revolution at the rate of over 1000 miles an hour, or about 17 miles per minute.



## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

**CAR COUPLING.**—A. N. Towne, S. F. No. 353,519. Dated Nov. 30, 1886. This coupling consists of peculiarly formed draw-heads adapted to interlock with each other as the cars come together, and having a pin-opening lying within each of the heads so that when the pin is introduced it will hold them together, and, in combination with this, a plate or mechanism by which the two heads are prevented from separating by reason of too great vertical movement of one of the cars which they connect.

**ANGLE-HANGER FOR ACOUSTIC OR MECHANICAL TELEPHONES.**—Michael Gerst, Paso Robles, San Luis Obispo county. No. 353,489. Dated Nov. 30, 1886. This is one of the class of hangers which are used for suspending the wires of mechanical or acoustic telephones and for directing them around an angle; and the invention consists in two separate wires attached at one end to the severed ends of the inleading and outleading line-wires, and uniting with said wires at a true right angle, and in a separate wire attached at each end at the junction of the other wires. The object is to provide for the carrying of the line wire around any angle, great or small, in such a manner that the sound waves may pass without loss to their intensity.

**CAR COUPLING.**—A. N. Towne, S. F. No. 353,518. Dated Nov. 30, 1886. This invention relates to a device for coupling or connecting railway cars, and it consists of peculiarly formed heads which are adapted to interlock with each other when the cars come together, and they are connected with a pin-opening, part of which lies within each of the heads so that when the pin is introduced it will serve to hold together. With these couplers any amount of vertical movement may take place short of entirely separating the two heads without interfering with the connection of the cars; but if any accident should take place, the cars will very readily separate by the slipping of one part out of the other. These draw-bars are very economically made, consisting of only one piece, which may be cast, forged or otherwise constructed, and no finishing work is necessary upon them.

**CONCRETE MOLD FOR SUBWAYS OF CABLE ROADS, DITCHES, ETC.**—Ernest L. Ransome, S. F. No. 353,500. Dated Nov. 30, 1886. This is a mold constructed of any suitable material having a curvature or direction of outline and extent of perimeter at one end conforming to the concrete work to be made, and thence tapering or sloping on its top toward a point. It consists further in an auxiliary or supplementary frame, having at one end a curvature or direction of outline and an extent of perimeter conforming to the excavation to which it is fitted, said frame having a straight top and a bottom sloping upwardly toward a point, being the reverse in construction and position to the mold. The invention consists further in a means for increasing and diminishing the diameter of the mold, and also of the auxiliary frame, when necessary; in adjustable rollers in the mold on which it may freely ride over a plate laid under them; in recesses in the sides of the mold for receiving guides for sustaining bolts, nuts and other forms in position in the concrete until the same become sufficiently set to retain said forms unaided; in a mechanism for changing vertically and horizontally the line of draft of either the mold or auxiliary frame, and in certain details of construction. The object is to provide a mold for easily and rapidly laying the concrete lining for cable roads, ditches, sewers, tunnels and other extended excavations, and holding the excavation in advance of the mold, when said excavation is made in sandy soil, where it would have a tendency to cave.

**RED-LEAD PAINT.**—Experiments made under the direction of the administration of the Dutch State railroads with various paints on iron plates are reported to have proved that the red-lead paints resist atmospheric influences much better than those of brown-red and iron oxides. The red-lead paints adhered closer to the metal and possessed greater elasticity than the others. It was also found that better results were attained if, before the paints were applied, the plates were pickled, instead of being merely scraped and brushed. The test plates were pickled in muriatic acid, washed with water, thoroughly dried, and while warm carefully oiled.

**THE SALMON PULVERIZER.**—We are informed that the owners of the Boss mine, near San Juan, who have one of Forbes' quartz mills, are able to crush about 30 tons of rock in 24 hours, their rock being soft and easily reduced. Taken in connection with the fact that this mill only costs about \$600, and requires but a small amount of power to run it, this showing is remarkable. The Salmon Pulverizer is the name of this mill, and it is manufactured in Downville by Taylor & Forbes.—*Montana Messenger.*

The Anaconda Company is shipping 200 cords of wood daily from Mill Creek to their mine in Butte, and the smelters at Anaconda. The latter consume 100 cords daily.

## USEFUL INFORMATION.

## Making Hard Wood Out of Soft.

A scheme, deemed entirely impracticable, has at last been developed in England for making hard wood out of soft, by compression. We have already alluded to this matter in these columns, and now refer to it again to record the substantial progress which is being made in it.

The London *Engineer* says: "For the manufacture of loom shuttles, boxwood has hitherto been very largely used; but the price has become almost prohibitive, and it has been found that, by the compression of cheaper classes of wood, a substitute meeting all requirements can be obtained. For carrying out this process, Sir Joseph Whitworth & Co., of Manchester, England, have recently completed a powerful hydraulic press to be used in compressing wood for loom shuttles. This press consists of a strong cast-iron top and bottom, with four steel columns and steel cylinder, with a large ram. In the center of this ram is fitted a smaller ram, fitting into a die, which is placed on the top of the large ram. The wood is put into this die, and a pressure of 14 tons per square inch is applied. The top pressure block which fits the die is then removed, and the small ram, rising, pushes the wood out at the top of the die."

The same exchange adds: "The wood thus treated is made very dense and uniform, and so close-grained that it is capable of taking a very high finish. For the manufacture of shuttles it has been found as good as boxwood, and there is no doubt that a similar process might be applied with advantage to other branches of industry where expensive hard woods have now to be used."

There can be no doubt but that wood prepared by some such method will, before long, be employed very generally in carriage building. One has only to read that portion of the lecture by Mr. H. G. Sheppard, of New Haven, Conn., referring to wood similarly toughened, to understand that a remarkable future of the timber trade will some time be opened up by some enterprising wood-bender, who will supply himself with the necessary machinery, accompanied by tests. Mr. Sheppard made the following prophecy. He said: "I want now to show you some timber I have here, which has been so toughened by a new process that you are not likely to recognize it. Here, first, is a piece of whitewood. It is tougher than ordinary ash, and yet whitewood is not considered a tough wood. Here, again, is a piece of ash that has been subjected to the same process. I believe the time will come when our carriage poles will be manufactured out of wood that is to-day considered very common and inferior. This ash is toughened to a degree you can hardly realize. The secret is this: It was toughened by steaming it, and then compressing it endwise. \* \* \* I believe it is perfectly practicable to make even carriage poles out of this same ordinary poplar or whitewood by subjecting it to this, for our high-grade white ash and hickory are becoming very scarce, and, at the present rate of construction, they will soon be used up."

The above account of the Whitworth process and results, already attained, gives promise of a speedy realization of Mr. Sheppard's prophecy.

**FOREIGN MATTER IN BREAD.**—Even in the most ancient times, the *Scientific American* says, different foreign matters were mixed with bread. In Thracia, bread was mixed with powdered dried roots; in Syria, with dried mulberries; in Egypt, with whole grains. In modern times, in Sweden, they add to the bread powdered dried fish; in Ireland and Iceland, moss, which, besides being nutritious, keeps the bread from drying; in Prussia, white clay, which contains alkali salts and makes bread very light; in Russia, powdered bark or finely chopped straw. On the western shore of England a certain kind of seaweed is gathered, washed, boiled, and then baked with oatmeal flour. In Africa, powdered dried locusts are mixed with bread; in India, potatoes and pea flour, and during the famine, stones ground to a fine powder.

**FIRE SMOTHERED WITH SAND.**—Few people are aware how readily an incipient fire may be smothered with sand or dry earth of any kind. An exchange speaks of the explosion of a gasoline stove in an assay office, which set fire to the building. There was no water convenient, but the alarm soon brought numerous anxious neighbors to the scene, and a convenient street full of sand enabled them to subdue the flames before any serious damage was done. A shovelful of sand is a very effective fire extinguisher, especially when oil is burning.

The following, it is said, is an admirable cure for damp cellar walls: Boil two ounces of grease with two quarts of tar for nearly 20 minutes in an iron vessel, and having pounded glass one pound, slacked lime two pounds, well dried in an iron pot, and sifted through a flour sieve. Add some of the lime to the tar and glass to form a thin paste only sufficient to cover a square foot at a time, about an eighth of an inch thick.

A NEW USE has been discovered for potatoes. They can be converted into a substance resembling celluloid, by peeling them, and after

soaking in water, impregnating with eight parts of sulphuric acid, then drying and pressing between sheets of blotting paper. In France pipes are made of this substance scarcely distinguishable from meerschaum. By subjecting the mass to great pressure a substance can be made of it rivaling ivory in hardness.

**ANOMALIES OF SMELL.**—Peculiarities of the sense of smell form a subject of investigation by Arthur Mitchell, of Edinburgh. Among those observed thus far is that of a person who smells nothing from a bed of mignonette, and of another who perceives no odor from a bean field, the sense being otherwise acute and discriminating in both cases. Another person can discover no difference between certain odors which are very different to others; while there are persons who are sickened by certain odors which usually give pleasure. A considerable number of persons seem to be altogether destitute of the sense of smell; and, on the other hand, there are a few who have the sense very strongly developed.

**POWDERED GLASS** is largely taking the place of sand in the manufacture of sand paper. It is readily pulverized by heating it red hot and throwing it into water, the finishing being done in an iron mortar. By the use of sieves of different sizes of mesh the powder can be separated into various grades, from the finest dust to very coarse, and these should be kept separate. A strong paper is tacked down and covered with a strong size of glue, and the surface covered with powdered glass of the desired fineness; when the glue is dry the surplus glass is shaken or brushed off. Muslin is better than paper, and lasts much longer in use.

**KEROSENE OIL STAINS.**—Kerosene oil spilled upon the carpet will often entirely disappear if the room is kept free from dust. If the spot still remains, a thick coating of powdered French chalk put over the spot and occasionally heated by laying a piece of brown paper upon it and passing a hot iron over it will generally remove the oil.

**MAKING SULPHUR JOINTS.**—To mix sulphur for making joints under engine beds, melt the sulphur in an iron ladle in the same manner as with lead; only cover the ladle, while melting, with a piece of iron to prevent fire.

**A NON-CORROSIVE LUBRICANT FOR BRASS.**—An excellent lubricant that will not corrode brass, and will last for weeks, is made of one part of melted india-rubber (not vulcanized) and two parts of common vaseline.

## GOOD HEALTH.

## Art and Science of Eating.

## Rules for Invalids and Harmless for All.

**EDITORS PRESS:**—Allow me to contribute to your health column the following advice in regard to eating: Eat small mouthfuls; masticate thoroughly. Have every particle of food completely comminuted so that the various juices of the mouth and throat shall be completely and thoroughly mixed with every particle and iota of the food. Get every last virtue out of every atom of the nutriment. Then, and then only, is it fitted to be introduced into the stomach. Then the galvanism, the magnetism, the electricity, the life-principle, or some occult, or other unknown, or undiscovered, or unnamed something, is mixed and blended with the food, and the stomach is ready to act upon it without taxing and wearing overmuch its powers. Then the food, after being transformed to chyle, is in proper condition to build up and strengthen the system, with all its powers. Have the variety small at each meal, so as not to over-stimulate the appetite, thus causing excess in eating. Of condiments, relishes, sauces, gravies, butter, meat, spices, fats, eat only the smallest quantity compatible with rational—not excessive—gustatory enjoyment. The enjoyment is just as great in that mode of eating; even greater, as you will have the pleasurable feeling that you are doing your whole duty to yourself. A little self-denial adds to, rather than abstracts from, the pleasures of eating. As above remarked, get all the good out of all the food; and most especially so out of all the relishes, for it is these of which we are apt to partake too freely. Observe great regularity as to times of eating—whether you eat two, three, or even five times a day, eat at these times and at these times only. If, from accident, the time of eating goes by, wait until the next regular time, rather than be irregular in this matter. No matter how great the general variety, the greater the better; eat anything that does not positively disagree with you; only be careful to have each meal simple and of few articles.

Let the last meal of the day be light. If fruit or anything else must be eaten out of the regular meal time, let it be, if possible, near the meal time—just before or soon after, so as not unnecessarily to burden the stomach, which needs its stated rest as much as does the overburdened body. Never overload the stomach; err on the side of too little, rather than too much; then will "good digestion wait on appetite," and the nervous system be in good tone. It is a good rule to get up from the table a little hungry, although a better one is, eat to satisfaction, but never to satiety. Never

eat while laboring under any excitement. The stomach needs all the powers of the mind as well as of the body for a time. When its labors are finished, that, too, can take a rest, while the body and mind may perform with health and vigor their allotted tasks. S. P. SNOW.

**HINTS FOR FAT MEN.**—The American, relieved of the onerous duties of settlement life, has long since ceased to be the lean, cadaverous dyspeptic that he was pictured to be. His Anglo-Saxon blood is beginning to manifest itself in the storing up of tissue. In other words, he is John Bull's unmistakable offspring, and the old gentleman's paunch is beginning to show on him. The American of both sexes and of all conditions is certainly getting fat. Neither of them likes the new contour, and hence the popularity of the scores of systems for reducing corpulence. A good weight at maturity is not unhealthful. Even a superabundance of tissue is not a serious disadvantage. As age approaches after a certain point it will begin to disappear naturally, but it is unsafe as well as painful to attempt to remove it by medication or any other process beyond what a fair amount of exercise will do. Rapid reduction of weight involves a corresponding depletion of the system, a decided lowering of vitality, a larger predisposition to disease and a pretty sure invitation to consumption. Let the fat stay; it will do less harm than drugs.

**TO REMOVE A SPECK OR AN EYELASH FROM THE EYE.**—This, we all know, requires the aid of a looking-glass, or the kindly hand of a friend, whether in or out of the house, but there are times when neither of these helps is near; so Nature has provided that, if we will use her appliances, she will assist us, and with a little practice it will be found the best and quickest in the end. The upper and lower eyelashes are given us as a protection to the eyes, but they also serve as little brushes when an accident happens. By taking the upper eyelashes between the thumb and finger, and drawing the lid completely over the under eyelashes, and gently moving it backward and forward, any specks in the eye fasten on to the lower fringe and remain there after having let go of the upper. This is a sure plan, and can be adopted anywhere, but it requires some perseverance to acquire it, and should not be given up if the first attempts are unsuccessful. Any disagreeable feeling about it is not half so painful or dangerous as is occasioned by the smallest speck.

**THE DIET OF STRONG MEN.**—The Roman soldiers, who built such wonderful roads and carried a weight of armor and luggage that would crush the average farm hand, lived on coarse brown bread and sour wine. They were temperate in diet and regular and constant in exercise. The Spanish peasant works every day and dances half the night, yet eats only his black bread, onion and watermelon. The Smyrna porter eats only a little fruit and some olives, yet he walks off with his load of 800 pounds. The coolie, fed on rice, is more active and can endure more than the negro fed on fat meat. The heavy work of the world is not done by men who eat the greatest quantity. Moderation in diet seems to be the prerequisite of endurance. It is not so much what people eat as what they digest that makes them strong. It is not what they gain but what they save that makes them rich. It is not what they read but what they remember that makes them learned. It is not what they profess but what they practice that makes them righteous.

**IN THE ELEVATOR.**—An intelligent physician says: "It is a good rule always to ride up in an elevator, and when coming down to take the stairs. Like going uphill, walking upstairs is hard work, and sometimes risky, especially for people with weak lungs, defective respiratory organs or heart disease. But going downstairs hurts nobody, but is good exercise; going down on a brisk run is really a good thing—it shakes up the anatomy, without incurring the danger of physical over-exertion. This shaking up is good for one's internal mechanism, which it accelerates, especially the liver, the kidneys and the blood circulation."

**MILK IN ARSENIC POISON.**—Dr. Joseph Jones, of New Orleans, recommends, as the result of his observations, the drinking of large quantities of milk as a quick antidote in cases of arsenical poisoning. His observations are based upon 13 cases, all of which recovered. According to his theory, the milk dilutes the poison, incloses it within its coagula, protects thus the coat of the stomach, and, if the stomach is in condition for absorption and digestion, it forms an aliment of the highest order.

**LEMON FOR THE HANDS.**—Lemon is always good for the hands; it cleans them as well as soap and makes them soft. You should clean the nails with a brush if necessary, but it is better to rub the fingers and nails with a half of a lemon, thrusting the fingers into it and turning it until the nails are perfectly clean. Lemon will likewise prevent the skin at the root of the nail from growing upward.

**PASTEUR'S CURE FOR RABIES.**—During the 12 months just expired M. Pasteur applied his preventive cure of hydrophobia to 3490 patients, most of whom had been bitten by dogs undoubtedly mad, yet of that large number only 10 succumbed to the disease for which they were treated.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**MINES BONDED.**—*Ledger*, Dec. 11: On Saturday last ex-Governor Hale, one of the stockholders in the South Spring Hill mine, bonded the Comet mine, from Mrs. Mahoney, of Sutter Creek, the bond running for the period of one year. The Comet is situated on the ridge between Sutter creek and Amador City. The work of developing the property will no doubt be pushed forthwith. On Monday last, Mr. Bryan, on behalf of a company of San Francisco capitalists, bonded the North Star mine, situated south of the South Spring Hill mill. The purchase price agreed upon is \$27,000, payable in one year. The bond stipulates that work must be commenced on the property within 60 days from date, and that a stoppage for 30 days works a forfeiture of bond, and all money paid thereon. The North Star is considered a flattering prospect, although the work of development consists in a shaft only 50 feet deep. From the adjoining claim, the Wabash, rich stringers of quartz have been followed toward the North Star property, creating the belief that a well-defined ledge exists in that mine. The company that has bonded it is possessed of ample means, and will undoubtedly test its value within the life of the bond.

**SALE OF A MINE.**—*Col.* W. T. Robinson has sold within the past week the Middle Bar Gold Quartz mine, to a company of Eastern capitalists, who will soon erect works on it. This claim is considered to be one of the best prospects for a big mine in Amador county.

## Calaveras.

**MINES AND MILLS.**—*Angels Echo*, Dec. 10: Mining operations in this section have commenced for the winter's run with an earnestness that betokens activity and prosperity. The Stickle mine is running full-handed night and day. Stopping in the north and south end is being carried on vigorously. The principal part of the rock which is being milled at present is taken from the north end, and is pronounced to be of a high grade. It is expected that the next cleanup will be an enormous one. The mine is very dry for this season of the year, the flow of water being so light as to necessitate but little pumping. The mill, of 20 stamps, is kept in constant motion. The future outlook of this mine is very flattering. The Utica mine, situated a short distance north of the Stickle mine, is also running in full blast night and day. Stopping is being prosecuted in the north and south end with considerable energy, the greater part of the ore being extracted from the south end. The ore is of a very high grade and as developments are gradually made the ore increases in richness. Considerable comment has been made by disinterested parties regarding the safety of this mine, owing to the large caves that have taken place at intervals in the old works. We are informed upon reliable authority that the old works are now completely filled and that no further settling of this ground is anticipated in the future. During all this disturbance the mine proper was not in the least affected. The chasm that has been opened by the caves is being promptly filled by a force of men employed on the surface. The mill is kept in motion night and day, and judging from the heavy coating of the plates, an immense yield will be the result of the present run.

**GOOD ROCK.**—*Calaveras Chronicle*, Dec. 11: We were shown some very rich rock last Monday, which was taken from the lead near Glencoe, and owned by J. H. Reed, of this place. The rock carries free gold and also abounds in rich sulphurets. The rock shown us prospects at the rate of \$40 per ton, and the vein averages four feet in width.

**WEST POINT.**—*Cor.* *Calaveras Chronicle*, Dec. 11: At present all the principal mines of this little burg are paying large dividends and running at full blast. Among the principal mines are the Lockwood, Peasley, Scorpion, Water Lily and the Star of the West. Of the above-named mines there is not one that yields ore but what will average from \$95 to \$120 per ton, and sulphurets as high as \$300 and \$400 per ton. There are several other mines in progress, but running on a smaller scale. The Peasley mine is richer at present than it ever has been before. This, no doubt, will prove to be the best mine in the county. The mines of this place have never before produced as much valuable ore as at present. Jake Morris & Co. are making preparations for constructing machinery on their mine, known as the Mountain Lion. New machinery is being put up on the Sawyer mine. If the mining boom of this place continues in the future as at present, and there is no doubt but what it will, West Point will be the metropolis of Calaveras.

**THE JONES MINE.**—We are informed that Senator Jones will crush 200 tons of ore from the Jones mine, situated at the mouth of Carson creek, in the Marshal mill at Altaville, having made arrangements to that effect. The mine has recently been pumped out and the rock will be extracted at once for the purpose of making a thorough test of its metalliferous properties. The ore of the Jones mine is silver-bearing. The ore body of this mine is about 50 feet in width. Should the test that will soon be made prove satisfactory, immense reduction works and other necessary improvements will be erected upon the mine, and developments on a large scale immediately follow.

**AT THE TOZER MINE.**—Improvements have been in progress during the past two weeks. The shaft has been repaired and quite an addition built on the east end of the hoisting works. Ever since operations ceased at this mine the works have been kept freed from water, steam having been generated tri-weekly for that purpose. We were informed at the mine that work would commence some time next week.

**AT THE LINDSAY MINE.**—The shaft and levels of this mine are being timbered and put in excellent condition for the winter's operations.

**THE GOLD CLIFF MINE.**—This mine, situated about half a mile west of town, will not resume operations until after the next rain, everything being in readiness to start up immediately thereafter.

## El Dorado.

**CHILI RAVINE.**—*Placerville Observer*, Dec. 14: Among the most recent mining developments undertaken in this section is that at Chili ravine. Many years ago this mine was worked with good results by Goyan, Gluyas & Co., but after penetrating the hill for about 900 feet they were driven out by water, and the mine has been allowed to lie idle for years. Recently it came into the possession of L. L. Lewis, of Sacramento, and systematic work was begun under direction of Dan Coffin, one of the most experienced gravel miners in the State. The lower tunnel, which is calculated to not only assist in opening up the property, but will serve to drain all the upper ground, has been run about 650 feet, and the gravel therein, which is found in abundance, prospects from 25 cents to the pan upward. A fine 10-stamp mill has been erected, which was started up last Tuesday, and we miss our guess if the Chili Ravine does not prove the best paying gravel mine in the county, and that right away.

## Inyo.

**PANAMINT.**—*Inyo Independent*, Dec. 11: Last Monday White Smith arrived at Independence from Panamint. He reported that there is a lot of machinery, some lumber and other stuff at Keeler for Panamint. His team will haul and deliver this and will then be withdrawn. All the additional machinery, lumber and whatever else may be needed for rebuilding the works at Panamint will be collected at Keeler in readiness for teams to begin hauling again about the beginning of next March. When the work is resumed, it will then be pushed with vigor to a finish.

**LOOKOUT MINES.**—Mr. Frank Fitzgerald writes that the Modock group of mines and his own mines at Lookout are looking and doing well. The only drawback to the mines is the lack of good miners. Men are plentiful enough, but miners are scarce. Out of 29 men who applied for work during November, only nine were miners.

**DARWIN.**—Jack Wilson arrived in town from Darwin, last Thursday. He says the mill at Coso will be finished and running by Christmas. There is plenty of good gold ore in sight.

**GRAVEL.**—It is reported that a rich gold gravel bed has been found on the west branch of the Walker river, above Antelope valley. If the strike is as rich as reported, it will make good times for the farmers of Mason valley. The Defiance mine at Darwin is looking better than ever; the ore body on the lower level gets bigger as it is opened. Work there, as in all the mines about Darwin, is hindered for want of more good miners. Skilled miners are wanted there and would find steady employment.

## Nevada.

**ORE TO BE CRUSHED.**—*Foothill Tidings*, Dec. 11: There is considerable rock on the dump at the Peabody mine awaiting an opportunity to be crushed. This ore, together with considerable more, will be hauled to Patrick Riley's mill and crushed. It is estimated that the rock will pay well. If the miners have no bad luck in the Peabody, ore will be regularly milled.

**ROCK FROM THE PENNSYLVANIA MINE.**—Last night the miners working in the shaft of the Pennsylvania got into some extra good ore. The ledge on the trend of the shaft where this rock was taken from is about 250 feet from the surface. The ledge there is about 20 inches in thickness, and is all milling ore of good quality, while that brought to town and lodged in Byrne's drug store is of extra value, being prominent in free gold and abounding in other gold-bearing metals. A crushing of 30 loads will be hauled to the custom mills next week. The Pennsylvania is going steadily and surely along.

**QUARTZ MINING SALE.**—*Grass Valley Union*, Dec. 11: Messrs. Abbott & Hewitt, who have been prospecting in quartz for some time, on a ledge about three-fourths of a mile beyond Rough and Ready, have disposed of a one-half interest in their claim to Grass Valley miners. The ledge has not been worked to a great depth, but it shows in good size and regular between its walls. Cravings of the rock made by custom mills here gave a result of \$25 per load, which was sufficiently satisfactory to the purchasers to induce them to buy a half interest in the claim. The work on the mine is to be prosecuted diligently under the new partnership.

## Placer.

**GOLD BLOSSOM.**—*Placer Republican*, Dec. 8: The old Gold Blossom mine on the Lincoln road, below Ophir, which was idle for so long, is now a place of considerable activity. Last summer it was leased by E. L. Hubbard, Dr. E. T. Wright and Mr. Morse for a term of five years, with the privilege of purchase. Mr. Hubbard put everything in thorough repair and working order. The 10-stamp mill was refitted, the shaft of the mine cleaned out, and enough wood to last a year was hauled to the mine and placed under cover. A prospecting shaft on the Marion ledge was sunk as deep as it could be profitably with a whim. The Marion is supposed to be a branch of the Gold Blossom, and joins it at an acute angle, a short distance west of the old shaft on the latter. Water was brought to the mill through a pipe from the Bear river ditch, and crushing commenced a few weeks ago. The Gold Blossom ledge is as distinct and well defined as the old St. Julian below Newcastle. It has been worked to a depth of 20 feet, and for the greater part of that distance the walls of solid country rock are about three feet apart and perpendicular. Between them is the ledge of gleaming quartz, the most of which carries much silver and is rich in gold sulphurets. It would be very valuable if all the mineral could be easily saved, but it is refractory like much of the Ophir quartz, which is characterized by a peculiar combination of iron pyrites, gold sulphurets and silver. So far, however, the lessees of the mine are well satisfied with their venture. They have made a cleanup, after a crushing of 190 tons of the second quality rock from the mine, which resulted in eight pounds of bullion, besides a large quantity of sulphurets which yet remains under the two Frue concentrators. They are sacking the best of the rock, and will ship it to some reduction works to have it worked. Samples of the sulphurets and some of the best ore were recently sent East to be assayed. The result was as follows: Sulphurets, \$46.18 in silver and \$35.16 in gold; ore, \$565.10 in silver and \$20 in gold. The ore is cheaply mined and milled, and there is a prospect that it will pay handsomely. The Gold Blossom is like many

another claim in and around Ophir—they would be bonanzas if there were good reduction works in the district capable of saving all of the precious metals contained in the quartz.

**HUNTINGTON MILL.**—*Cor.* *Placer Herald*, Dec. 11: A few days ago a Huntington quartz mill boiler was taken through town on the road to the Lynn quartz mill near Damascus. It will not be long before the mill will be in good working order. From all accounts the ledge looks well.

**GOOD ROCK.**—*Cor.* *Placer Herald*, Dec. 11: L. R. Colgrove and C. Curran, of Dutch Flat, have evidently made a rich find. They are the owners of a quartz ledge, located about seven miles south of Emigrant Gap, near Texas hill. A few weeks ago they struck rich gold-bearing rock, and after prospecting along the surface for a distance of 170 feet, they found rich rock throughout the entire distance. They have a tunnel run in the hill about 150 feet below the surface of the ledge and have struck rock-bearing galena. It is thought by the owners that by running the tunnel in 150 feet further, rich rock will be struck. The ledge is situated in a bed of porphyry and is four feet in thickness. Some of the rock taken from the top prospects immensely.

**QUARTZ MINING.**—The old St. Patrick, the Doig and the Boulder quartz mines, all within a short distance of one another, on the hill north of Ophir, are running steadily, and all are taking out ore. The latter has its own mill and crushes its own rock, while the first two are having their ore crushed at the Lavelle mill, near Ophir. The Doig and St. Patrick have yielded some fabulously rich rock lately, and the Patrick, we understand, is still panning out well, while the Doig, report says, is not showing up so encouragingly as it has done in the recent past.

## San Bernardino.

**MESCAL DISTRICT.**—*Calico Print*, Dec. 12: Your Occasional visited the Mescal mining district a few days ago. The 5-stamp mill of the Cambria Co. was pounding away on some fine ore. The company is represented by Mr. L. W. Carr as superintendent. Messrs. McFarlane & Barrett, who sold the property to the present lucky owners, have been retained by the company. Sim A. Barrett has charge of the opening of the mines, and W. A. McFarlane as millman. Four bars of bullion had just been run out, the lowest being 938 and the highest 995 fine, showing that Mr. McFarlane keeps up his reputation as a first-class millman. The four bars represented about 5000 ounces of bullion. The mill is now running in splendid style. Mr. Carr has shown that he has gone there to stay. The mill is a thoroughly substantial one in all its parts. They have a fine assay office, overseen by the painstaking assayer, Mr. L. A. Blackburn. The offices are comfortable, and the boarding-houses, lodging-house, etc., show that they look to the comfort of their men. The mine shows ore enough in sight to keep their present reduction works running at least two years. No ore has been stoped below the first level and not one-half of that. The second level is about 125 feet on the vein below the first. They are now running in as good ore on that level as on No. 1. The quartz is hard but the ground good. The company pays \$3.50 per day for good miners, and excellent board is to be had at \$8 per week.

**JENNIE LIND MINE.**—Another claimant to the now locally famous Jennie Lind mine has loomed up. While claimants are springing up and the air getting blue with litigation around it, the mine is being vigorously worked by the lessees, who are taking out a large quantity of rich ore, and are trying to "make hay while the sun shines," for their leases expire on Jan. 1st. To facilitate the transportation of the ore to the mill, Allyn, Madison & Co. have graded a road along the hillside to the spot where the Harwood boys are working, and have also built a small tramway and chute to convey the ore to the road, where it will be taken by the teams. At present there are no signs of the ore giving out. Whitton, Cochran & Boyle are doing well on the Comet, and realizing a profit of about \$30 a day from their ore returns. This mine has yielded considerable ore in the past, and from present appearances it still contains large deposits of rich ore. J. R. Lane and J. R. Stevens have a lease on the Josephine and are making wages with a good prospect of striking it rich, as there are indications of ore deposits in the mine of a high grade. At different times a large quantity of ore has been taken from the mine and milled at a good profit.

## Shasta.

**SYBIL MINE.**—*Democrat*, Dec. 8: This mine consists of four claims, the Sybil, Rosa, Stuart and Young Banghart, each 1500x500 feet. It has been worked with flattering results for several years. It lies partly in Trinity and partly in Shasta counties, the dividing line passing through near the western end of the claims. The reduction works, by which the ore has been formerly treated, was an arastra, but recently a Huntington mill driven by water power has been constructed. The mine has been recently bonded and leased to Martin Jones, of S. F., who is now opening the mine at greater depth. He has now obtained a vertical depth of 252 feet, at which point good ore is being extracted, and a still deeper tunnel is being pushed ahead, now in 96 feet, which will soon cut the vein 125 feet deeper. Ore is free, containing a fair percentage of sulphurets. Timber and water are both abundant and convenient, and several hundred feet of additional depth can be easily obtained by short tunnels.

**JOHN TIFFIN'S LUCK.**—*Republican Free Press*, Dec. 11: That old pioneer miner, who, with undaunted pluck and sublime patience, for the past 34 years, pursued the fickle goddess Fortune in the bowels of the earth, has at last discovered what promises to be a valuable mine. We refer to John Tiffin. John, for several months, has been developing an extension of the Muchmore mine in the Lower Springs district, and has at last tapped a well-defined ledge of rich ore four feet wide. It promises to be equally as good as the Muchmore, which is now acknowledged to be a valuable mine.

## Sierra.

**TUNNEL.**—*Mountain Messenger*, Dec. 11: The Good Hope tunnel is going ahead very rapidly, and will be into the ledge about March, if nothing hinders. The water is now coming from the bottom and sides of the tunnel instead of the top, which enables the men to make better progress. D. L. Whitney has several men at work running a tunnel on a quartz ledge which crops out about half-way up the hillside above Frank Beaver's old place, along-

side of Hog canyon trail. He has a tunnel in about 200 feet, and the quartz all prospects. It is on a direct line between the Primrose, in Hog canyon, and the Cleveland ledge, on the south side of the river, and is probably the same ledge. P. Lamping came down from Hog canyon on Wednesday, on his way below. He reports that a contract has been let to run the tunnel from the bottom of the shaft ahead to the ledge. Since the contract has been let, it has been discovered that a tunnel had been run from the upraise, made from the tunnel by a former prospector—had been run to the ledge, and that the chute contained many tons of good rock, not a pound of which has ever been worked. The mill will be started up early in the spring, by which time the lower tunnel will be into the pay chimney, and rock can be taken from both openings if deemed necessary.

## Tuolumne.

**CHINESE CAMP.**—*Tuolumne Independent*, Dec. 11: Operations have commenced on the Willietta mine during the past week—Messrs. Long & Hampton having sold an interest in the mine to some foreign capitalists. The mine is situated above Jacksonville, and has a fine body of low-grade ore in sight. The new owners will increase the stamps at the old mill, and with the new machinery which they will put in operation, feel confident of an increased yield over the old methods.

## NEVADA.

## Washoe District.

**CON. CALIFORNIA AND VIRGINIA.**—*Virginia Enterprise*, Dec. 3: Daily yield about 420 tons, shipped to the Morgan and Eureka mills, on Carson river, for reduction, the largest portion going to the Eureka. The assays from mill battery samples have fallen down a little, averaging below \$40 per ton. On the 1650 level the regular ore yield continues undiminished from the various breasts and stopes. The drift southwest from the C. and C. shaft is 580 feet in length, 18 feet having been added during the week. On the 1500 level the lateral drift north from the Consolidated Virginia shaft has been advanced 53 feet, making a total length of 321 feet. Face in low-grade ore, but improving with further advancement. On the 1435 level a winze is being sunk at an eligible point next to the east clay wall, a small hoist engine being set up for the purpose. On the 1400 level the winze being sunk below the track floor of the south drift, to connect with the south drift on the 1500 level, has nearly reached the desired connection and has passed through some very rich seams of ore. It is 300 feet south of the old Consolidated Virginia shaft. On the 1300 level the drift being run north from the Consolidated Virginia shaft is 456 feet in length, 47 feet having been added during the week. This drift has passed through 10 feet of good paying ore, with a considerable amount of low-grade ore on each side of it. Less than 100 feet will carry it to a connection with the upraise from the 1400 level, establishing a good air circulation and giving better advantages for further explorations and developments.

**SAVAGE.**—On the 500 level east crosscut No. 1 was extended 20 feet, when a seepage of water coming in at the face was encountered. West crosscut No. 1, opposite the above-mentioned crosscut, has been advanced 25 feet, and continues in good ore. On the 600 level the main south lateral drift has been extended and timbered 35 feet, and about 40 feet farther should take it to connection with the main Savage shaft. The double compartment winze being sunk in the ore body below the track floor of this level is in good ore. On the 1640 level, just above the Sutor tunnel, some very excellent ore has been exposed in the large body of quartz at that point and eastward.

**SILVER STAR.**—This is the first extension south of the old Santiago mine, now incorporated under the Quinn relocation as the Hayward. The Silver Star is owned by Silver City and Virginia parties. They sunk a shaft 50 feet deep and drifted on the ledge, finding it about two and one-half feet wide. Since then they have sunk 30 feet deeper and find the ledge about four feet wide. They have had three lots of ore crushed at the Thompson mill, Lower Gold Hill, yielding from \$18 to \$35 per ton, and having got the company incorporated in good operative shape and listed in the Stock Board, they propose working the mine for all it is worth. The bullion yield thus far has been in the proportion of 60 per cent gold to 40 per cent silver. It is free milling ore.

**HALE AND NORCROSS.**—All the working compartments of the main vertical shaft are now in a good state of repair, from the surface down to the 1300 level, where the shaft merges into the incline. New guides have been put into the north hoisting compartment throughout. On the seventh station the main west drift has been extended and timbered 30 feet, making a total distance from the shaft of 67 feet. Lateral drifts north and south from this main west drift have been started, and are well advanced. On the second station level, the main west drift has been cleaned out and retimbered for a length of 90 feet, making a total distance from the shaft of 120 feet.

**POTOSI.**—On the 250 or old Potosi tunnel level, the chambering out for the winze below the track floor of the northeast drift, in the ore body shown at that point, is not yet completed. This is near the Chollar south line and known as the north winze. In the splendid ore body developed by the north-west drift, 300 feet south of the Chollar line on the same level, the chambering out for the winze to be sunk below the track floor to explore the depth of the ore body is completed, and the sinking of it will be practically commenced to-day.

**BEST AND BELCHER.**—On the 800 level east drift No. 1, at the north boundary line, was advanced 41 feet, making a total length of 111 feet. Material, favorable vein porphyry. On the 1500 level the station is being repaired and put in first-class shape for active work and practical development.

**GOULD AND CURRY.**—On the 425 level the south drift from the main west drift has been extended 41 feet, making a total length of 314 feet. This drift has been cleaned out and thoroughly repaired for that distance. Material in face, clay and porphyry, with increasing quartz seams. The main shaft of the mine is being put into a thorough state of repair, and both north compartments are being put into complete practical working order, while the



hoisting goes on through the south compartment.

**OPHIR.**—On the 1065 level the south drift started from the shaft station is making good progress in favorable ground. On the 1300 level, east crosscut No. 1, 200 feet north of the Ophir shaft, is being energetically pushed ahead toward a very promising section. This level of the Ophir corresponds with the 1435 level of the Con. Cal. and Virginia.

**OCCIDENTAL.**—From the old north upraise of the two connecting the upper and lower tunnels, a lateral drift is being run along the ore vein 48 feet below the track floor of the upper tunnel. In the lower tunnel upraise No. 2, 50 feet south of upraise No. 1, has been commenced. The north drift from the incline winze, 10 feet above the lower tunnel, has been discontinued.

**CHOLLAR.**—The repairs and regeneration of the old shaft are making good progress. A lateral drift north from the shaft on the 350 level, which was in ore the first of the week, ran out of it, and was turned to the northeast, but soon ran into clay and porphyry, therefore it was abandoned, and operations resumed in the face of the drift north.

**ALPHA AND EXCHEQUER.**—All work is confined as yet to getting the surface machinery placed in working position at the old Alpha shaft, through which both mines are to be further developed in their upper departments.

**ALTA.**—On the 700 level the drift south following the east side of the old Keystone ledge is out of the Benton and into Alta ground. The winze sunk below the track floor of west crosscut No. 2 is down nearly to its proposed connection with the 800 level, and continues its showing of bunches and streaks of good ore.

**ANDES.**—On the 230 level the main west drift has been put in a state of thorough repair to the distance of 600 feet, at which point quite an extent of caving ground is met with, requiring considerable work to catch up, remove and retimber.

**CROWN POINT AND BELCHER.**—The ore stopes and chambers on the 1600 and 1700 levels, as well as in some of the old sections above, hold out finely, giving their regular daily output of 380 tons, keeping the mills steadily supplied.

**JUSTICE.**—Running the drift from the old Woodville shaft into the southern portion of the mine progresses. It is simply a low-grade ore proposition, with hopes of something better.

**KENTUCK.**—The daily yield is about 60 tons of low-grade ore from the 800 and other upper levels. The old ore resources hold out well, and bid fair to do so for years to come.

**SIERRA NEVADA.**—On the 520 level west crosscut No. 5, from the north lateral drift, was advanced 29 feet, making a total length of 294 feet. Material, principally birdseye porphyry.

**BULLION.**—The cleaning out and repairing of the old Croesus shaft goes ahead, and the low-grade ore proposition will soon be reached.

**YELLOW JACKET.**—About 150 tons per day of low-grade ore continues to be the daily output, keeping the Brunswick mill well supplied.

**UNION AND MEXICAN.**—Operations are confined to advancing the joint north lateral drift on the 1300 level and the crosscut east from it.

**OVERMAN.**—Overhauling the hoisting machinery at the old shaft is what is being done at present.

#### Bartlett Creek District.

**A PROSPECT FOR A REVIVAL.**—*Silver State*, Dec. 11: There are some evidences of a revival of interest in the Bartlett Creek mines. Frank Raymond, just in from there, says some prospectors have arrived in the camp, and there is a probability of something being done to develop the mines this winter or next spring. When the district was organized, some years ago, the rich gold-bearing quartz found on the surface created considerable excitement, and attracted a good many people to the place. Several loads of the ore were brought to the Humboldt Reduction Works here, and yielded handsome returns, but the camp, like Spring City and other places in which mines were afterward shown to exist, was abandoned, and probably will not amount to much until a McCurdy or Ross gets interested in them.

#### Cortez District.

**RUMORED MINING SALE.**—*Silver State*, Dec. 11: It is reported in Eureka that E. N. Robinson, of the Sweetwater Mining Co., of Hamilton, White Pine county, has bought the Wenban mining property at Cortez. Mr. Robinson has just returned to Eureka from Cortez.

#### Eureka District.

**ORE SHIPMENTS.**—*Sentinel*, Dec. 12: During the past week ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Richmond Works—White Pine mine, 5 tons; Sanchez, 1½ tons; Williamsburg, 2 tons; Member, 23 tons; Antelope, 36 tons; Eureka Tunnel, 7 tons; Dunderberg, 67 tons; King Lear, 1½ tons; Silver Lick, 21 tons. To the Eureka Con.—Alexandria mine, 30½ tons; Silver King, 8½ tons; Morey, 8 tons; Wm. Schenck, 7½ tons; Woodchopper, 3½ tons.

#### Hawthorne District.

**THE GOLDEN LAPANTA.**—*Walker Lake Bulletin*, Dec. 11: From all parts of the coast come reports of good mines and favorable prospects, but no district has yet shown a mine equal in all respects to the Lapanta. Many show small bodies of very rich ore that are soon exhausted. Many show large bodies of ore that have required years of labor and vast sums in discovery and working, but no district has yet shown a mine which began paying at the surface and never ceased not simply paying but improving. Necessarily, work was begun on a small scale, but during a little over a year of operation, \$70,000 has been produced, over one-half of which has been profit. This profit was made in the face of the extraordinary expenses attendant on operations in a new district and inseparable from working a mine previous to proper development. Notwithstanding all disadvantages the mine paid a steady profit, and now with good development greatly improved facilities and large quantities of rich ore in sight, there is a golden future before the Lapanta. The quantity and quality of ore have both improved and the cost of reduction has been so reduced by recent work that both total production and percentage of profit will be vastly increased. Heretofore, anything un-

der \$50 has been left in the mine, and this low-grade reserve is now there in immense quantities to add to the sometime future output. Beginning at the surface, this ore body has been worked continuously for more than 800 feet, the rock taken out averaging over \$100 a ton in clean gold, and now with the recent developments in sight it would seem that the history of the mine as a bullion producer is but beginning. There are good mines in other districts, but the Lapanta is alone on the list of mines that have paid since the first pick stroke and always exhibited larger reserves as ore was extracted.

#### Mount Rose District.

**PARADISE VALLEY M. Co.**—*Silver State*, Dec. 14: Mill work—Three Huntington centrifugal roller mills; six Triumph concentrators. Mill run 190½ hours; worked 144 tons. Concentrates produced, 420 sacks, 35,470 pounds, of the par value of \$9419.43, which was shipped to Boston and Colorado Smelting Co., Argo. Number of men on pay-roll, 104.

**NOYES.**—The ledge still holds in No. 5 face, but is quite barren, the small bunches of milling ore having disappeared entirely. All going usually well at the mill and mine.

#### Ophir Canyon District.

**OPERATIONS PUSHED.**—*Belmont Courier*, Dec. 11: Operations in the Chicago Mining and Reduction Co.'s mine, Ophir canyon, under the management of Supt. T. A. Oliver, are being pushed steadily ahead. The production of ore is undiminished and a sufficient quantity is easily extracted to keep the mill running steadily. The bullion output is regular and good.

#### Philadelphia District.

**EL DORADO NORTH.**—*Belmont Courier*, Dec. 11: County Auditor and Recorder W. F. Leon is working on the El Dorado North mine. He is satisfied that as soon as this mine is properly opened, rich and extensive ore bodies will be uncovered. He feels confident that there are millions of dollars in this mine, and its neighbor—the El Dorado South. In the early days of mining in Philadelphia district, Mr. Leon took several hundred thousand dollars worth of ore out of the outcrop of the El Dorado South.

#### Spanish Belt District.

**BARCELONA.**—*Belmont Courier*, Dec. 11: Work is still pushed vigorously in the Barcelona mine at Spanish Belt. Some high-grade ore is being taken out and shipped to Reno for reduction.

#### San Antonio District.

**ASSESSMENT WORK.**—*Belmont Courier*, Dec. 11: Several men are busy doing the assessment work on the mines of San Antonio district. The ore in some of them is of a very high grade.

#### Star District.

**AN ANTIMONY MINE.**—*Silver State*, Dec. 9: Thomas Bray, who arrived in town yesterday, says there are four miners at work on the Trinity mine at Star extracting antimony ore. The mine was leased some time ago by Squire Brown, of Unionville, who pays a stated price per ton for extracting the ore, a carload of which will be shipped from Mill City to San Francisco in a few days. The ore carries a high percentage of antimony and some silver.

#### Tuscarora District.

**BELLE ISLE.**—*Times-Review*, Dec. 10: Line crosscut west has been extended nine feet. Crosscut east, same level, is in very hard rock, and progress is slow.

**TORNADO CONSOLIDATED.**—Last week we made better progress in tunnel, advanced six feet. Have finished a commodious blacksmith shop and covered entrance to tunnel. Contractors have commenced to sink a winze on a vein of sulphuret ore, giving fair assays.

**NAVAJO.**—South drift on east vein, 350-foot level, has been extended a total distance of 81 feet. Winze on west vein from east lateral vein, 350-foot level, has been sunk 35 feet.

**NORTH BELLE ISLE.**—North gangway on the 300-foot level has been extended 50 feet the past week. There is an increased flow of water. A portion of the drift requires to be timbered.

**NEVADA QUEEN.**—During the week No. 1 shaft was sunk 15 feet; total depth, 28 feet. Rock continues hard blasting; water increasing as depth is attained. East crosscut was driven 10 feet to the foot-wall. Work stopped at this point and the men put back in the north gangway, which was driven 19 feet. South drift from No. 2 shaft has been advanced 26 feet. The vein has been broken up, but looks like coming in regular, as the ore is showing again in face of drift. Several loads of shaft timbers arrived this week.

#### Union District.

**RICH STREAK.**—*Belmont Courier*, Dec. 11: There is a very rich streak in Cirac's North Belle gold mine, Grantsville. It is expected that capitalists will take hold of it and open it up in good style. There are several locations that show free gold in Union mining district—and they will be worked in the not very distant future.

#### ARIZONA.

**PURCHASED.**—*Prescott Courier*, Dec. 7: A Mr. Jones has, it is said, purchased the Groom Creek mill, also several Groom Creek district mines. He is negotiating for others. Groom Creek district is about six miles south of Prescott and is well watered and timbered. Its ledges carry gold and silver in paying quantities. A gentleman who is well posted on its gold mines assures us that there are hundreds of tons of rock in sight that will yield from \$10 to \$40 per ton, and we have seen a great deal of rich silver ore there. Its mines have been held by people who were unable to work them properly. These people have always been willing to turn them over to capitalists, for reasonable considerations, and it pleases the *Courier* to learn that the turning-over process is now going on. Negotiations are also pending for mines in Walker and Hassayampa districts, and we really believe all negotiations will lead to purchases and production of bullion.

#### IDAHO.

**THE WEST CAMAS.**—*Wood River Times*, Dec. 8: The West Camas, on the Gold belt, has been bonded to Capt. T. W. Buzzo; the bond being only

for 30 days, and the bond a man who stands well with investors, the transfer will probably be made. The price is somewhere between \$10,000 and \$20,000, and the cash must be paid by the 2d of Jan., 1887, time being of the essence of the contract.

**ERA.**—Although Era is snowed in, it is by no means snowed under. The work of development goes steadily on, and the latest strike is reported from the Rustler, a mine situated on Lava creek. It is owned by Jack Voss, formerly of Hailey, and is a probable fortune to him, as the rock is said to be worth from \$4000 to \$5000 a ton. M. C. Thumb, secretary and manager of the Bannock Co., is pushing work vigorously on the Horn Silver.

**HARTSFELD FURNACE FAILURE.**—*Coeur d'Alene Record*, Dec. 7: The Hartsfeld smelting process is not considered an utter failure, although the Milo works have been fairly weighed in the balance and found wanting. It is believed that serious troubles with the valves and furnaces can be remedied to a large extent if not entirely by reconstruction. Nothing further is likely to be done with the Milo plant this winter.

#### NEW MEXICO.

**WORKING.**—*Black Range*, Dec. 10: Kingston's mines and mills are working day and night, and a flood of gold and silver is pouring out to enrich her people. The development of the North and South Percha districts will double the present output of Kingston before the end of another year. Capt. Cooney is about to commence on a 1200-foot tunnel, which will be driven in the mountain. The work will be done with a diamond drill. Socorro smelters officially report their bullion output for the month of November at 1007 tons, being an increase of some 600 tons over the same month last year. It is said that the Hillsboro stamp mill is now in the hands of the English syndicate who are said to have recently purchased the Lady Franklin group of mines, and has been thoroughly overhauled and repaired for future use.

#### OREGON.

**WATER.**—*Jacksonville Times*, Dec. 12: Most of the miners of Josephine county have plenty of water now and are making the most of it. Nearly all of the hydraulic mines are being worked, and some ground-slucing is also going on. Wm. Huggins and Phil Miller will operate John Miller's extensive diggings on Farmer's flat during the present season. John O'Brien has rigged up his mines in the Steamboat district in first-class shape and will operate them on an extensive scale. Ennis & Cameron have rented one of their gulches on Galice creek to Chinese, who will work it during the coming year. It is supposed to be rich. The past week has been a very favorable one for the miners. A great deal of rain has fallen, as also a considerable amount of snow on the mountains. The Sterling Co. has been doing some pipping each week for a short time past, but now has an ample supply of water and is running two pipes on full time. Brown & Co.'s mill, at the Swinden ledge, in Rock Point precinct, has not been running much of the time, owing to repairs being made and for lack of harmony among the managers. Bauble, Klippel & Co.'s mill this week finished a run on a lot of ore from McKenzie & Co.'s ledge. A cleanup was completed yesterday, but we have not learned as yet how it resulted. Several parties in this vicinity are about letting contracts to take large quantities of quartz from different ledges and thoroughly prospect the same, which is the best method possible for ascertaining the value of those lodes. If the present weather should continue much longer, the miners will be able to make an extended run, and money will consequently be more plentiful next spring than for some time past. Prof. Thos. Price, the well-known metallurgist, of San Francisco, has just returned from a visit to Portland, where he was called for a consultation with the directors of the Portland Reduction Works. These gentlemen are proceeding with reliability and precision in the inauguration of a great manufacturing enterprise. It is their purpose to "get their hand in" with an establishment of moderate size, and then expand to any capacity that the business will call for. Their stock is all taken, the machinery bought and paid for, and mostly in place, the buildings nearly completed and the land purchased and paid for. Everything is in readiness for the purchase and accumulation of ore, except the adjustment of freight rates. As soon as this matter can be settled the material and personnel will be assembled and fires started up in 10 days, provided that ore enough can be gathered before winter stops the supply to run the smelter until spring. If rates cannot be adjusted in time, the smelter will have to be idle until spring. Prof. Price regards Portland as a favorable point for the reduction of ores, and is sanguine that a great metallurgical industry has been founded here.

#### UTAH.

**REVIEW.**—*Salt Lake Tribune*, Dec. 10: The receipts of ore in this city for the week ending the 2d inst., inclusive, were of the value of \$50,421.82; of bullion for the same time, \$69,759.17, a total of \$120,180.99. For the week previous the total receipts were \$142,233.83, of which \$91,146.01 was bullion and \$51,087.82 was ore. The product of the Ontario for the week was 17,837.86 ounces of fine bullion and \$10,654.59 in ore sales, a total of \$28,492.45. The daily output for the week was six bars of fine bullion, 8339.18 fine ounces. Fine bar receipts for the week were of the value of \$12,990.15; of base bullion, \$13,400. Stormont silver bars, valued at \$2250, were sent up on the 3d. The product of the Hanauer smelter for the week was \$24,592 in bullion. Bannock bars to the value of \$5300 were received during the week. The Alice sent down, on the 3d, 17 bars of bullion, valued at \$11,237.02. The Horn Silver, of Utah, is said to be selling some ore, but the usual reticence and air of mystery attaching to the operations of this company prevail. Homestake stock, 900 shares, sold in New York during the week at \$17, \$16.75, \$17, \$16, \$16.50, \$17.25. Ore receipts in this city during the week were as follows: By Wells, Fargo & Co., \$10,700; by McCormick & Co., \$29,143, including \$4743 from the Queen of the Hills, \$1200 from the Crescent, and \$750 from the Overman; by T. R. Jones & Co., \$10,578.22.

#### List of U. S. Patents for Pacific Coast Inventors.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING DECEMBER 7, 1886.

- 353,657.—ANIMAL TRAP—John Bean, Los Gatos, Cal.  
354,037.—STREET RAILWAY CAR—J. C. Brown, S. F.  
353,785.—CAR SIGNAL—Sands Forman, Gold Hill, Nev.  
353,851.—TAPE MEASURE—J. Fountain, La Grande, Ogn.  
353,854.—FERMENTING BUNG—T. S. Glaister, Sonoma, Cal.  
353,857.—ALMOND HULLER—Jos. Hobart, Nordhoff, Cal.  
353,872.—SHUTTLE—McGee & McMahon, Oregon City, Oregon.  
353,020.—VALVE FOR HYDRAULIC ELEVATORS—P. F. Morey, Portland, Ogn.  
353,877.—HUB-BORING MACHINE—A. L. Navone, Calistoga, Cal.  
353,866.—SAWMILL SET WORKS—A. E. Roe, S. F.  
353,897.—PUMP—L. Teague, Arcata, Cal.  
354,029.—ARTERY LIGATOR—Jas. Trullinger, Silverton, Ogn.  
353,718.—LEAK-STOPPING MATTRESS—J. H. L. Tuck, S. F.  
353,727.—ORE-FEEDER—G. E. Woodbury, S. F.  
353,847.—TRADEMARK—Cal. Wire Works, S. F.  
NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

#### Mining Share Market.

The numerous failures among the brokers had the effect of depressing prices again in the market, and stocks are not so high as they were. The excitement has had the effect of bringing into notice again a lot of varieties of stock which have been out of sight for years. The list has increased largely and transactions are, of course, greater than for some time past. The excitement has somewhat abated, although the market may be still considered lively. The *Enterprise* says of the Comstock situation: There are all sorts of rumors afloat, as usual, relative to the mines, one being that the south winze of the Con. California and Virginia on the 1400 level has run into porphyry before reaching the 1500; also, that the Savage Co. has made an arrangement with the Sutro Tunnel Co. whereby the tunnel company is to extract and reduce the fine, large body of ore recently developed on the 1640 level, at the junction of the Savage shaft and Sutro tunnel. The tunnel company may have facilities enough for removal of the ore, but certainly has none for reduction at present.

The three bonanza points, the Consolidated California and Virginia, Savage and Potosi, all not only continue their good showing of high-grade ore, but improvement in their development as further explored.

#### Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

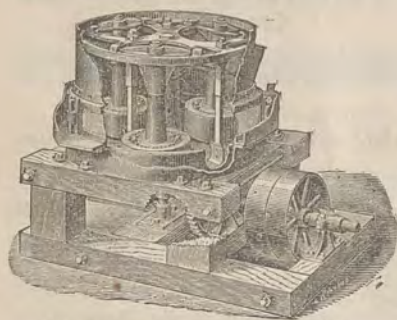
Eberhardt Monitor, Dec. 7, \$2300; Richmond Con., Dec. 11, \$14,734; Hanauer, Dec. 7, \$6500; Bannock, Dec. 8, \$3600; Crescent, Dec. 8, \$3400; Hanauer, Dec. 10, \$2170; Queen of the Hills, Dec. 10, \$2500; Alice, Dec. 11, \$10,942; Hanauer, Dec. 11, \$2170; Queen of the Hills, Dec. 11, \$2880; Hanauer, Dec. 12, \$4280; Crescent, Dec. 9, \$8600; Hanauer, Dec. 9, \$6380. Last week, Wells, Fargo & Co., at Salt Lake, shipped in bullion \$37,090; McCormick & Co., \$61,275; T. R. Jones & Co., \$10,578; Union Bank, \$11,237.

THE OVERLAND MONTHLY for December has an unusually varied table of contents. The number is about twice the usual size. With an increase of reading pages, it also contains a complete history of the early days of the magazine, and its announcements for 1887. In all respects, this issue of the representative magazine of the West is a credit to the well-organized company who now own it, and is a proof of the success of the enterprise. The leading article is Prof. Hilgard's exhaustive study of The Beet Sugar Industry of California. It has both industrial and political bearings, and is one of the most important articles ever published in the magazine. Other articles are: The Poet's Pipe, James Buckham; Writings of Laura Bridgman, E. C. Sanford; Margot's Apple Sprig, Becca M. Samson; St. Anders, Charles Noble Gregory; In the Sleepy Hollow Country—Chapters V-XI—S. N. Sheridan, Jr.; Our Forests, Abbott Kinney; An Episode of Chub Guleh, L. A. B. Curtis; Women as School Directors, M. W. Shinn; The Poppy, Edmund Warren Russell; Chata and Chinita—Chapters XVIII-XX, Louise Palmer Heaven; The Works of Thomas Middleton, An Epoch-making Lie, Mary E. Grafton. Among the miscellany is the following: The Chief Need of Observatories, Mr. Lowell and Charles Francis, The Elections, the Charter and the Mayor, Winter in San Francisco, E. S. B.; Mount Shasta, as seen from Tehama, J. S. M.; San Emigdio, Mary E. Bamford; Views on Oakland Creek (Illustration), E. M. Reynolds.

#### Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.





Centrifugal Roller Quartz Mill.

**F. A. HUNTINGTON,**

MANUFACTURER OF

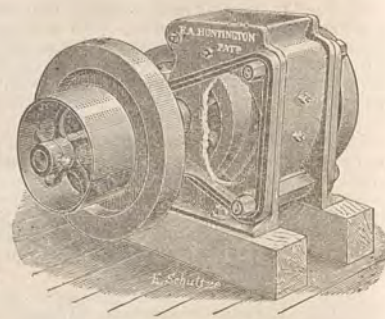
**Centrifugal Roller Quartz Mills,  
CONCENTRATORS AND ORE CRUSHERS,**

Mining Machinery of Every Description,

**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

**NOTICE TO GOLD MINERS!  
SILVER-PLATED AMALGAMATED PLATES  
For SAVING GOLD!**

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER

FULL WEIGHT OF SILVER AND BEST QUALITY OF WORK GUARANTEED.

GET OUR PRICES BEFORE ORDERING ELSEWHERE. SAMPLES  
FURNISHED ON APPLICATION.**SAN FRANCISCO NOVELTY AND PLATING WORKS,  
No. 108 FIRST STREET.**

NOTICE.—All our plates are guaranteed to have the full weight of silver agreed upon, and are tested before leaving our works, thereby avoiding the complaints about light weight, made so often before we started in this branch of industry.

**JUSTINIAN CAIRE, Agent,**

521 &amp; 523 Market St., San Francisco,

—DEALER IN—

**Assayers' and Mining Material.**

—MANUFACTURER OF—

**BATTERY SCREENS AND WIRE CLOTH.**

Agent for HOSKINS'

**HYDRO-CARBON ASSAY FURNACES.****H. P. GREGORY & CO.**

Nos. 2 and 4 California St., - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

**MACHINERY**

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING  
MACHINERY.FRANK & CO.'S WOODWORKING  
MACHINERY.NEW HAVEN MANUF'G CO.'S MA-  
CHINISTS' TOOLS.BEMENT & SON'S MACHINISTS  
TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM  
PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND  
EXHAUSTS.

SHIMER MATCHER HEADS.

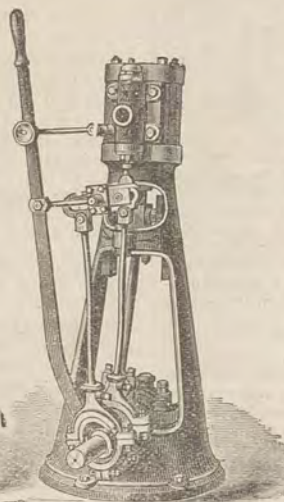
BRINARD MILLING MACHINES.

TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISH-  
ERS.

YACHT ENGINES.

WILLIAMSON BROS' HOISTING  
ENGINES.ATLAS ENGINE WORKS ENGINES  
AND BOILERS.PAYNE'S VERTICAL AND HORI-  
ZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS  
AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJEC-  
TORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACK-  
ING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACK-  
ING, PAINT, ETC.**ENGINES and BOILERS**

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

**ROCK BREAKERS!**

"DODGE."

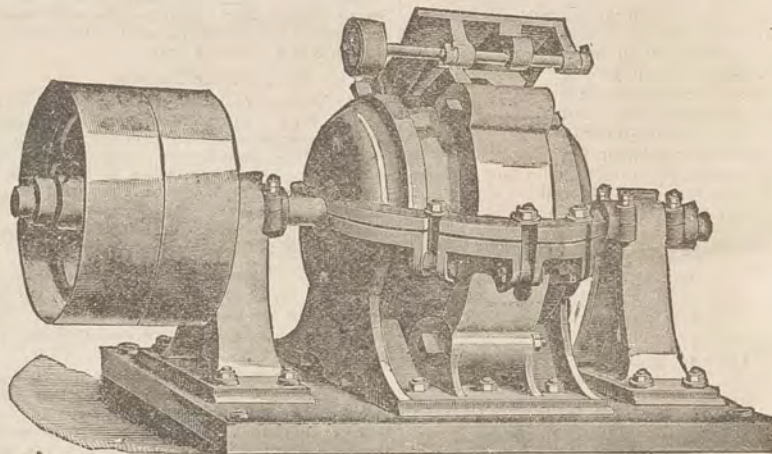
"GIANT BLAKE."

STEAM ENGINES,

MINING MACHINERY, SHAFTING, PULLEYS.

Machine Work to Order.

SAVAGE, SON &amp; CO., 135 to 143 Fremont St., San Francisco.

**SQUARE FLAX PACKING.**Finest Packing in the world. Trial Samples sent free. Send for circular. Best of ref-  
erences. Manufactured by W. T. Y. SCHENCK, 256 Market St., San Francisco.**THE FRISBEE-LUCOP MILL,****A CENTRIFUGAL ROLLER MILL**

—FOR WET OR DRY—

**Reduction of Ores, Quartz, Phosphate Rock, Carbon, or  
other Mineral Substance to any degree of fine-  
ness in a rapid and economical manner.**

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh  
dry, and from 3000 to 6000 pounds wet.All wearing parts easily and cheaply replaced. May be seen in operation at the New York  
Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.Certificates as to performance of the Mills, and any information required, furnished on  
application.**THE FRISBEE-LUCOP MILL CO.,**

Office, 104 &amp; 106 Washington St., NEW YORK.

OR PACIFIC IRON WORKS, SAN FRANCISCO.

RICHARD C. REMMEY, Agent,

**Philadelphia Chemical Stoneware Manufactory,**

1100 East Cumberland St., PHILADELPHIA, PA.

Manufacturer of  
all kinds of  
Chemical Stoneware  
—FOR—  
Manufacturing  
Chemists.Also Chemical Brick  
for Glover Tower.**California Inventors**Should consult  
DEWEY & CO.  
AND FOREIGN PATENT SOLICITORS, for obtaining Patents  
and Caveats. Established in 1860. Their long experience as  
journalists and large practice as Patent attorneys enables  
them to offer Pacific Coast Inventors far better service than  
they can obtain elsewhere. Send for free circulars of infor-  
mation. Office of the MINING AND SCIENTIFIC PRESS and  
PACIFIC RURAL PRESS No. 252 Market St., San Francisco.  
Elevator, 12 Front St.**COAL MINES OF THE WESTERN  
COAST.**A few copies of this work, the only one ever published  
treating of Pacific Coast Coal Mining, have been obtained,  
and are for sale at this office for \$2.50 per copy. It was  
written by W. A. Goodyear, Mining and Civil Engineer,  
formerly of the California State Geological Survey.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in leading smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

**MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.**

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.

**FRASER & CHALMERS, MINING MACHINERY,**

ENGINES AND BOILERS.



Huntington Centrifugal  
QUARTZ MILL.

SEND FOR CATALOGUE.

CORNISH ROLLS,  
JIGS and TROMMELS.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.  
NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.  
MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.  
UTAH OFFICE—SALT LAKE CITY, UTAH.

**Metallurgy and Ores.**

**SELBY**  
**SMELTING and LEAD CO.,**  
416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY**  
And Assay Office.

Highest Prices Paid for Gold, Silver and  
Lead Ores and Sulphurets.

...MANUFACTURERS OF...

**BLUESTONE,**  
**LEAD PIPE,**  
**SHEET LEAD,**  
**SHOT, Etc., Etc.**

ALSO MANUFACTURERS OF  
**Standard Shot-Gun Cartridges,**  
Under Chamberlin Patent.

**JOHN TAYLOR & CO.,**

IMPORTERS AND DEALERS IN

**ASSAYERS' MATERIALS, MINE**  
**AND MILL SUPPLIES,**

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists,  
Mining Companies, Milling Companies, Prospectors, etc.,  
to our full stock of Balances, Furnaces, Muffles, Crucibles,  
Scorifiers, etc., including, also, a full stock of  
Chemicals.

Having been engaged in furnishing these supplies since  
the first discovery of mines on the Pacific Coast, we feel  
confident from our experience we can well suit the demand  
for these goods, both as to quality and price. Our  
New Illustrated Catalogue, with prices, will be sent on  
application.

Our Gold and Silver Tables, showing the value per  
ounce Troy at different degrees of fineness, and valuable  
tables for computation of assays in grains and grammes,  
will be sent free upon application. Agents for the Patent  
Plumbago Crucible Co., London, England. Also for E.  
G. DENNISTON'S Silver Plated Amalgam Plates. The  
plates of this well-known manufacturer are thoroughly  
reliable, and full weight of Silver guaranteed. Orders  
taken at his lowest prices.

JOHN TAYLOR & CO.

**Nevada Metallurgical Works.**

NO. 28 STEVENSON STREET,  
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the  
most suitable Process for Working Ores.

Special attention paid to Examinations of  
Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt,)

Mining Engineers and Metallurgists.

J. KUSTEL. H. KUSTEL.

**METALLURGICAL WORKS,**

318 Pine St. (Basement),

Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my  
Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical Instruction given Treating Ores by im-

proved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

C. H. AARON,

**ASSAYER AND METALLURGIST,**

NOGALES, ARIZONA,

Will attend to business in connection with mines in So-  
nora or Arizona.

WM. D. JOHNSTON,

**ASSAYER AND ANALYTICAL CHEMIST.**

514 Kearny Street,

SAN FRANCISCO, - CALIFORNIA

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

**SPENCERIAN**  
**STEEL PENS**  
Are The Best

Established 1860.

**USED BY THE BEST PENMEN**

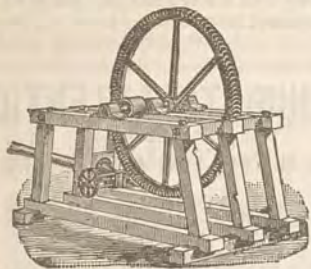
Noted for Superiority of Metal,

Uniformity, and Durability.

20 Samples for trial, post-paid, 10 Cents.

IVISON, BLAKEMAN, TAYLOR, & CO.,

753 and 755 Broadway, New York.

**KNIGHT'S WATER WHEEL**

For Mills, Pumping and Hoisting.

OVER 300 IN USE!

**All Estimates Guaranteed.**

SEND FOR CIRCULAR.

EDWARD A. RIX & CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco.



**WATER TANKS! WINE TANKS!**  
**CALIFORNIA WINE COOPERAGE CO.**

FULDA BROS., Proprietors,

30 to 40 Spear St., - San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

**San Francisco Cordage Factory.**  
Established 1856.

Constantly on hand a full assortment of Manila Rope,  
Sisal Rope, Tarred Manila Rope, Hay Rope, Whale  
Line, etc., etc.

Extra sizes and lengths made to order on short notice

TUBBS & CO.

611 and 613 Front St., San Francisco.

**JAMES LEFFEL'S Mining Turbine Water Wheel.**

These Wheels are designed for all purposes where limited quantities of water and  
high heads are utilized, and are guaranteed to give more power with less water than  
any other wheel made. Being placed on horizontal shaft, the power is transmitted  
direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in  
capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the  
ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost,  
by applying to the manufacturers.

JAMES LEFFEL & CO.,

Springfield, Ohio,

or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents,  
Chicago, Ill., and Denver, Col.

PARKE & LACY, General Agents, San Francisco, Cal.

**THE CONSUMERS' COMPANY.**

**VULCAN B B AND AJAX.**  
The Best LOW GRADE EXPLOSIVES in the Market.

**Vulcan Nos. 1, 2 and 3,**  
The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank  
Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

**VULCAN POWDER CO.**  
218 California Street, San Francisco, Cal.

**THE GIANT POWDER COMPANY**

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

**GIANT POWDER or DYNAMITE,**  
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and  
GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

**JUDSON POWDER IMPROVED.**

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting  
Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and  
saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

**BANDMANN, NIELSEN & CO.,**

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

**THOMAS PRICE'S ASSAY OFFICE,**

CHEMICAL LABORATORY,

**BULLION ROOMS and ORE FLOORS,**

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed  
of in the Open Market to the Highest Bidder.



MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

Table with 5 columns: COMPANY, LOCATION, No. AMT. LEVIED, DELINQ'T. SALE, SECRETARY, PLACE OF BUSINESS. Lists various mining companies and their financial details.

MEETINGS TO BE HELD.

Table with 5 columns: NAME OF COMPANY, LOCATION, SECRETARY, OFFICE IN S. F., MEETING, DATE. Lists upcoming meetings for various companies.

LATEST DIVIDENDS—WITHIN THREE MONTHS.

Table with 5 columns: NAME OF COMPANY, LOCATION, SECRETARY, OFFICE IN S. F., AMOUNT, PAYABLE. Lists recent dividends for various companies.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

Table with 5 columns: NAME OF COMPANY, WEEK ENDING, WEEK ENDING, WEEK ENDING, WEEK ENDING. Lists stock prices for various companies.

Sales at San Francisco Stock Exchange.

Table with 2 columns: THURSDAY Dec. 16, 1886, and various stock prices. Lists sales for various companies.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves.

For Mining Share Market, Bullion Shipments, etc., see page 397.

MINING AND SCIENTIFIC PRESS.

Delinquent Notices.

DELINQUENT NOTICE.

Santa Annita Mill and Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Nevada County, California.

NOTICE.—There are delinquent, upon the following described stock, on account of Assessment No. 10, levied on the 26th day of October, 1886, the several amounts set opposite the names of the respective shareholders, as follows:

Table with 5 columns: Names, Certificate, Shares, Am't. Lists delinquent shareholders for Santa Annita Mill and Mining Company.

And in accordance with law, and an order of the Board of Directors, made on the 26th day of October, 1886, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, 309 California street, San Francisco, California, on Monday, the 20th day of December, 1886, at the hour of 2 o'clock p. m., of said day, to pay said Delinquent Assessments thereon, together with costs of advertising and expenses of the sale.

J. M. BUFFINGTON, Secretary. OFFICE—309 California Street, San Francisco, Cal.

DELINQUENT NOTICE.

Tallulah Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Sierra District, Humboldt County, Nevada.

NOTICE.—There are delinquent, upon the following described stock, on account of Assessment No. 21, levied on the 30th day of October, 1886, the several amounts set opposite the names of the respective shareholders, as follows:

Table with 5 columns: Names, Certificate, Shares, Am't. Lists delinquent shareholders for Tallulah Mining Company.

And in accordance with law, and an order of the Board of Directors, made on the 30th day of October, 1886, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the salesroom of Maurice Dore & Co., 412 Pine street, San Francisco, on Wednesday, the 29th day of December, 1886, at the hour of 12 o'clock noon, of said day, to pay said Delinquent Assessments thereon, together with costs of advertising and expenses of the sale.

GEORGE A. HILL, Secretary. OFFICE—With Estate of Samuel Hill, 634 Market Street, San Francisco, California.

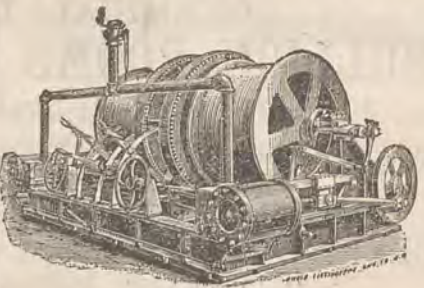
NATIONAL ASSURANCE CO., OF IRELAND.

ATLAS ASSURANCE COMP'Y, OF LONDON.

BOYLSTON INSURANCE COMPANY, OF BOSTON, MASS.

H. M. NEWHALL & CO., GENERAL AGENTS, 309 & 311 Sansome St., San Francisco, Cal.

HOISTING ENGINES FOR MINES.



1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.

LIDGERWOOD M'FG COMPANY, 96 Liberty St., New York.

PACIFIC COAST AGENTS, PARKE, LACY & CO., SAN FRANCISCO.

DELINQUENT NOTICE.

Acme Mill and Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Volcano Mining District, Amador County, California.

NOTICE.—There are delinquent, upon the following described stock, on account of Assessment No. 9, levied on the 25th day of October, 1886, the several amounts set opposite the names of the respective shareholders as follows:

Table with 5 columns: Names, Certificate, Shares, Am't. Lists delinquent shareholders for Acme Mill and Mining Company.

And in accordance with law, and an order of the Board of Directors, made on the 25th day of October, 1886, so many shares of each parcel of such stock, as may be necessary, will be sold at public auction, at the office of the Company, 309 California street, San Francisco, California, on Monday, the 20th day of December, 1886, at the hour of 2 o'clock p. m., of said day, to pay said Delinquent Assessments thereon, together with costs of advertising and expenses of the sale.

J. M. BUFFINGTON, Secretary. OFFICE—309 California Street, San Francisco, Cal.

DELINQUENT NOTICE.

Aultman Mill and Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Georgetown Mining District, El Dorado County, California.

NOTICE.—There are delinquent, upon the following described stock, on account of Assessment No. 3, levied on the 26th day of October, 1886, the several amounts set opposite the names of the respective shareholders, as follows:

Table with 5 columns: Names, Certificate, Shares, Am't. Lists delinquent shareholders for Aultman Mill and Mining Company.

And in accordance with law, and an order of the Board of Directors, made on the 26th day of October, 1886, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, 309 California street, San Francisco, California, on Monday, the 20th day of December, 1886, at the hour of 2 o'clock p. m., of said day, to pay said Delinquent Assessments thereon, together with costs of advertising and expenses of the sale.

J. M. BUFFINGTON, Secretary. OFFICE—309 California Street, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Paradise Valley Mining Company

At a meeting of the Board of Directors of the above-named Company, held November 26, 1886, Dividend No. 10, of Ten (10) Cents per share was declared, payable on Tuesday, the 30th day of November, 1886, at the office of the Company, 328 Montgomery Street, San Francisco, Cal.

MACHINISTS, ATTENTION!

AN OUTFIT FOR A MACHINIST. Good Tools, Patterns and an Established Business

FOR SALE AT A BARGAIN,

If applied for immediately. Address, B. A. W. Care of this Paper.

Advertisement for Dr. Pierce's Electric Belt, featuring an illustration of the product and descriptive text.

HEAD'S BUSINESS COLLEGE, 24 Post St. S. F.



## MINING ENGINEERS.

W. A. GOODYEAR,  
Civil and Mining Engineer,  
MINING EXPERT AND GEOLOGIST.

Address "Business Box A," office of this paper, San Francisco.

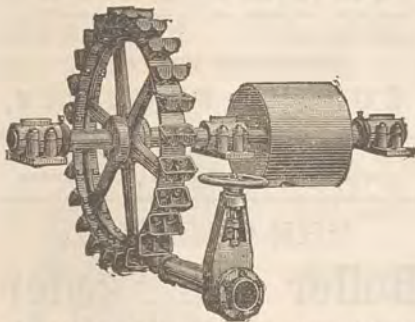
ROSS E. BROWNE,  
Mining and Hydraulic Engineer,  
No. 307 Sansome St., San Francisco.



UNCLE Sam has found it at last!  
A sure remedy for Torpid Liver,  
Sick Headache, Habitual Constipation,  
Chills and Fever, and all affections of the  
Kidneys and Liver. This is a New Com-  
pound, and one trial will convince you  
that it is the Cheapest and Best Remedy  
in the Market for Diseases of Kidneys,  
Liver and Stomach. If you want a pure  
vegetable compound, that is positively  
guaranteed to contain no mercury, go to  
your Druggist, and get a Bottle of the  
Arkansaw Liver and Kidney Remedy.  
Price, \$1.00 per Bottle.

For Sale by all Druggists.

## PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED  
by the Idaho Company at Grass Valley, Cal., and  
gave 90 2 per cent, distancing all competitors. Send for  
Circulars and guaranteed estimates.

L. A. PELTON,  
Nevada City, Nevada Co., Cal.  
AGENTS—PARKE & LACY, 21 and 23 Fremont Street  
San Francisco, Cal.



LIFE SCHOLARSHIP, - \$75  
Full Business Course.

SIX MONTHS' COMBINED COURSE, \$75.  
Including the Business Course, Academic Course, Mod-  
ern Languages, Telegraphy, Shorthand, Type-Writing, etc.  
Ladies admitted into all Departments. Day and Even-  
ing Sessions during the entire year.  
CALL OR SEND FOR CIRCULARS.



## CALIFORNIA VIGORIT POWDER CO.,

No. 40 California Street, San Francisco,

—MANUFACTURERS OF—

## NITRO-GLYCERINE BLASTING POWDERS.

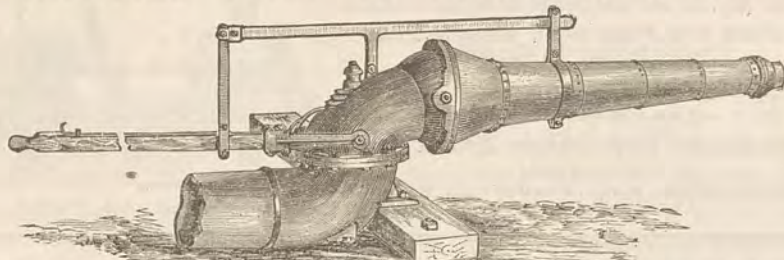
Vigorit "LOW" Powder,

FOR REMOVING STUMPS AND TREES,  
HAS NO EQUAL.

WORKS: California City, Marin Co., Cal.

ED. G. LUKENS, Manager.

## IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manu-  
facture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under  
the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,  
39 to 51 Fremont St., San Francisco, Cal.



This cut represents our  
IMPROVED  
HYDRAULIC  
MACHINE.

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT  
instead of two. It is of greater capacity and more easily worked and  
kept in repair. The statement of Mr. Hendy that all styles are infringe-  
ments on the machines made by him, he knows to be utterly false. All  
litigation has been in reference to old style two jointed machines, which  
are superseded by our new style one jointed. The decision of Judge  
Sawyer, referred to by him, is carried up on appeal to U. S. Supreme  
Court, with absolute certainty of a reversal in our favor. Miners and in-  
tending purchasers are hereby notified that we are the sole owners of the  
patents covering this style of Giant; we will prosecute to the fullest ex-  
tent of the law manufacturers or users of an infringement.

Send for Circulars and Price List.

HOSKIN & CO., Marysville, Cal.

MACHINE TOOLS,  
PRESSES AND DIES,  
PUNCHING and SHEARING  
MACHINERY.

F. A. ROBBINS,

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and  
Dies, 20-inch Engine Lathes,  
12-inch Shapers.

Punching and Shearing Machinery for  
Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

## ORE FEEDERS.

We direct attention to an advertisement, which ap-  
pears in our journal, of the "Original Roller" Ore  
Feeder, manufactured by the "Joshua Hendy Machine  
Works," of Nos. 39 to 51 Fremont St., this city.

As the manufacturers of a similar form of Feeder,  
known as the "Templeton Roller," claim that it is su-  
perior to any other style, and cite those in operation at  
the "Bunker Hill" mill in Amador county, we expressly  
contradict the statement, and in substantiation submit a  
copy of a letter shown to us by a representative of the  
"Joshua Hendy Machine Works," which speaks for itself

BUNKER HILL GOLD MINING CO.,

AMADOR CITY, CAL., July 12, 1886.

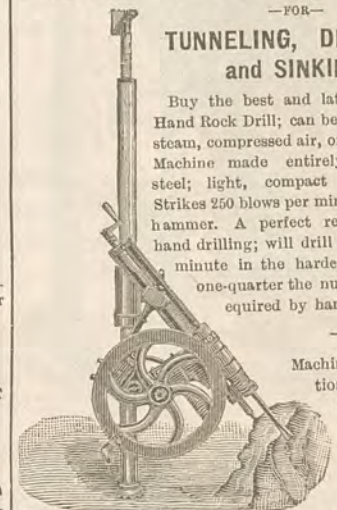
To Joshua Hendy Machine Works, No. 51 Fremont  
St., S. F.—GENTLEMEN: We have used the "Challenge"  
and "Roller" or "Templeton" Ore Feeders in our mill for  
the past three years, and I am free to say that I con-  
sider the "Challenge" far superior to the "Roller"  
Feeder, in that most important of all things in a quartz  
mill, namely, the regular feeding of ores to the bat-  
teries. If the "Roller" Feeder is regulated to feed finely  
pulverized ore, the coarser ore will choke the outlet of  
the Feeder, and no ore can reach the batteries. If, on  
the other hand, it is regulated to feed coarse ore, then  
the fine ore when it comes will sluice right through and  
fill the batteries. The "Roller" Feeder requires constant  
attention. Yours truly,  
(signed) N. W. CROCKER, Supt.

CALIFORNIA  
HAND ROCK DRILL,

—FOR—

TUNNELING, DRIFTING,  
and SINKING.

Buy the best and latest improved  
Hand Rock Drill; can be run by hand-  
steam, compressed air, or water power.  
Machine made entirely of crucible  
steel; light, compact and durable.  
Strikes 250 blows per minute with 7-lb  
hammer. A perfect reproduction of  
hand drilling; will drill one inch per  
minute in the hardest rock, using  
one-quarter the number of drills  
required by hand labor.



Machines on exhibi-  
tion at No. 32  
First St., San  
Francisco.

Send for  
Circulars.

GEO. T. EMERY, General Agent.

DEWEY & CO  
PATENT  
SOLICITORS.  
252 MARKET ST. S.F.  
ELEVATOR 12 FRONT ST. S.F.

## JAMES' PATENT RECIPROCATING STAMP MILL.

(PATENTED AUG. 16, 1881.)

Weight of Boss and Shoes (1200 pounds) acts on  
each Shoe separately. It is practically the same as  
the regular Stamp Mill.

Capacity, 6 Tons in 24 Hours. 4 H. P.

Parties wishing to test the Mill with any ore  
they may bring, will find one in operation at our  
works in this city.

## PRICES:

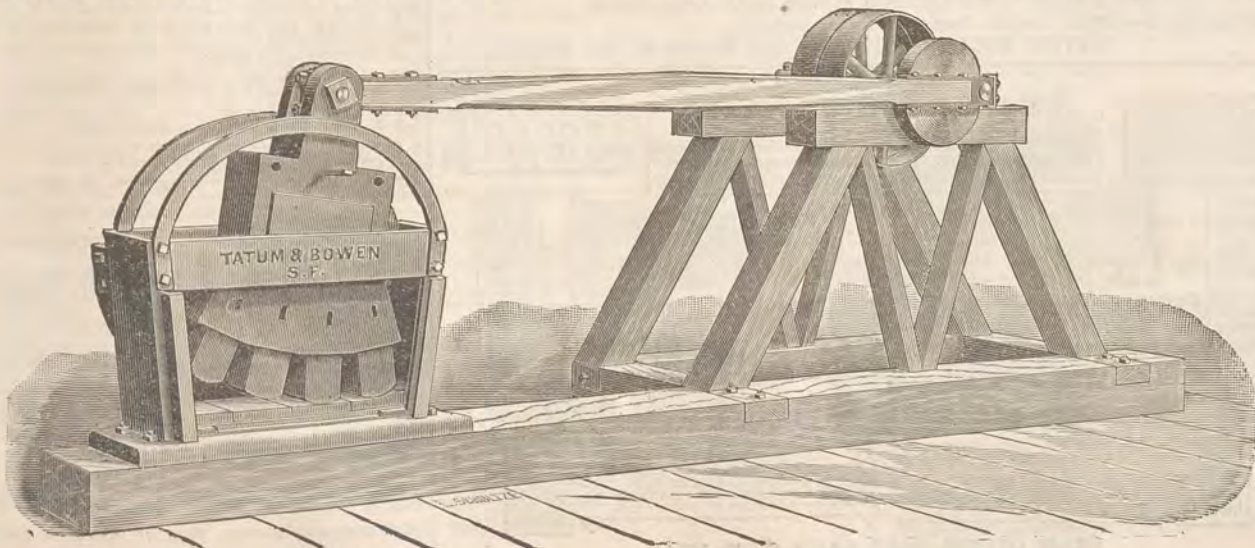
Reciprocating Stamp Mill,	\$350 00
Rock Breaker, - - -	100 00
Automatic Ore Feeder, -	50 00
Single Track Ore Car, -	40 00

SEND FOR CIRCULAR.

TATUM & BOWEN,

34 & 36 Fremont St., San Francisco.

91 & 93 Front St., Portland, Oregon





NOTICE TO  
**MINING MEN,**  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.

**Engineers' Tables of Progress**

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

**NEW YORK  
AQUEDUCT TUNNEL**

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, Etc. address:

**INGERSOLL ROCK DRILL CO.,**

REPRESENTED BY

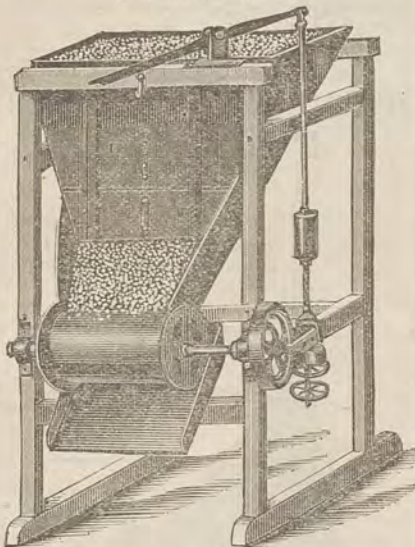
**BERRY & PLACE MACHINE CO.**

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

**THE ROLLER ORE FEEDER**

[Patented May 28, 1882.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

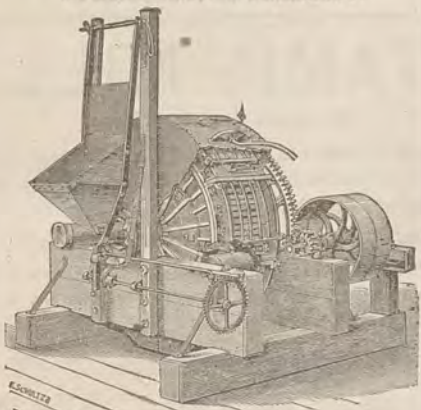
In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

**Golden State and Miners' Iron Works.**

Sole Manufacturers,

287 First Street, San Francisco, Cal.

**Tustin's Pulverizer**  
WORKS ORE WET OR DRY  
FULTON IRON WORKS, S. F.



MANUFACTURED BY

**HINCKLEY, SPIERS & HAYES,**  
**THE RUSSELL PROCESS COMP'Y.**

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.

**HOOD'S FOUNDRY COKE.**

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake. The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

**BALFOUR, GUTHRIE & CO.,**  
316 California St., San Francisco.

**FULTON IRON WORKS,**

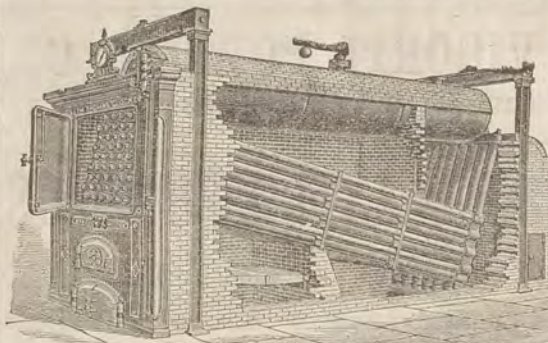
HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

MANUFACTURERS OF

San Francisco.



BABCOCK & WILCOX BOILERS.

**ENGINES AND BOILERS**  
OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

**Deane Steam Pump.**

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure  
or Compound, Stern or Side-wheel En-  
gines.

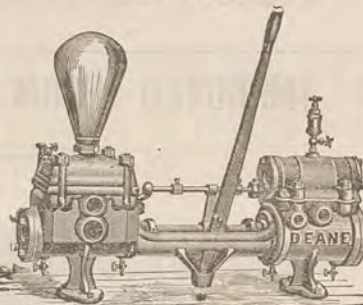
MINING MACHINERY—Hoisting En-  
gines and Works, Cages, Ore Buckets,  
Ore Cars, Pumping Engines and Pumps,  
Water Buckets, Pump Columns, Air Com-  
pressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for  
Dry or Wet Crushing, Amalgamating  
Pans, Settlers, Furnaces, Retorts, Con-  
centrators, Ore Feeders, Rock Breakers,  
Furnaces for Reducing Ores, Water Jack-  
ets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MA-  
CHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines  
and Boilers, Dredging Machinery, Pow-  
der Mill Machinery, Water Wheels.



DEANE STEAM PUMP.

**PACIFIC ROLLING MILL CO.,**

.....MANUFACTURERS OF.....

**Cast Steel Castings and Steel Forgings**

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.

— ALSO —

**HOMOGENEOUS STEEL, SOFT and DUCTILE,**  
SUPERIOR TO IRON FOR

**LOCOMOTIVE AND MARINE FORGINGS.**

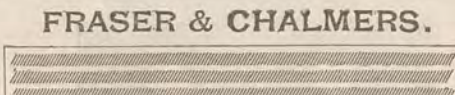
ALSO Steel Rods, from 1/2 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

**PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**

**FRASER & CHALMERS.**



CHICAGO, ILL.  
U. S. A.

General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

PERFORATED METALS FOR  
REVOLVING and SHAKING-SCREENS,

JIGS & STAMP BATTERIES.

Denver  
Office:  
No. 248  
18th Street,  
Denver,  
Colo.

NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.

Mexico  
Office:  
No. 11  
Calle  
de Duquesne  
Chihuahua,  
Mex.

UTAH OFFICE—SALT LAKE CITY, UTAH.

**Iron and Machine Works.**

**CALIFORNIA MACHINE WORKS,**  
**WM. H. BIRCH & CO.,**

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

— BUILDER OF —

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines  
Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power  
ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. **ESTD 1854** ORDERS SOLICITED.

**UNION IRON WORKS,**  
SACRAMENTO, CAL.

**ROOT, NEILSON & CO.,**

MANUFACTURERS OF

Steam Engines, Boilers,

AND ALL KINDS OF

MACHINERY FOR MINING PURPOSES.

Flouring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front St., bet. N & O Sts., Sacramento, Cal.

**Golden State & Miners Iron Works.**

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON THORNTON THOMPSON

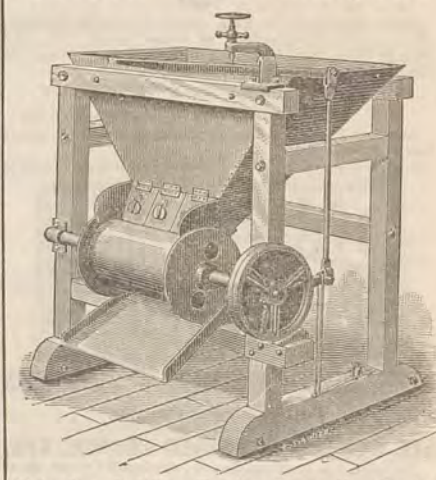
THOMPSON BROTHERS,

**EUREKA FOUNDRY,**

129 and 131 Beale St., between Mission and Howard, S.F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

**THE ORIGINAL  
Roller Ore Feeder**



This form of Ore Feeder is well adapted  
for its peculiar work.

In reference to a similar form of "Roller" Feeder,  
which is being manufactured and offered for sale in this  
city, and of which a cut appears in this journal, we have  
to say that the Superintendent of the Bunker Hill Gold  
Mining Company states that the "Challenge" is far su-  
perior to the "Roller," he having had both of them  
operating side by side. We shall be pleased to show this  
letter, upon application, to any one interested.  
We are also manufacturers of the "Challenge" and  
"Stanford Improved."

Prices furnished by the

**JOSHUA HENDY MACHINE WORKS,**  
39 to 51 Fremont St., San Francisco.

**N. W. SPAULDING  
SAW COMPANY**

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

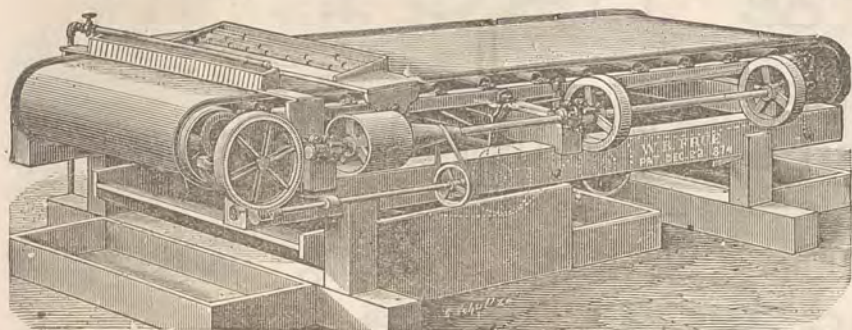
CIRCULAR

**Saws.**

SAW MILLS AND MACHINERY  
Of all kinds made to order. Send for Descriptive Cata-  
logue. 17 and 19 Fremont St., San Francisco.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS  
(\$575.00) F. O. B.**

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.

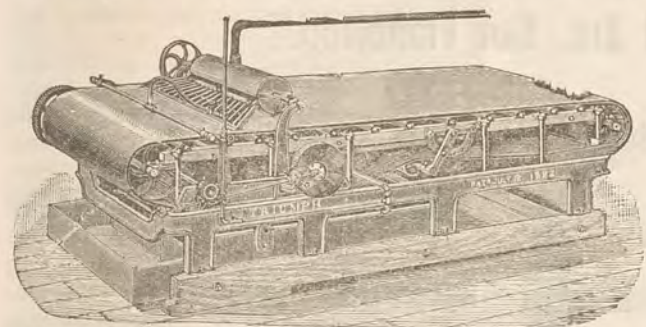
Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

**ADAMS & CARTER, Agents Frue Vanning Machine Co.,**

Room 7, No. 109 California Street,

**SAN FRANCISCO, CAL.**

# \$1,000 CHALLENGE ACCEPTED, PRICE, FIVE HUNDRED AND FIFTY DOLLARS (\$550.00).



**THE  
"TRIUMPH" ORE CONCENTRATOR.**

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE, placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

**JOSHUA HENDY MACHINE WORKS,**

Nos. 39 to 51 Fremont St.,

**San Francisco, Cal.**

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

**BEST SOFT LAKE SUPERIOR COPPER USED.**

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

**SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.**

**E. G. DENNISTON, Proprietor.**

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



SEND FOR CIRCULAR.

GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.  
J. C. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

## STEAM, AIR, AND HYDRAULIC MACHINERY.

**Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

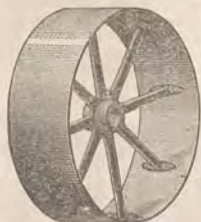
TRY OUR MAKE, CHEAPEST AND BEST IN USE.

## UNION IRON WORKS

SEND FOR LATE CIRCULARS

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS.



PAT. OCT. 25, 1881.

## PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.  
**CLOT & MEISE,**

Sole Licensed Manufacturers of the

**Medart Patent Wrought Rim Pulley**

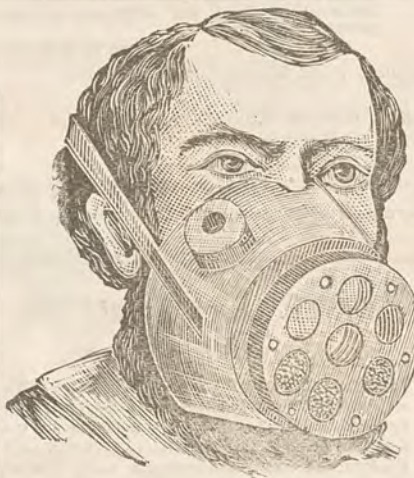
For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

**SHAFTING, HANGERS AND APPURTENANCES.**

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 & 131 Fremont Street,

San Francisco, Cal.



PATENT

## LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning  
and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, Threshing and Stock-driving, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

**T. E. JEWELL, Sole Agent,  
330 Pine St. (Room 4) San Francisco.**

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.



**Chicago Prices Beaten!**

ESTABLISHED 1860.

**S. F. PIONEER SCREEN WORKS,**

221 & 223 First St., cor. Tehama, S. F.

**J. W. QUICK, Prop'r.**

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Churns, Cement and Snout Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed

## INVENTORS, TAKE NOTICE

**L. PETERSON, MODEL MAKER,**

258 Market St., N. E. cor. Front (up stairs), San Francisco. Experimental machinery and all kinds of metal, tin, copper and brass.

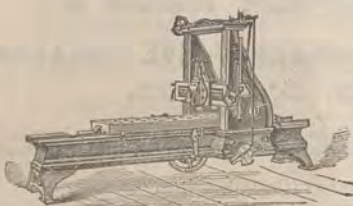
This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



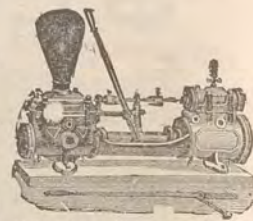
Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Knowles Steam Pump  
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**

SEND FOR CIRCULARS.

WM. H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

# RISDON IRON & LOCOMOTIVE WORKS

Location of Works, S. E. Cor. Beale and Howard Sts., San Francisco.

Manufacturers and Sole Agents for the Pacific Coast for

## HEINE SAFETY WATER TUBE BOILER.

HAS THE FOLLOWING  
ADVANTAGES:

**SAFETY,**  
**DURABILITY,**  
**ECONOMY,**  
AND  
**Facility of Inspection and Repairs.**  
**60,000**  
**HORSE POWER NOW IN USE.**

Boilers can be seen working in San Francisco  
at Palace Hotel, Spring Valley Water Works,  
Hueter Bros. & Co., California Jute Mills, and  
other places.

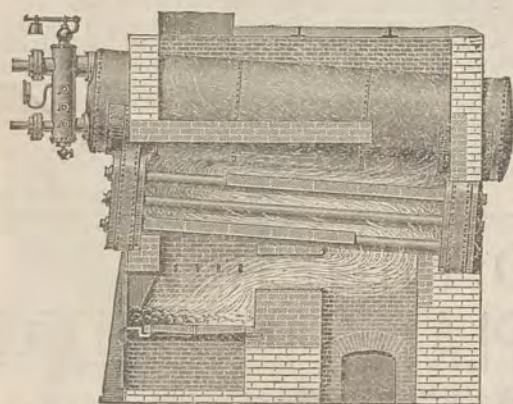
**GUARANTEED MORE EFFICIENT**  
than any other Boiler made.

Sole Agents Pacific Coast for

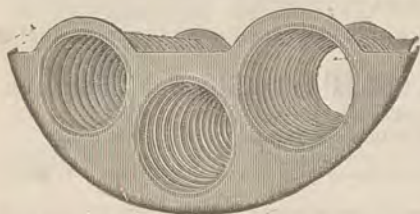
## FOX'S CORRUGATED FURNACE FLUES,

For BOTH LAND & MARINE BOILERS.  
Rapidly Replacing Old Style.

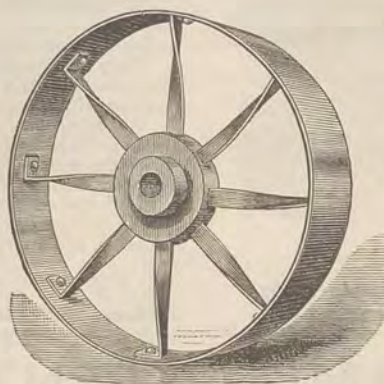
Over 10,000 now in use. Have just fitted 12  
furnaces in Oceanic S. S. Co.'s Steamer  
Zealandia. Send for Circular of com-  
parative tests.



HEINE SAFETY WATER TUBE BOILER.



FOX'S CORRUGATED BOILER FLUES.



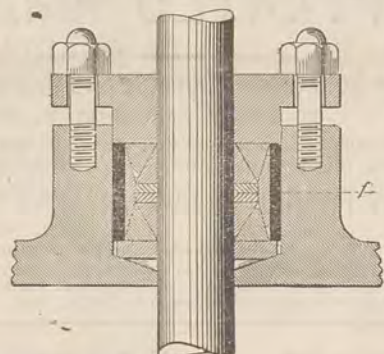
MACBETH'S PATENT PULLEY.

Also Manufacturers and Sole Agents for the  
Pacific Coast for

## MACBETH'S PATENT PULLEYS.

**STEEL RIMS,**  
**WROUGHT IRON ARMS,**  
**LIGHTEST, STRONGEST AND**  
**BEST PULLEY IN THE MARKET.**

**HALF THE WEIGHT OF CAST-IRON**  
Accurately Balanced.  
Cannot be Broken in Transportation.



## DUDLEY'S Patent Self-Adjusting Metallic Packing

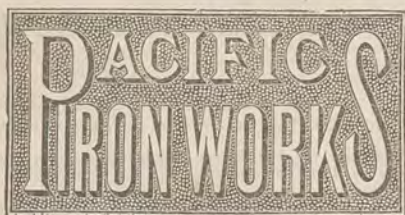
For LAND & MARINE ENGINES.  
Call and See It Working.

### BUILDERS OF

**QUARTZ MILLS**—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
**AIR COMPRESSORS**—Rope Power Transmission.  
**HYDRAULIC PUMPING** and Hoisting Machinery.  
**WROUGHT-IRON WATER PIPE** a Specialty. **NOTE**—Have just completed order for 35 miles of 44-inch  
pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.  
**SAW-MILL MACHINERY** of all kinds.  
**STEAM ENGINES**—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
**SOLE MANUFACTURERS** for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube);  
60,000 horse power now in use.  
**MACBETH PATENT STEEL-RIM PULLEYS**—Fifty per cent lighter and 25 per cent cheaper than cast-  
iron pulleys; will not break in transportation.

**REFRIGERATING MACHINERY** for Steamships, Breweries, and Cellars.**WILSON'S PATENT GAS-PRODUCER.****STEAM BOILERS** of all descriptions.**SUGAR MACHINERY**—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.**STEAMSHIPS**—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship  
Pumps, Steam Capstans, Cargo Winches, etc.**Builders of 120-stamp Gold Mill** for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain  
Mining Company

Send for Circular and Price Lists.



1850. 1885.

## RANKIN, BRAYTON & CO., MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

**PLANTS FOR GOLD AND SILVER MILLS,**  
embracing machinery of LATEST DESIGN and  
MOST IMPROVED construction. We offer our cus-  
tomers the BEST RESULTS OF 35 YEARS' EX-  
PERIENCE in this SPECIAL LINE of work, and  
are PREPARED to furnish from SAN FRAN-  
CISCO or CHICAGO, the MOST APPROVED  
character of MINING AND REDUCTION MA-  
CHINERY, adapted to all grades of ores and SU-  
PERIOR to that of any other make, at the LOWEST  
POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DE-  
LIVER in COMPLETE RUNNING ORDER,  
in any locality, MILLS, CONCENTRATION  
WORKS, WATER JACKET SMELTING  
FURNACES, HOISTING WORKS, PUMP-  
ING MACHINERY, ETC., ETC., of any DE-  
SIRE CAPACITY.

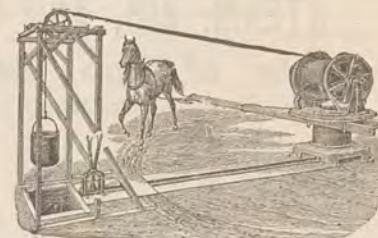
## WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD  
ores of NEW and ORIGINAL DESIGNS, covered  
by LETTERS PATENT. No other Furnace CAN  
COMPARE with these for DURABILITY, and in  
CAPACITY for uninterrupted work. MORE  
THAN 150 of them are now RUNNING in various  
parts of THIS COUNTRY, as well as many in  
FOREIGN COUNTRIES, giving results NEVER  
BEFORE ATTAINED as regards CONTINU-  
OUS running, ECONOMY of fuel, AMOUNT and  
QUALITY of BULLION produced. These  
CLAIMS have been PROVEN BY RESULTS in  
ANY NUMBER of INSTANCES, and the  
GREAT SUPERIORITY of this SYSTEM of  
smelting ores DEMONSTRATED BEYOND  
QUESTION. COMPLETE PLANTS furnished  
to order of any CAPACITY, with ALL IM-  
PROVEMENTS that experience has DEMON-  
STRATED as VALUABLE in this class of work.



Beyond question the cheapest and  
most effective machine of the kind  
now in use adapted to all grades and  
classes of ores.

This machine has been THOROUGHLY TESTED  
for the past TWO YEARS, under a GREAT VA-  
RIETY of CONDITIONS, giving most EXTRA-  
ORDINARY results FAR IN ADVANCE of  
anything EVER BEFORE REALIZED. A re-  
cent COMPETITIVE TEST at the Carlisle Mine in  
Mexico, showed an ADVANTAGE OF OVER 30  
PER CENT in favor of THE DUNCAN. The  
amount SAVED OVER THE TRUE being suffi-  
cient to PAY THE ENTIRE COST of the ma-  
chines EVERY MONTH OF THE YEAR. One  
of its MOST VALUABLE features is as an AMAL-  
GAMATOR. It saves all THE AMALGAM GOLD  
and SILVER that ESCAPES the BATTERIES,  
PANS or SETTLERS, making the machine worth  
MORE than ITS COST for THIS PURPOSE  
ALONE.



## BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a  
FIRST-CLASS HOIST, and affording means for the  
CONTINUOUS OPERATION of a BLOWER,  
WITHOUT interfering with the HOISTING AP-  
PARATUS. It is made ENTIRELY OF IRON,  
no piece WEIGHS OVER 300 POUNDS. At the  
ORDINARY SPEED of a horse, a 700-pound  
BUCKET OF ORE may be raised 75 feet per  
minute. The HOISTING-DRUM is under the  
COMPLETE CONTROL of the man of the shaft,  
and is CAPABLE of CARRYING 500 feet of five-  
eighths steel rope. SEND FOR CIRCULAR.





# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, DECEMBER 25, 1886.

VOLUME LIII.  
Number 26.

## Formation in Copper Mines.

We give on this page engravings of a different class of copper veins from those described in the PRESS last week, as occurring in Clifton District, Arizona. The ores of both the second and third class being found in a siliceous country rock (whereas the ores of the Longfellow and similar mines are in the limestone), the gangue is more siliceous, and there is more or less sulphur in the minerals. The most prominent development of this class of ores is on the Metcalf hill, something over two miles northerly from the Longfellow mines and near the center of the Clifton copper-basin. Fig. 1 illustrates the character of deposition of these ores.

At the surface the veins form a *stockwork* in the porphyry. In depth, all the small branches of ore, covering in places a territory 100 feet in width on the surface, unite and form a single vein, which has been developed by the lower adit, shown in Fig. 1. A great deal of development-work has been done in depth on these and the other mines formed in porphyry, and the result has (continues Mr. Wendt) invariably proved that these veins rapidly deteriorate in depth and become valueless under the commercial conditions ruling at present in the Southwest. The croppings of the Metcalf mine are worked as an open cut. Several hundred tons of ore from the thin strings and small veins are loosened at one blast and then sorted. The Queen group also belongs to this class of mines.

The Coronado mines are also of this class. They are several miles west of the Metcalf and Longfellow claims, and are found in a huge dyke of quartz-porphyry cutting through syenite and granite. The latter abuts against it and is surrounded by stratified limestone. There are six claims located on this dyke, the Boulder, Horseshoe, Coronado, Crown Leaf, Copper Crown, and Matilda. When first examined by Mr. Wendt in 1881, these mines formed to all appearance an inviting prospecting field. Their large development in late years has not, however, borne out the expectations then expressed by Mr. Wendt. It is a well-known fact, alluded to in a former report on this mine by the writer, that contrary to the notion held by the vast majority of the public, metallic mines grow poorer in depth in nine cases out of ten. The decomposed surface-ores are the richest. The undecomposed base ores underlying the surface ores are both poorer and more difficult to mine and beneficiate. This has been the history of all the copper-pyrites mines in the Alleghanies. It has been the history in the Lake Superior region, where rich black oxides and accumulations of native copper are of frequent occurrence when opening the mines. It has been the history in the well-known mines of Spain, now so important by reason of their enormous production of copper from low-grade pyrites; and the same may be confidently predicted in every instance. The Coronado mines, unfortunately for the owners, have presented an extreme case of rapid depreciation of ores in depth.

The vein itself is from 5 to 15 feet wide and can be traced continuously along and throughout the quartz-porphyry dyke. It is a fissure vein parallel with and in quartz-porphyry dyke. Fig. 2 shows a cross-section of it. In places the walls are very smooth and striated. Usually they are decomposed and kaolinized for some distance into the quartz-porphyry. Where not

so decomposed, the vein is of inferior quality. Indeed, it can be laid down as a law, both for this mine and for all others through the South-

The copper glance in the Coronado mines usually occurs massive. In the Horseshoe claim, where the vein is some 15 feet wide, it

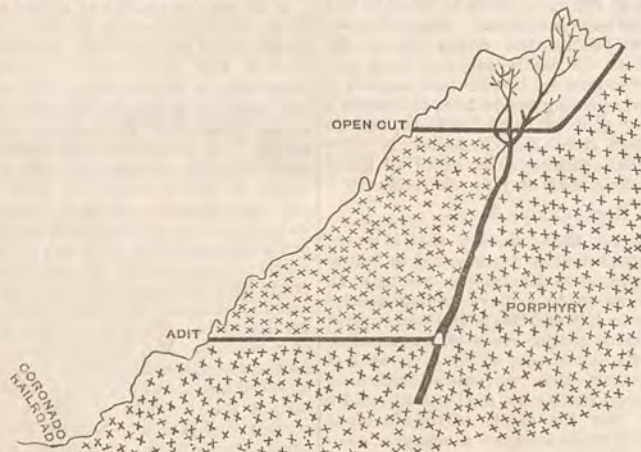


Fig. 1.—SECTION OF METCALF HILL, SHOWING COPPER MINES.

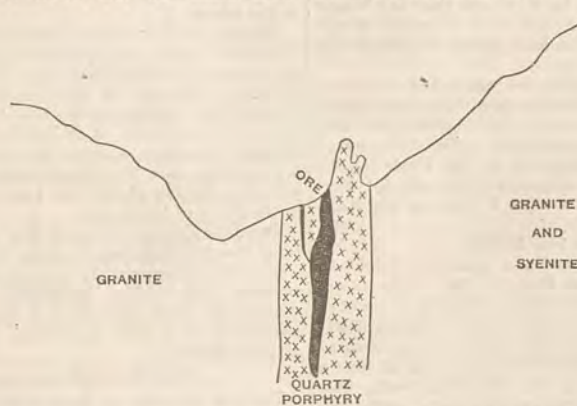
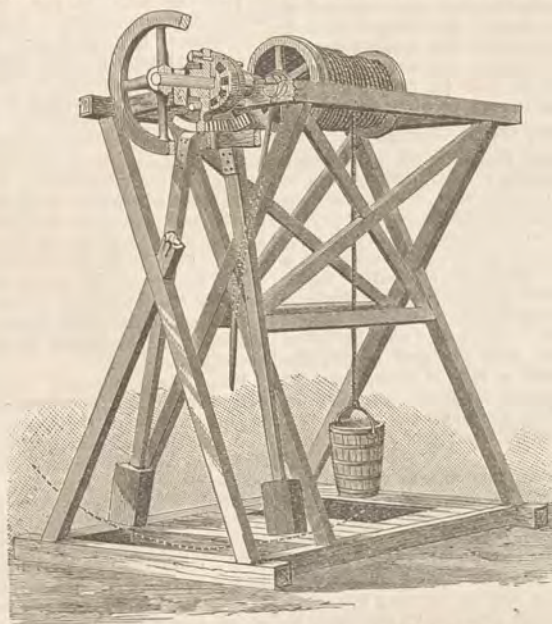


Fig. 2.—VERTICAL CROSS-SECTION OF CORONADO VEIN.

west, that indications of an extensive decomposition of the country rock are favorable to the finding of large ore bodies. From the very na-

occurs in minute particles scattered through the gangue, which is practically a matrix of kaolin with imbedded rounded particles of quartz, un-



A PENDULUM HOISTING APPARATUS.

ture of things this must be expected, for this decomposition is an accessory to the deposition of the ore, and where there has been an extensive deposition of ore, there an extensive decomposition of the surrounding rocks must be expected.

doubtedly in its original form a quartz-porphyry. On the Horseshoe claim a parallel vein has been cut and prospected to some extent. It is a counterpart of the main vein, but somewhat smaller. Wherever the copper glance in the Coronado mines has been followed down, it dis-

appears at a depth of 150 or 200 feet from the surface, and either the vein becomes barren or the glance is replaced by yellow sulphurets, sparingly disseminated through the gangue. Experimental concentrations of these yellow sulphurets gave assays of eight per cent. With the conditions governing the mining industry of the Southwest at the present time, such ore is valueless, although in the future, undoubtedly, these ores may be worked on an extended scale.

## A Pendulum Hoist.

A hoisting apparatus intended to meet the requirements of prospecting claims has been patented by John Sattes, of Butte, Montana, and an engraving of the device is shown on this page. Mounted upon the main frame is a shaft carrying a loosely mounted drum, a balance wheel, and a fixed collar, each vertical face of which is formed with ratchet teeth. Upon each side of the collar there is arranged a disk formed with a segmental rack and a downwardly extending arm to which a pendulum is attached. Meshing with each of the segment is a beveled pinion, mounted in a sleeve carried by a bracket fixed to the stationary frame. The disks are provided with pawls that are forced outward against the ratchet teeth of the collar by springs, the number of pawls being one less than the number of teeth. The motion of the shaft is imparted to the drum by a properly arranged clutch, which may be thrown into or out of gear by a lever. Attached to the drum is a brake, by means of which its motion may be regulated.

To operate the hoist, one of the pendulums is started, the force applied to it being gradually increased until it swings in the arc required. Any force exerted upon one pendulum will be transmitted to the other, owing to the connection established between them by their segments and the interposed pinion. As the pendulums swing, their pawls engage with the ratchet teeth of the collar—the pawls, of course, failing to engage during the return stroke—and impart a constant rotary motion to the shaft, and, when necessary, to the drum. If desired, the balance wheel may be left off.

**FREE COINAGE OF SILVER.**—A bill has been introduced in Congress which provides that holders of silver bullion may have the same coined into standard dollars of 412½ grains on the same terms as applied to the coinage of gold. That the silver dollar shall be the unit of account and standard of value in like manner as is now provided for the gold dollar, and shall be a full legal tender. It also provides that the Secretary of the Treasury, instead of the coinage of all the silver bullion presented, shall exchange therefor silver dollars or certificates, coining only as much of the bullion as the needs of the country may require.

**THE Bald Mountain Extension Drift Mining Company, Forest City, Sierra county, cleaned up last Sunday, for the previous six days' work, 96½ ounces of gold. The company is out of debt, has all winter and spring supplies laid in and paid for; and, with an extensive and rich gravel lead ahead of them, the prospect is very favorable for large and regular monthly dividends. Their main tunnel is 8212 feet long.**

**THERE has been a strong demand for silver from France of late.**



## CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eus.

## A Place for the Gold Where They Fine it.

EDITORS PRESS:—Your editorial suggestions in the PRESS recently, for prospectors and miners, were excellent, but I am not disposed to let the misquotation of scripture pass unnoticed. You say that a Biblical writer remarks, "gold is where you find it." Some years ago Mr. Almarin B. Paul made the same misquotation in the pages of the PRESS, but I let that pass, thinking others might point out the error. If the public libraries of San Francisco have not got a Bible or two that literary men of prominence might consult when desirous of quoting scripture, I fear the allegation of Rev. Dr. Sprecher, that it is the wickedest city in the United States, is not very far from the truth.

In Job, chapter 28 and 1st verse, appear these words: "Surely there is a vein for the silver, and a place for gold where they fine it." The word used is "fine," not find. Moses, the reputed author of the Book of Job, is evidently describing the contrast between lode and placer mining. In effect he says: "Silver occurs in veins, but gold is found in places, or placers, and is washed and made fine-gold fit for the market." It is not fair to the worthy old Hebrew law-giver to make him boom silver mining at the expense of gold mining. If people can once be brought to believe that the Bible asserts gold is only to be got by blind chance-digging, and not by skillful mining, the effect will necessarily be injurious to gold mines. If Moses knew anything of gold lodes, he was not alluding to them on that occasion, and I protest against his being improperly used to "bear" lode mining for gold.

A PROSPECTOR.

Arizona, Dec. 11, 1886.

## Lower Springs, Shasta Co.

EDITORS PRESS:—Since I wrote you last there has been quite an important excitement about the mines here. N. E. Muchmore has sold his mine and others are developing their properties. The mill that is being erected at the Gem mine is fast nearing completion. All of the machinery will soon be on the ground. The mill is placed north of the tunnel about 200 feet, just over the hill from the mine, and facing Middle Creek road, about half a mile above the bridge on Middle creek—a most beautiful place for a quartz mill.

The Bulkhead mine, south and east of the Gem mine, has a ledge which will average about two and a half feet wide so far, and the rock prospects elegantly for a new strike. The company has spent many long months running the tunnel to tap this ledge. They started in on the footwall side of the ledge and were greatly disappointed in finding hard foot-wall rock. They stuck to it like men, however, and it is hoped and thought that they have a good mine, as all present appearances indicate it.

The Eureka mine, known as the west extension of the Gem mine, is having a tunnel run upon the ledge, following it as work progresses, so as to prospect the ledge the entire distance of tunnel. Some very fine prospects are being found. This mining camp is destined to be of considerable importance to this northern part of California. All we want is more active men with money, like those interested in the Gem Company.

J. C. F.

Lower Springs, Shasta Co., Dec. 9, 1886.

A DEVICE FOR WRITING IN THE ABSENCE OF THE HAND.—A patented invention, called the brachionigraph, is claimed to render the art of writing possible in the absence or uselessness of the hand. It is therefore serviceable in cases of writers' cramp and paralysis of the fingers. The instrument is of simple construction, and consists of a long, light strip of iron, curved so as to be easily adapted to the ulnar border of the forearm. This splint is sewed into a casing of supple leather material, shaped so as to form a kind of gauntlet or sleeve for the forearm. The gauntlet is fastened to the forearm by an ingenious arrangement of screw hooks and studs, allowing of an adjustable degree of pressure. The bar or splint carries at its lower end a mechanism with a universal joint by means of which a pen may be held in any desired position. With this instrument the act of writing is performed by the muscles of the arm and shoulder, while those of the digits and thumb are thrown completely out of use. It is easy to acquire the necessary dexterity in the use of the invention for legible "handwriting."

A GOOD MINE.—The product of the Ontario mine for the month of November was 133 bars of bullion, \$1,917.68 fine ounces; ore sales, nine lots, \$73,917.11, a total for the month of \$155,913.79. This, added to the product of the previous 10 months of this year, gives a total for 11 months of \$1,540,171.16. A regular dividend of 50 cents a share per month has been paid; and yet Ontario stock sells at \$23 to \$24!—Salt Lake Tribune.

## The Golden Age in California.

## A Pioneer's Reminiscences.

At a recent meeting of the Pioneers of Alameda, Major E. A. Sherman read an address entitled "My Trip to California in 1849," from which we make the following extracts:

On the morning of the 24th day of May, 1849, Queen Victoria's birthday, with all the shipping gayly trimmed with flags, we dropped our anchor in the harbor, San Francisco.

It did not take long to get our baggage ready to go ashore, and but a few minutes elapsed ere the vessel was surrounded by boats, and we gladly paid the one dollar each to the boatmen, and in 15 minutes more were safely landed at the foot of California street, where the Bank of California now stands. Our original company having disbanded on board ship, each group of four or five members, into which smaller companies had been formed, pitched their tents in Happy valley, which lay between high sandhills, and we located about where Sansome and Market street join. Here we were encamped for nearly a week getting our supplies and outfits for the mines, to which nearly every new-comer was bound. On May 31st we took passage in a large open boat for the Embarcadero of Sutter's Fort, now Sacramento city, paying \$16 each for the privilege of rowing the entire distance of 120 miles, lying by at night and furnishing our own provisions. Stimulated by the desire to get at the mines before the gold should all be taken out, and being constantly spurred forward by countless swarms of myriads of prospecting mosquitoes, it became a question of "gold or blood" with us, and we pulled through from San Francisco in three days and a half, passing shipping of all kinds that were making their way up the river.

## Sacramento River.

On our arrival there, finding that it would be several days before a team could be had to haul our supplies to the mines, we took an unfinished contract to remove an immense lot of Chile flour in 100 and 200 pound sacks, piled up on the bank of the river at Sacramento, receiving \$10 a day apiece, which gave each of us about \$75 more than we started with from San Francisco. We took a contract to build a small bridge over the mouth of the slough at that place, and while doing so a stranger committed suicide by shooting himself in the head with an old single-barreled cavalry pistol. We buried him on the bank, where the City Water Works stand, and we were informed at the time that he was the first person ever buried in Sacramento city.

On the 12th of June we embarked in a boat for the mouth of the Feather river, and landed on the east side, where a Mr. Lawton had laid out the site for a new town called "Vernon," and immediately opposite a Mr. Jonas Specht had laid out the site of a town called "Freemont." Both town sites, I believe, are there yet.

## In the Mines.

We engaged an ox-team from Mr. Specht to take us to Rose's Bar, on the Yuba river, and on the 17th of June, 1849, the seventy-third anniversary of the battle of Bunker Hill, we were celebrating that event by our ox-team running away down the steep hill to Rose's Bar, and dumping our blankets, tools, and supplies in one promiscuous heap, with the wagon overturned and on top. Here we pitched our tent, sent back the team, commenced prospecting like hundreds of others, crossed the river in a canoe, staked out our claims and commenced mining in earnest. The pick, shovel, pan, rocker, bucket, etc., were immediately manufactured or procured, and as soon as we got the hang of the thing of rocking and panning out the gold, our labors began to be successfully rewarded, and when we only averaged an ounce of gold (or \$16) a day per man we considered it very poor diggings.

## The First White Woman.

Scarcely had we gotten down to our work when the first Fourth of July spent by us in California had to be celebrated, which was done by nearly all the men on the Yuba river paying a visit to the first white woman we ever saw in the mines. She was an Oregon woman, in a Bloomer costume made entirely out of buckskin, and who had accompanied her husband from Oregon in an ox-team. The first comers had the best show. She baked biscuits for us in a Dutch oven, and for each biscuit she baked she received a sack of flour, some of which had been packed on men's shoulders for several miles. Many gave her rich specimens, and it was a profitable Fourth of July for herself and husband.

Immediately after this miners and adventurers poured in from all quarters, and the first of the overland immigration began to make its appearance. Trouble commenced between the new-comers and the old about mining claims, and a disposition was manifested to overturn the district mining laws by reducing the area of each claim, which would have amounted to a confiscation of about one-half of each claim that was located, which would have been resisted with arms and ended in bloodshed; which, singularly enough, was fortunately averted by an event which turned the tide in another direction; the interest involved affecting not California alone but the nation itself.

## The Slavery Question.

There came at that time at Rose's Bar, on the Yuba river, a few Texans under the leadership

of General Green, who, during the war for the independence of Texas, was taken prisoner with others by the Mexican troops, confined in prison in Mier, where he was fortunate in being one of those who drew white beans, while one-tenth of the number who drew black beans were shot. The others were taken to the interior of Mexico, confined in dungeons, and made to work upon the public roads, quite a number of whom, with himself, made their escape, about which he subsequently published a book. General Green, with the other Texans, brought some of their slaves along with them, who were to work three years for their masters, at the end of which time they were to have their freedom. In the location of claims along the river, General Green also staked off claims in addition for his negroes, the ownership of which should be in himself. When this matter became noised about the miners protested strongly against it, and he was told that he would have trouble. He declared that he would do as he pleased and take up as many claims and work as many niggers as he saw fit, and if interfered with he would fight.

## No Slaves Allowed in the Mines.

At that time there were three claims located together by one company, called "The Governor's Claim," from the singular fact that they were owned by the three ex-Governors there from three different States, among whom was ex-Governor Shannon, of Ohio.

A meeting was called of all the miners on the river, and ex-Governor Shannon presided. A statement of the facts was presented and a resolution was unanimously adopted "that no slave-owners should bring slaves in the mines and take up claims in their names, nor should slaves be allowed to work for any man in the mines." A committee was appointed to wait upon General Green and inform him of the action of the meeting. Of that committee I was one, knowing General Green personally, having met him during the Mexican war. Governor Shannon went with us. We stated the result of the action of the meeting, which the entire body of miners would enforce, and advised him to either send his slaves back to Texas or set them free. He was very angry and talked of resistance. We told him that he was very foolish to express himself in that manner; that he could not hold his slaves a single hour if the miners told them to go, which they certainly would; that it was an unwise thing for him to bring them away from home, and he would have to take the consequences; that the people would allow no slavery or forced manual labor in the mines.

The next day he sold his own claims and left. Whatever became of his slaves we never learned, but when the orders came from General Riley, Military Governor of California, to hold an election for delegates to the Constitutional Convention to meet at Monterey, we elected Governor Shannon as one of the delegates, with instructions that the Constitution should provide that slavery should be forever prohibited in the State of California.

The action taken at Rose's Bar on the Yuba river was the first step taken in that direction; and as the news spread from one mining camp to another the public sentiment became so unanimous upon the subject that when the convention met that provision was adopted without debate.

## The Early Pioneers.

The best years of our lives have been given to the development of the Golden State of California. Those who came at the time do not exceed 10 per cent of the original number. Seventy per cent are mining upon the golden shores of the beyond, and the rest are living in the other States and Territories.

There are only four now living in California of my original company: Judge Robert Thompson, Samuel Heyneman and Rev. Charles M. Blake, ex-Chaplain of the United States Army, residing in San Francisco, and myself. None of the original company were ever tried or convicted of any crime or hanged, though some of us have helped to hang others who were guilty of foul murders, and the people rose to inflict condign punishment.

Of those who joined us at Mazatlan and came on the bark *Fannie* to San Francisco, not over a dozen are now living, so far as we are able to learn. Col. A. W. Von Schmidt and brother, in San Francisco; Dr. McMurtry, of Los Gatos, in Santa Clara county; Israel Luce, in Sacramento, and our Brother Pioneer Newton Sewell, the honored Treasurer of our society, are all that are known.

From these personal reminiscences of our early experiences the true history of the founding of the State of California should be made up. All that has subsequently occurred is interwoven with the life and progress of California, in which each, both men and women, have indelibly written their own; and not until so late a day as the organization of this society has woman, who suffered the greatest hardships, endured the greatest privations, and helped to rear a State, received the full share of honor and meed of praise in being admitted to full fellowship, which, if longer denied, we would have been unworthy the name of California Pioneers or American citizens and gentlemen.

DUN GLEN MINES.—Assemblyman Ward reports the Dun Glen mines as looking well, and the Ross and Thomas & Hendra mills running steadily. The mills are run on gold-bearing rock exclusively, though some very rich silver leads have been found in the district.—Silver State.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FERMENTING BUNG.—Thos. S. Glaister, Sonoma. No. 353,854. Dated Dec. 7, 1886. This is a bung for casks or vessels which are provided with a valve for the escape of gas under pressure; and the invention consists in the peculiar construction of the valve and its application to the bung. The object is to provide a simple and serviceable bung of the class which is effective in its operation, and not liable to get out of order.

HUB AND GENERAL BORING AND MORTISING MACHINE.—Antonio L. Navone, Calistoga, Napa Co. No. 353,887. Dated Dec. 7, 1886. This is one of that class of machines adapted for hub-boring, general boring of various kinds and mortising; it consists in new and useful mechanisms for fitting the machine on the hub and clamping it; for boring various-sized holes, with any desired taper, for rotating, feeding and reciprocating the cutter, bit, or blade-carrying spindle; for holding the work in proper position, and for serving other necessary purposes.

PUMP.—Logan Teague, Arcata, Humboldt Co., Cal. No. 353,897. Dated Dec. 7, 1886. This is a pump in which the discharge is occasioned by the displacement of the water caused by the introduction of the plunger within a confined body of water, and the suction is occasioned by the withdrawal of said plunger. The invention consists in a cylinder provided with peculiarly arranged entrance and outlet valves, a reciprocating plunger of smaller diameter than the cylinder, and adapted to be inserted and withdrawn from that chamber of the cylinder formed between the valves, and in an arrangement to provide escape for the water when the plunger is at rest, whereby the danger of bursting from freezing is prevented.

SAWMILL SET WORKS.—A. E. Roe, assignor to Tatum & Bowen, S. F. No. 353,886. Dated Dec. 7, 1886. In the mechanism for operating the feed-screws of the head-blocks in sawmills, considerable difficulty has been experienced in making the movements exactly the same when the lever is moved upward and downward, so that a certain number of movements of the lever will produce a corresponding movement of the screws, whether the movement be upward or downward. This invention consists of a mechanism by which this obstacle is overcome, and by which the ratchet-wheels attached to the screws of the head-blocks may be rotated an equal amount by the upward and downward movement of the operating lever. It consists also in a means for regulating the amount of cut in inches and fractional parts.

LOOM-SHUTTLE.—P. F. McGee and M. McMahon, Oregon City, Oregon, assignor of one-third to Albert Stokes, same place, No. 353,872. Dated Dec. 7, 1886. This loom-shuttle consists of a pivoted lever for engaging the base of the spindle-butt and locking the spindle, a small spindle having a head engaging and holding the rear of the spindle-butt against the wood of the shuttle, a spring actuating both the small spindle and the locking lever, and a lock spring on the base of the lever for the bobbin. The object is to bring a pressure upon the spindle-butt so directed as to hold it from behind against the wood of the shuttle, and thereby prevent the spindle from being tipped or pressed below the center plane of the shuttle, whether it is locked or unlocked, and at the same time to lock and hold the spindle steady on said plane, and adapted when locked to resist any blow or concussion which would have a tendency to press it either up or down.

ALMOND-HULLER.—James Hobart, Nordhoff, Ventura county, Cal. No. 353,857. Dated Dec. 7, 1886. Almonds have usually been hulled by hand, and with a large crop this is a tedious and laborious operation; but with a machine, such as Mr. Hobart has invented, the work of hulling is performed quickly and at much less expense than by any other method. The almonds are fed to a bed or frame, which has an uneven surface on its bottom, over which said almonds pass. A rubber is then reciprocated over the almonds, whereby their hulls are broken and separated from the nuts. The hulls thus separated and broken fall down through the open bottom of the bed or frame, and the nuts pass down an incline, where they are collected. In this operation of course some of the nuts will be broken; but these will fall through with the hulls and can be separated by a subsequent screening operation. The huller can be run by hand or power mechanism.

CAR SIGNAL.—Sands Forman, Gold Hill, Nev. No. 353,785. Dated Dec. 7, 1886. This is of that class of signals in which a whistle located upon or near the locomotive of a railway train, and connected with an air receiver, is operated by means of valves within an air pipe passing through the cars of the train and connected with the whistle and air receiver. Mr. Forman already has one patent on this class of signals. The new invention consists, in connection with a single pipe passing through the cars of the train, and having



suitable valves for effecting and controlling the escape of air from said pipe, of a novel valve, controlling the whistle, and a connection between said valve and the pipe and the air receiver, said connection being controlled by a cock or valve. The object is to simplify the signal by constructing it in such a manner that but a single pipe passing through the cars of the train is necessary.

### The Blue-Bird Mill, Montana.

The works cover something over an acre of ground and were built at a cost of about \$300,000. They are situated half a mile below the mine, on a steep declivity or bluff, on the right bank of Silver Bow creek. The ore is conducted from the mine to the mill on a tramway by force of gravitation, no motive power being employed except to return the empty cars.

The mill is a dry crusher—that is, the ore is reduced to a fine pulp in a dry state, no water being used in the batteries. Sixty stamps are dropping on ore and 10 on salt, making 70 stamps in all. Twenty-six pans and 13 settlers are employed. A 400-horse power Corlies compound engine moves the vast machinery with the precision and steadiness of clock-work, scarcely a jar being perceptible in any portion of the immense building except in the immediate vicinity of the batteries. In the construction of the plant advantage was taken of the latest improvement in mining machinery and its working, hence the Blue-bird mill is not only the largest dry-crusher in the world, but stands as a model of completeness in details and of economy of working. The present capacity of the mill is 90 tons per day, which will be increased to 100 as soon as the roughness is taken off of the shoes, dies and batteries.

A machine shop, blacksmith shop and carpenter shop occupy a roomy building apart from the plant, where fine work under skillful hands is being daily turned out. In an apartment of this building electricity is generated for the lighting up of the entire works at night. The retort-house is a few rods distant, where the furnaces are in course of construction. The company will commence shipping bullion in about 10 days.

Wood, coal, salt and other mill supplies are brought to the doors of the great works by a track from the main line of the Montana Union Railway, 200 or 300 yards distant. All the buildings are thoroughly painted on the outside, and the woodwork inside bears evidence of the same care. Everything in and about the works shows order and strength in arrangement and masterly workmanship in construction. The whole reflects great credit upon Mr. Grant, the building superintendent.—*Butte Miner*.

### Nevada Mines.

The *Silver State* is indebted to the Superintendent of the Carson Mint for a copy of the report of the Director of the Mint on the production of precious metals in the United States for the calendar year 1885. Three estimates of the production of the precious metals in Nevada are given for 1885. The first is that of Wells, Fargo & Co., estimated by J. J. Valentine, and is as follows:

Gold dust and bullion, by express .....	\$1,253,355
Silver bullion, by express .....	6,575,430
Ores and base bullion, by freight .....	1,384,368

Total .....

The second is the production, as reported to the State Controller by county assessors, which is given by counties, and aggregates \$6,636,781.16. In this report Humboldt county is credited with \$253,512.12 in gold and silver.

The third estimate is by William Garrard, Superintendent of the Mint at Carson. This is also given by counties, the aggregates being as follows:

Gold .....	\$3,083,800
Silver .....	6,229,311

Total .....

Mr. Garrard states that his estimates are based upon the above reports, upon the answers of many mining superintendents, and the best available information from all sources. He credits Humboldt with having produced \$80,000 in gold and \$250,000 in silver, making a total of \$330,000.

**PATENTS TO MINING GROUND.**—The owners of mining ground of any kind should get patents for their claims or ground. Possession may give a good title as long as that possession is maintained by a strict compliance with customs which have the strength of law. But possession is good only against parties other than the United States. The policy of the United States can change in regard to mining grounds which are not conveyed to owners by the United States. When the Government, however, gives a man a patent to a piece of ground, the ground is that man's. No change of policy will affect his ownership. The patent gives the best title, and that is what every owner of land, mining or other, ought to have. And then it really costs less to get the perfect title which a patent gives than it costs to keep up a possession which may give a good title, but certainly does not give the best. Congress may pass a law which will do away with mere possessory titles; Congress cannot enact a law which can do away with patented titles.—*Foot-hill Tidings*.

### River-Bed Dredging.

The *Virginia Chronicle* has the following to say concerning the small steam dredge which Dr. Rae constructed to prospect the Carson river-bed, in successful operation near Dayton. The doctor says the experiments with it demonstrate that the value of the deposit of quicksilver and amalgam mingled with the sands lying above the bedrock of the stream is far beyond all estimates heretofore published.

The deposit varies in depth from 4 to 90 feet. Careful assays of the material in bulk ranged from \$3 to \$75 per ton. Of this, 50 per cent is quicksilver and amalgam, and 25 per cent sulphurets.

The deposit lies in stratas. The composition in some of these layers is of an adhesive nature in the form of slimes, which, when sucked up by the vacuum chamber, choke the pipe. The doctor will leave for San Francisco in a few days to personally superintend the construction of another small steam dredge, in which this fault, as well as numerous other defects in the dredge now in use, will be remedied.

The scows to receive the machinery of the practical working dredges, as heretofore stated, will be 100 feet long and built in sections, each 20 feet in length, bolted together on the same principle as canal-boats plying on the New York and Erie canal. The object in constructing the scows in sections is for the purpose of facilitating the moving of such long craft around the numerous sharp bends in the Carson river. When a point is reached where an abrupt curve interferes with navigating the scow through the channel, the sections can be disconnected and propelled around the bends separately.

The object in having the scows of such great length is for the purpose of accommodating the triple strings of sluices, which will have a total length of 300 feet, and will be arranged in tiers one above the other, as heretofore described.

With the dredges of the dimensions of the operating size above described, the doctor estimates that it will require a decade to recover the wealth buried in the Carson. Dr. Rae announces that he intends to make this dredging project the final crowning effort of a life successfully devoted to scientific investigation in the broad field of mining engineering. With this end in view he is moving cautiously, and carefully considers every step, confident that the final result will vindicate his ability to resurrect the fabulous wealth now buried in the shifting sands of the river bottom.

He has demonstrated that he can raise with his dredge the deposit on the bedrock of the stream, and is equally sanguine that with his system of sluices he can secure a large percentage of the wealth it contains. The doctor's knowledge of river-bed mining was acquired through long years of practical experience. He is perfectly familiar with all its details and can "run down" a pan of dirt as closely, skillfully and speedily as the most experienced placer miner on the coast, as well as plan and direct the construction of the most complicated and ponderous machinery required to accomplish his ends.

Prominent mining men, who, before witnessing the prospecting dredge in operation, were skeptical in relation to the success of the project, are now convinced that it is perfectly practical and that the dredging process is the only method whereby the wealth of the river bed can be resurrected, and that Dr. Rae is the right man in the right place.

**A QUARTER OF A MILLION.**—The Maryland quartz mine is situated due south of the Idaho quartz mine, which latter has already produced about \$10,000,000 in gold, and the Idaho ledge rims on its southeast side through the Maryland ground. The Maryland claim is not a railroad section, and is owned by the Maryland Mining Company—a corporation among whose stockholders are S. P. Dorsey and the Coleman Brothers, of Grass Valley. Some time since the C. P. R. R. Company undertook to prove off the mineral from certain lands in that vicinity, among which were certain portions of Section 25. Somehow the lot, on which the Maryland stands, became afterward "listed" to the Railroad Company by the Sacramento Land Office, which entitled the company to a patent therefor as agricultural land. Subsequently the land was quit-claimed by the Railroad Company to certain persons having no interest in the Maryland mine, but as the patent has not issued, the Maryland Company are said to have taken steps to preserve their rights and show the nature of the land. The Maryland people have spent about \$30,000 on their mine, but hold no patent to it. As the only extension of the Idaho ledge ever discovered, the Maryland mine is reputed to be worth a cool quarter of a million.—*Nevada Transcript*.

**HARDENING GUN BARRELS.**—English newspapers report that a Mr. Neupert proposes to improve by condensation and hardening the barrels of small arms, tubes and the like, of iron, steel or other metals, in their finished state, by subjecting them to a pressure of 500 to 550 tons while they are immersed in water or other suitable liquid in a sufficiently strong vessel, performing the operation by hydraulic pressure caused by a heavy hammer falling on a piston which closes the said vessel in which the objects to be condensed are inclosed.

### An Alaska Forest.

Enormous Trees Ground to Pulp by an Advancing Glacier.

Frederick Schwatka writes an interesting letter to the *New York Times*, which gives one a life-like pen picture of an Alaskan forest in the presence of peculiar surroundings. It moreover furnishes some valuable information in regard to the great size of some of the forest trees in that far northern region. We extract as follows:

Wandering around near camp, I was struck with astonishment at the great size of the trees of the forest into which we had crept. Within 20 feet of our camp-fire were two trees, one of which measured 12 feet 7 inches and the other 17 feet in circumference at the height of a person's arm from the ground. The latter had its thick, shaggy bark stripped off nearly to the ground, being a dead tree, and thus losing much of its measurement. About 30 yards from camp was a tree that gave 21 feet in circumference at about six feet from the ground. The most astonishing part was that such a forest should be found actually surrounded by ice 10 to 20 miles across in every direction. Of course, it is reasonable to suppose that trees were here before the ice, and that this forest probably once connected with the forests of the great flat lands. Here was undoubted evidence that this small forest was being obliterated rapidly by the advancing front of the Guyot glacier, the foot-ice grinding the huge trees into pulp and splinters as surely as a quartz-crusher grinds the rock into powder. Trees five and six feet through were bent over and splintered as if they were brush, while some of the fallen trunks were split longitudinally into perfect kindling-wood. It was the mills of the gods grinding slowly, etc. Nor were they grinding so very slowly, either, as one could see by comparing them with other glacial action near by. But a little way off, probably a half a mile to a mile away, was a small clump of woods into which the glacier in the past had protruded, as shown by the fallen shattered trunks that lay near the edge of a small moraine, from which the glacier had now retreated a great number of rods.

Out from the bristling line of shattered tree trunks, piled over each other for nearly or fully 100 yards, all the spruce trees were dead, but still standing, their whitened trunks and long, gaunt limbs contrasting strangely and conspicuously with the trees still covered with foliage that formed their background. These dead evergreens had been actually killed by the proximity to the ice without its touching them, and either by its chilling influence, kept up throughout the year for probably centuries, or the constant application of the ice-water about their roots preventing their growth; for along this foot-ice there was always a marshy stream of ice-water draining off to the nearest muddy creek or rill. This was true of the glacier foot, not over 50 yards from our camp in the forest, for here we got our water for cooking purposes, but here, also, the ice of the glacier had evidently come forward so fast that the trees were rather killed by direct crushing of their trunks and limbs than by the slower one of the influence of the great masses of ice near by, and it was possible to sit down on this foot-ice of the Guyot glacier, probably 10 to 20 feet thick at that point, and at the same time be under the shade of a huge evergreen tree, if a person desired two such cooling influences at the same time. Thus I came to the conclusion that the front of this great glacier was like the fingers of some huge radiating animal prolonging themselves outward and retracting again at long intervals, that would require many human lives one after the other to measure a single stride and its backward flow.

**THE RENO REDUCTION WORKS.**—The near approach of the completion of the new reduction works is most gratifying. The flume was finished some time ago. The large Lefell wheel has been in position several days, and most satisfactorily does its work. Power has been attached to the rock-breaker, and the machinery for sampling. Two batteries, each with five 800-pound stamps, will soon be in shape. Five pans and two settlers are ready to be put in working order. The 40-ton Howell furnace is mounted and the masons and bricklayers will soon have completed their part. The dust chambers are in readiness. All this ponderous machinery is expected to be set in motion during the first week in January. Ore is coming from all directions by the sack and carload. Thus far the company has paid out about \$30,000 for ore that has been delivered. Nearly every available spot in the spacious storehouse for ore has been filled. In addition to this large quantity purchased, John Howell has of his own, in ore and concentrates, about 150 tons, a part of which has been shipped, and the remainder is at his mines and mills in the southern country. There is no reason why Reno should not become a second Denver. There are mines within sight, and the incoming of ore and samples indicates that nothing has been or is known, comparatively, of Nevada's mineral resources.—*Reno Gazette*.

**PLACER'S STONE INTERESTS.**—At present work is a little slack in the granite business in this county, though with the commencement of the work on the Mare Island drydock contract business in this line will take quite a boom.

Mr. Griffith, of Penryn, is in hopes also of getting the contract for the stone for a large new wine-storage building which an association is about to erect in San Francisco. The future outlook for the stone business in Placer is, to say the least, rather encouraging. The stopping of contract work at the Folsom State Prison alone will, if adhered to, do much to stimulate the granite business in the large quarries in this county. Two vacancies will occur on the 1st of January next in the Board of State Prison Directors, and our quarry-men should use their influence to have men appointed to fill these places who are known to be friendly to their interests.—*Placer Herald*.

### West Point Mines.

A correspondent of the *Calaveras Chronicle*, writing from Rich Gulch, says:

The country bordering on the Mokelumne river, extending from Mokelumne Hill to West Point, will undergo an unprecedented change in the way of the development of its mineral resources during the winter and the ensuing spring and summer. A mining boom is now under a fair headway in West Point and vicinity, and is attaining larger proportions as time progresses. The bonanzas there retain their volume and increase in richness as depth is attained, thereby attracting the attention of the outside world that that district well merits. West Point now boasts of possessing the banner mine of Calaveras county. It has two other dividend-paying mines that are running a close race in trying to outdo their more successful rival in unobscuring the precious metal, and in unfolding a greater extent of golden area. A half-dozen paying mines will be added to the list when the fleeting wings of another year will have passed around. The old quartz-mining camp now presents a lively appearance after having awakened from a long sleep, and reminds the old pioneers of the golden days of yore—the days of "grinds and cleanups." Thanks to some supreme power that it is no more a "twenty bean for a quarter camp." The boom will re-echo to Glencoe, Railroad and Rich Gulch, and from the many mines that will be opened and prospected in those localities a few will turn out paying properties, thus proving to the world that gold existing in paying quantities lies secreted within the bosom of these metalliferous mountains, and only awaits the helping hand of capital to unfold their hidden treasures.

The extravagance and mismanagement which has marked the path of many mining operations that have been carried on in this region in the past, is an undeniable proof that our mines have not had a fair test yet. And the capitalist who has partaken of the bitter pill of sad experience ought to be cautious in selecting only honest, practical and economical superintendents—those that will serve him faithfully and work for the best interests of their employer.

Mining is a business, and if not prosecuted from a business standpoint, a collapse will unavoidably follow even under the most favorable circumstances where the fissure may be profusely spangled with the glittering metal. This has been proven time and again where an experienced superintendent has held of a mining failure, and who by good practical and discreet judgment has lifted and redeemed it from all embarrassments and placed it on a paying basis. It is a great deal owing to the advent of these kind of men that mining successes are rife in the upper country.

**STATE MINING BUREAU.**—Recent contributions to the State Museum include: Globular pyrites, Alaska, from J. W. Kelly; gold quartz with petzite, Bald mountain, Tuolumne Co.; Fred Hellman; specimens of wall rocks and vein matter, Zeile mine, Amador Co., Cal.; W. F. Detert; crystallized apatite and galenite, Joplin, Jasper Co., Missouri; J. Z. Davis; specimens of ores from Washington Territory and the Coeur d'Alene district, Morris Cohen; rare minerals, Cornwall, England; silver ore from Shasta Co.; W. P. Litten; ores from Santa Fe district, Esmeralda Co., Nevada; J. R. Scupham; linarite, anglesite, and caldonite from Cerro Gordo, Inyo Co., Cal.

**A MOUNTAIN OF PAINT.**—A few months ago while some men were prospecting for gold in the western part of Calaveras county, large quantities of earth of all colors and shades were discovered. The substance rested in layers, and upon further investigation it was found that it extended over about 20 acres of the mountain on the side of which it was found. The substance was found to be various varieties of ochres. The find was a veritable mountain of paint containing all the primary colors with their various shades. Sanford & Wooley, of Campo Seco, are now putting up all necessary appliances for getting out the paint for market. Judges think the find is an important one.—*Stockton Mail*.

**A NEW MINING COMPANY.**—George Lovelock, who is largely interested in the nickel and cobalt mines in Cottonwood canyon, has just returned from San Francisco. He informed a *Gazette* reporter at Reno that a new company has been organized to work the mines, and the Union Iron Works at San Francisco will furnish the necessary machinery.

CHINESE iron and steel are becoming an important competitor in the world's markets,



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

## CALIFORNIA.

## Amador.

**ENTERPRISE.**—*Ledger*, Dec. 18: This mine, located at Enterprise, near Huse's bridge, on the Cosumnes river, is the only one in operation in that camp. It is owned by Messrs. Hayward & Hobart. Shaft has been sunk several hundred feet—600 feet, we are told—disclosing a very large ore body at that depth. Whether the rock carries gold in paying quantities is a problem that remains to be solved. It is probable that a crushing of the ore will be had at one of the Plymouth mills to test this question, and if the ore comes up to the paying standard, the erection of a mill near the mine will be proceeded with at once.

**MISCELLANEOUS.**—At the Moore mine they are running a drift north at the 500-foot level, for the purpose of striking a ledge which crops out on the surface, and appears to be of better quality than any yet discovered. The drift has been run nearly 100 feet, with over 200 feet to run to reach the point aimed at. It will take from two to three months to complete this work. At the big tunnel at Middle Bar they are working above and below the tunnel level, with no new developments to report.

**SUTTER CREEK.**—The prospects of the early starting up of the Wildman have materially improved during the past week. It is reported that the bond has been redeemed, and the property purchased outright. John Tregloan, Sen., has been East for some time, endeavoring to form a company to take hold of the property. In this mission he has succeeded. He is now on his way back, and is expected to arrive here in a few days. Several mining timbers have already been delivered on the ground, and laggin and other material is to follow. W. Strickland is making preparations to start up his gravel claim, situated about five miles above here. They have more ground opened than at any time in the history of the claim, and another good rain will enable him to commence operations.

**MORE STAMPS.**—*Amador Sentinel*, Dec. 15: Sixty more stamps are to be added to the Quartz Mountain mill. Clark Randolph has got his five-stamp mill to running at the Olive mine, Drytown. Ten additional stamps have been added to the mill of the South Spring hill at Amador city, making 30 in all. Timbers are being hauled to the Wildman mine, Sutter creek, which would indicate the intention of starting work upon that property. There is again talk of starting up the Alpine mine, of Plymouth. The result of the inspection of Prof. Thos. Price, made a couple of months ago, is said to have satisfied the English owners that they have got a good mine.

## El Dorado.

**GARDEN VALLEY.**—*Cor. El Dorado Republican*, Dec. 16: The Ivanhoe Min. Co. are pushing their hoisting works. Mr. Knox and his son, Charlie, of Oakland, the owner, are superintending the erection of the works. They bought Harry Grover's engine at the sawmill on Travers creek. What El Dorado county wants is a few men of means, like Mr. Knox, of careful and unceasing energy. With such men we will have mines that will pay and the long-lost reputation of this county will be regained. Chas. Boden has charge of the mine.

**GEORGETOWN.**—A number of quartz mines in the vicinity of Garden valley are in active operation this winter, and we are confident there will be a great boom in quartz mining around here before spring. The Walker brothers are putting up machinery on the Alpine mine, southeast of town. We learn that the ore they mined turned out better than they expected. The Slate mountain mine is still running, with fine prospects in both the upper and lower levels. The Grover brothers are getting fine prospects out of the New York mine. This promises to be a good mine in the near future. N. B. Houston has commenced work on the St. John mine.

## Inyo.

**NEW MILL.**—*Inyo Independent*, Dec. 18: A force of men was put to work, this week, preparing the ground for the erection of a new mill at Soda Springs. This mill is for the Mount Diablo Co., of Candelaria. Water will be carried down to the mill from the springs, in pipes. Already there is quite a little stir at Soda.

## Mariposa.

**NEAR BENTON MILLS.**—*Cor. Mariposa Gazette*, Dec. 18: Thinking that your readers would like to hear a little mining news from the north side of the Merced river, in the vicinity of Coulterville, Bull Creek and Red Cloud, I drop you a few items, gathered from a trip of inspection in that direction. In crossing the Merced river at the Benton mills, I commenced ascending the Buckhorn mountain where I first fell in with the Repetto and Lewis quartz mine, from which several rich pockets have been extracted during the last two years, and the owners are still trying to find more. From this mine we traveled through a large scope of country until we reached the Martin Walling mine, on Gentry's gulch, belonging to P. P. Mast. This old mine has in the course of time been extensively worked and produced a great amount of gold, but owing to the high cost of fuel, lumber and timber, further work upon the mine has ceased for the present. We visited the well-known Hasloe, which is also situated on Gentry gulch, and has been extensively worked and produced considerable gold, but it is expensive working on account of water. It has to be worked by steam power, and latterly it has lost all its machinery for hoisting rock and water by a fire which mysteriously broke out and consumed several thousand dollars worth of property. The work upon this mine is probably suspended for some time. The next mine we came in contact with belonged to Mr. John Uren, said to be a good mine and worthy of the attention of capitalists, which if it could command would result in its being the "star" mine of this section. Our visit next extended to the Bandereta, a well-known mine owned by P. P. Mast, and under the management of C. L. Mast, who is, and has been, the superintendent ever since the mine was purchased by the present owner. The owner of the Bandereta has displayed remarkable tenacity in

his holding on and execution of a vast amount of labor upon this mine for the last five years. He has not realized as large a return as was anticipated. Leaving the Bandereta and traveling up the river about two miles, we came to a mill worked by the Reed boys of Coulterville, and judging from common report the owners were being well paid for their labor. We now come to the Red Cloud, which at present—as the boys would express it—"is taking the cakes" from all others on that side of the river. It is owned by a San Jose company, and is paying regularly a fair monthly dividend to its stockholders. They have about 30 men employed in and about the mine. J. S. Carter is general superintendent, a man who is well qualified and liked, and a good man for the position he holds, in the interest of the company. John Guest, of Bear Valley, is his foreman under ground. The mine is 430 feet deep, which nowadays is a very shallow mine. From each 100 feet they have a drift or level run each way, which shows a good-paying mine all through. The average of the vein is about five feet wide. They have an 18-stamp mill, which is kept running by steam day and night by Louis Repetto and Thomas Marshall, Jr., two good, reliable men.

## Nevada.

**CENTENNIAL.**—*Transcript*, Dec. 17: Henry Richards, superintendent of the Centennial, was in town yesterday. He reports work to be progressing favorably at the mine. The sinking and drifting operations were for awhile interfered with by a heavy flow of water making in from the 100 level; but a reservoir was constructed at a point 130 feet below the mouth of the shaft, and now the water coming in from above that depth is pumped directly to the surface from the reservoir. This is much cheaper and easier than letting it go to the bottom of the mine and raising it all of the way up again.

## San Bernardino.

**EDWARDS' LEACHING WORKS.**—*Calico Print*, Dec. 18: West of Wall Street canyon, about 1500 feet west of the graveyard, Dan Edwards has built leaching works for the reduction of silver ores. He has built 5 tanks each 4½ feet wide by 8 feet in length and 3 feet high, and holding 5 tons each, thus giving a running capacity of about 15 tons per day. The tanks are supplied with water by means of a pipe connected at the lower end of town with the main pipe of the Calico Water Works Co. About 1000 tons of ore have been contracted for from the Cuba mine in East Calico, and to-morrow the process of leaching the ore will be commenced.

**WILLIAM LANDMAN'S LEACHING WORKS.**—The leaching works at the foot of Main street, formerly owned by W. A. Sharp, the absconded W. F. & Co.'s agent, now belong to Wm. Landman, clerk in I. Norton's store. A few days ago the works were leased by Jas. Harper & Co., who have commenced operations. They are confident that they will be able to successfully treat ore of a very low grade. The success of the leaching process will soon be followed by an increased activity in chloriding and systematic mining.

## San Diego.

**THE JULIAN MINES.**—*Cor. San Diego Sun*, Dec. 16: The continuous and increased flow of bullion from our camp, together with the rapid developments into prominence of some prospects, are attracting the attention of mining capitalists to this district.

Since the recent rich strike in the Owens lower levels our camp has been visited by capitalists and prominent mining experts. Some sales have been made and others are in abeyance awaiting the concurrence of principals. Notable among them are the Ready Relief mine, mill and timber land, on which is given an option to English capitalists for \$100,000.

The Tarwater & Stratton mine and ranch on which it is situated is wanted by Los Angeles capitalists for \$40,000. No sale at that price.

One-third of the Owens mine has been bought by one of the late owners of the Stonewall mine. Terms reserved. One-half of the Argonaut mine has been sold to a party in San Francisco. Terms reserved. Negotiations are pending with prominent mining men for the sale of other valuable properties.

The yield of bullion from the Owens mine the past month is largely in excess of any previous month's yield. Considering the quantity of ore reduced in that period, the product is marvelous.

From the Oriflamme mine is being shipped to its owners in Boston, one-half ton of ore, that they may see it treated under their own observation by the most scientific mineralogist and by the most practical metallurgist. It is known here that certain deleterious mineral substances are present in its ore and that the milling process at the mine is nugatory in separating the gold from its combination. The Stonewall mine continues its shipment of bullion as usual. Appearance of the mine is indicative of continuous shipments.

## Shasta.

**MILL.**—*Republican Free Press*, Dec. 18: On Monday morning W. R. Conant's 10-stamp mill, Squaw creek, started up in successful operation. There are 380 tons of good ore in the shed that will average \$30 to the ton. Eighteen tons of ore are being taken out daily; four tunnels are being driven ahead and general activity prevails. A force of 37 men is employed. Mr. Chick, of Chico, is here with the view of putting up one of his patent furnaces for the working of rebellious ores. One has been erected at Yreka and gives good satisfaction. It is claimed that Mr. Chick's process is equal to the Denver Works. If this is so, mine-owners can save a great deal of money, as thousands of tons of ore go to Denver annually from Shasta county. Mr. Chick proposes to build his works in Redding. The Riley & Matthews mine on Squaw creek is now owned by Mr. Riley. This mine was located by Jack Conant, and we understand that Jack received a payment of \$5000 on it last Thursday. Mr. Riley, since purchasing the mine, has thoroughly prospected it with two Huntington mills, and proposes to erect an old-fashioned 15-stamp mill; in fact, is making arrangements for the necessary pipe for water power. He has some very rich ore in sight, and being an excellent judge of a mine, the erection of a 15-stamp mill is a good indication of permanency.

**GOOD PROSPECT.**—*Shasta Co. Democrat*, Dec. 16: John Tiffin has at last struck a prospect at Lower Springs that has every earmark indicating a veritable bonanza. It joins the Muchmore mine lately

purchased by W. P. Miller, for a San Francisco company, which has yielded extraordinary rich ore so far as developed. John has succeeded in tapping his vein with a short tunnel, and thinks he can safely estimate that he has \$40,000 in sight. There is no more deserving miner in the county than John Tiffin, for he has done many months of hard work prospecting and mining with hard luck always against him. The gulches all around Lower Springs in the palmy days of placer mining in this county, yielded up immense pay in quartz gold.

**RICH QUARTZ.**—Tutlock, a prospector who discovered a rich quartz vein near Minersville about two months ago, has taken already over \$8000 with a rocker and hand mortar. Frequently chunks of gold quartz worth from \$100 upward are found in decomposed ledge matter.

## Siakiyou.

**SCOTT RIVER.**—*Yreka Union*, Dec. 16: The quartz mill which had suspended operations for a short time past, will resume operations Monday. Magoffey Bros. are doing well in their drifting claim on Graveyard hill, also A. Neilson, working on same hill. Several claims of minor importance are springing up, as water is getting more plentiful. Henry Preckel has resumed operations on Hooper hill. It is said that he is doing well.

## Trinity.

**WATER SCARCE.**—*Trinity Journal*, Dec. 18: While a little "wet" keeps coming all the time, it is so far not enough to do much good. The rainfall during the past week measured 64-100 of an inch, making the total for December 5.51 and for the season 9.53 inches. Hydraulic miners are working some, but the water supply is limited.

## Tuolumne.

**THE BASIN G. M. Co.**—*Independent*, Dec. 18: The Basin mine, we are happy to state, is in a fair way of purchase by Senator Jones & Co., of Nevada. This mine is about three miles southeast of Confidence, and was formerly owned by the Lewis brothers, who, it is said, have taken \$90,000 out of the vein. The company has determined to thoroughly explore this fine old mine, under the management of Frank McCann. Boilers and machinery are now on the way to the mine; also a new road is being built off north from the Buchanan road. Men were sent into the mine last Monday. Messrs. Frank McCann and James Hamilton have been for months past spending considerable money in cleaning out shafts and tunnels which developed sufficient richness to induce the senator to take hold. From the amount of the expenditures now about to be placed on the property, no doubt is entertained but that the mine will be ultimately bought, probably when the bond expires.

**THE LOUISIANA MINE.**—We also hear that this mine, at Cherokee, will receive some attention at the hands of the same company, but the mine has to be unwatered.

**HYDE.**—We expect that the Hyde mine will be shortly started up by some capitalists. This is a very fine piece of property. There is a very large amount of ore on the dumps, which is good-paying, milling material. The sulphurets are high grade—which carry about three per cent; vein in places 26 feet; water in any quantity—either high pressure or free water by overshot wheel; timber in abundance, and every facility for working. The old contract expired on the 15th. This mine will resume almost directly. There is no question but this is a very valuable property.

**GOOD ROCK** is being taken out of the Buchanan mine, and the mill is pounding away lively. There is no waste in the vein; all the ore being worth milling—which proves the high value of this property.

**WOOD AND MINES.**—Mr. G. C. Baker has been awarded the contract to furnish 500 cords of wood for the Buchanan mine. Eight cords of wood per day is consumed at the mine, or nearly 3000 cords in a year. When Mr. Baker gets to work on his contract, there will be about 80 men engaged in work for the company. Our readers can understand by this that when a few of the many good mines in this county are being vigorously developed, it means the employment of a large number of men and the immediate circulation of large sums of money.

**SOULSBYVILLE.**—*Cor. Union Democrat*, Dec. 17: It is reported that several mines in the mountains will be started the coming winter. Experts from below are around investigating all the mines lying idle. From indications now there is no doubt but there will be the liveliest times in the mountains shortly than there has been for years past. Mr. Frank McCann, one of the parties who has the Basin Slope mine bonded, returned from San Francisco last Friday. Work will be commenced on the Basin mine this week. A survey was made this week for a new road from the Buchanan mine road at a point near Duckwall's to the Basin mine, a short distance of five or six miles. A 40-horse power boiler and engine is on the way from below, and will be taken to the mine and put in place as soon as the road is completed. A quantity of freight has been taken to the mine, and there will be considerable work done this winter. It is a first-class property. Assessment work is being done on the extension Louisiana mine. Soon as water can be had to run the hoisting works, the water in the Louisiana mine will be taken out. It is rumored that a company is expected up in a short time to commence work on the mine owned by Summers & Winwood on Long Gulch. Assessment work is being done in the Raymond mine at the south end of town; it is a good property if a few hundred were expended to open it. In working out the assessments on the Summerset mine at Spring gulch, a two-foot vein was opened showing free gold. Very rich rock was taken out of this mine many years ago. With further developments it may make a fine property. Mr. Wm. Sherwood, of this place, is one of the principal owners. It is reported that Scott and Dove will return in a short time to start their mine, the Black Oak. J. Mitchell & Co. commenced hauling rock from their mine to the Soulsby mill on Monday of this week. Messrs. Riley Gilkey, Tim Dunton and S. Holmes have commenced work on the Lava mountain near their place prospecting for an old river channel. From indications there is no doubt but what there is an old river bed under the mountain, but machinery and considerable work may be required to reach it.

## NEVADA.

## Washoe District.

**CON. CALIFORNIA AND VIRGINIA.**—*Enterprise*, Dec. 18: Daily yield 400 tons, reduced at the Morgan and Eureka mills, giving average assays from battery samples of about \$35 per ton. 1600 level—Lateral drift running south from the north end of the mine extended 37 feet; total, 514 feet. 1500 level—North lateral drift from the Con. Virginia shaft extended 52 feet; total 370 feet. A vein of high-grade ore 10 feet wide has been passed through by this drift, and it is being carried forward to its proposed connection with the upraise above the 1500 level, which connection will be completed very shortly, giving much needed ventilation, when the rich ore mentioned will be further explored. 1435 level—The winze being sunk below the track floor of the east crosscut, after passing through about 30 feet of good ore, is now in inferior vein matter, with stringers of low-grade ore. 1400 level—The vertical winze being sunk below the track floor of the south lateral drift, 300 feet south of the Con. Virginia shaft, having passed through the ore vein, which dipped away to the east, is now in vein porphyry and low-grade quartz. It will reach its connection with the 1500 level the first of the coming week. 1300 level—The lateral drift north from the Con. Virginia shaft advanced 49 feet, making a total length of 501 feet. Material, vein porphyry, clay and quartz seams.

**BULLION.**—At the old Croesus shaft, 400 feet north of the Bullion shaft, new and very efficient hoisting works have been erected during the last three weeks, of sufficient capacity to work to the depth of 600 feet or more. A commodious building has been erected, with a good hoisting or gallow frame, engine, boiler, two safety-cages for the shaft and all other requisites for practical mining work and development. The shaft is 500 feet deep. By means of a hand windlass it was cleaned out and retimbered to the depth of over 100 feet, when the work was suspended until the new steam works could be utilized. The new works were started into successful operation day before yesterday, and the development of the mine will be proceeded with as energetically as possible. The proposition is to repair and reopen the shaft to the 300 level, where a good body of fair-grade ore was developed in the early days of the Comstock. It was thought to extend to the 500 level or deeper, but the present explorations will soon demonstrate the real merits of the matter. All this new development work is being done under the special supervision of Thomas Minifie, who sank this same shaft 23 years ago, at which time he owned the controlling interest in the Bullion mine. On the 300 level, his present objective point, he developed a fine large ledge, over 100 feet wide, of ore assaying as high as \$20 per ton, and extending to an unknown depth. Archie McDonnell remains general superintendent of the mine and works.

**BALTIMORE.**—Under the foremanship of James O'Donnell, one of the oldest experienced mine-managers on the Comstock, being for years foreman of the Yellow Jacket and subsequently the Imperial, this mine is now about to be practically worked and developed for all it is worth. A pipe is being laid from the flume of the water company, a distance of about 2800 feet, to supply the hoisting works, as well the mill near by, with the requisite water. This will be completed in three or four days, when steam will be raised and the works started into operation once more, after lying idle for over a year. The shaft is being retimbered from the 225 level up, the timbers being found to be badly decayed from dry rot. From the 225 level down, the timbering appears to be all right. The proposition after starting up the works is to commence regular ore extraction from both the 225 and 450 levels, where good-paying ore deposits have been found to exist in former workings. This is to be reduced in the five-stamp mill near by belonging to the company. It is a five-stamp mill, but arranged for five more stamps if required.

**SAVAGE.**—500 level—West crosscut No. 1 advanced and timbered 48 feet, making total length from main south drift 70 feet. This crosscut shows a width of 50 feet of fair ore. 600 level—South lateral drift extended 40 feet, making connection with main Savage shaft last Friday night. The whole force of miners on this level are employed excavating a large working station at the west side of the main shaft. The winze now being sunk below the 600 level is down 37 feet and continues in fine ore. 800 level—South drift advanced and timbered 87 feet. No crosscutting yet. 1640 level—The Suro Tunnel Co. has extended its track to the openings in the east quartz body on that level, which is now being explored. The hoisting works and surface machinery of the main Savage shaft are being thoroughly overhauled.

**QUINN MINE.**—Work has been actively resumed in this old mine, below Silver City. It is the old original Quinn mine, located by Col. Pat Quinn, over 20 years ago, and not the Haywood, south of American Flat, which he has been successfully working for the last year or two and getting rich. Several carloads of lumber, shaft timbers, etc., have been received, and new hoisting works will replace those which were destroyed by an explosion of giant powder five years ago, since which time the mine has been allowed to lie idle. The old shaft, which is 200 feet deep, is to be sunk 100 feet deeper as soon as the requisite repairs to the shaft are completed. Good works are in process of erection, and it may not be many weeks before the Quinn will be shipping bullion.

**BEST AND BELCHER.**—600 level—East crosscut No. 1 was advanced 20 feet, making a total length of 713 feet. East crosscut No. 2, 90 feet further to the northwest, has been extended 30 feet; total, 172 feet. West crosscut No. 1, opposite the last mentioned, is in 20 feet. All three of these crosscuts are in favorable vein porphyry and clay, with an occasional streak of quartz. 800 level—East crosscut No. 1 has been advanced 30 feet, making a total of 141 feet. Material, hard porphyry. 1500 level—The reopening and repairs to the station are progressing well, and the north lateral drift has been reopened and repaired to the extent of 76 feet.

**HALE AND NORCROSS.**—1300 level (eighth station)—Southeast drift advanced and timbered 30 feet. The face of this drift is in quartz, giving low assay. Seventh station level—The south drift from the main west drift has been extended and timbered 35



feet. On the same level the north drift has been advanced and timbered 20 feet. Work generally throughout the various levels of the mine is being actively prosecuted.

**CHOLLAR.**—The clearing out and repairing of the old shaft has extended to the depth of 375 feet. 350 level.—The lateral drift south from the Sharon shaft is making good progress in vein matter. An upraise is being made in the high-grade ore body, found near the Potosi line. This is up about 15 feet, in the same quality of ore.

**IOWA.**—Superintendent Curtis has commenced operations by exploring all three tunnels, in order to get a proper knowledge of the ore developments reported to have been made in the former workings of the mine, before starting the surface machinery at the shaft into operation. He is running tunnel B for the middle ledge of the mine, and within the last two days has cut a fine stringer of quartz, lying very flat, which prospects from \$8 to \$15 per ton in free gold.

**OPHIR.**—1065 level.—The main south lateral drift was extended 42 feet during the week. Material, favorable-looking vein matter. 1300 level (corresponding with the 1435 of the Consolidated California and Virginia). East crosscut No. 1, from the south lateral drift, 200 feet north of the Ophir shaft, was extended 22 feet in good-looking vein matter.

**POTOSI.**—250 or old Potosi tunnel level.—The south winze being sunk below the track floor of the Lindsay drift is down 15 feet, and continues in the same high-grade ore developed by the drift. This ore body is 95 feet long and 24 feet wide, and its upward and downward extent remains to be ascertained.

**ALTA.**—700 level.—The main south lateral drift along the east side of the Keystone ledge, in Alta ground, makes the usual advancement, with no features of interest to mention. The winze sunk from west crosscut No. 2 has connected with the 800 level and a crosscut west is exploring the good ore vein extending down from the level above.

**UNION AND MEXICAN.**—1300 level.—The joint north lateral drift and crosscut east from it are both making good progress in favorable working ground.

**ALPHA AND EXCHEQUER.**—The surface hoisting machinery is all on the ground, and being placed in position.

**OCCIDENTAL.**—The lateral drift south from the incline winze, 48 feet below the track floor of the upper tunnel, is out 53 feet. A few tons of low-grade ore is being extracted. Upraise No. 2 from the lower tunnel is in low-grade ore.

**UTAH.**—472 level.—The main west drift from the station advanced 30 feet, making a total length of 550 feet. The face continues in very favorable vein formation.

**SIERRA NEVADA.**—520 level.—West crosscut No. 5 from the north lateral drift was advanced 20 feet. Material, principally birdseye porphyry and very hard.

**JUSTICE.**—350 level.—The drift south from the old Woodville shaft is making good progress in low-grade ore.

**CROWN POINT AND BELCHER.**—Daily yield, 375 tons, principally from the 1600 and contiguous levels. The old mining sections are being closely scratched and worked for all they are worth.

**YELLOW JACKET.**—Daily yield, 150 tons, low-grade ore reduced at the Brunswick mill, on the Carson river.

**KENTUCK.**—Daily yield, 50 tons, principally from the 800 level and contiguous points.

#### Hawthorne District.

**THE MOUNT DIABLO MILL.**—Walker Lake Bulletin, Dec. 16: The Mount Diablo Mining Company has begun the erection of a 10-stamp mill at Soda Springs. The work will be prosecuted vigorously, and it is expected that the mill will be finished and running in three months. Ground was broken yesterday with 25 men at work and in a few days the force will be increased to 40 as work progresses on the tracks, mill, etc. Soda Springs will be a lively place from this time on.

#### Eureka District.

**MINING PURCHASE.**—Eureka Sentinel, Dec. 16: Col. Joe Grandelmeyer, of White Pine, with his usual good judgment and enterprise in mining matters, has purchased an interest in Hon. Thomas Wren's mines at Mount Hope, and at once commenced developing the Good Hope mine—one of a series. The Good Hope already has a tunnel in 600 feet, and Mr. G. has put men to work to extend it 200 feet further, believing that he will strike the ore body by the time that distance is reached. He has just let a contract to run 100 feet of tunnel in the Imperial mine on Treasure hill, Hamilton, in which there is a big showing of ore at the present time, and Mr. Grandelmeyer thinks it is destined to make a very valuable property.

#### Pioche District.

**MORE MEN.**—Pioche Record, Dec. 13: Foreman Martin, of the Pioche Con., during the week, has put on a few more men at the mine. It begins to look like business; as many as five or six loads of timber and planks being delivered at the mine per day, for retimbering the shaft, etc.

#### Rebel Creek District.

**ORE FROM THE OHIO.**—Silver State, Dec. 20: The Ohio Company at Rebel creek is having ore hauled here for shipment to Salt Lake City. Pat O'Brien's and F. P. Snapp's teams have arrived with loads, and other teams are on the way here with loads. Two carloads will probably be shipped in a few days.

#### Tuscarora District.

**BELLE ISLE.**—Times-Review, Dec. 17: Belle Isle and Navajo joint crosscut west, 150-foot level, has been advanced 31 feet. A line crosscut east 150-foot level has been started.

**TORNADO CON.**—We cut out a spacious station for winze No. 1 and sunk the same seven feet; at this depth we cut hanging wall of ledge which brought on us such a body of water that we had to suspend operations until we are better prepared to handle the same. We also cut a good-sized seam of quartz (feeder) therein which assayed well in gold and silver.

**NEVADA QUEEN.**—West crosscut, 150-foot level, will soon drain some of the water from the shaft.

South drift from No. 2 shaft has been advanced 23 feet. It has been in vein, but low grade. A crosscut west was started toward hanging wall. It has been driven 19 feet. It is looking very favorable to cut ore. Have had to put in some timbers, in the winze from No. 1 shaft, as it started caving as the water raised.

**NORTH BELLE ISLE.**—Have started to drive the 400-foot level from Belle Isle north line, which will be pushed north as fast as possible.

#### ALASKA.

**RICH IN MINERAL.**—Alaskan, Dec. 2: The country is rich in minerals, has the largest and perhaps the best-paying gold quartz mill in the world, and many known veins of valuable ore and some rich placer ground. But there is no demand for more labor, and indeed not enough to keep busy that now here, and no bookkeeper or salesman need come here expecting to find employment. There is some demand for mechanics, but it is not certain and steady yet. Prospecting is extremely difficult, and in short no man ought to come here now unless he has the means to stand some period of unprofitable experiment. The mining season opens from March to May, according to season. Parties going to the Yukon pass here, and many intend next season to start in February and use snowshoes as a means of transportation over the trail to the headwaters.

#### ARIZONA.

**AROUND PRESCOTT.**—Courier, Dec. 15: Tom Roach has leased a portion of his rich silver mine to Ryan & Flores, who will sink, drift and stoppe. They are to have two-thirds of all ore that may be taken out by them. Outside of chloriding, not much is being done in Turkey Creek district, but by spring, extensive mining and milling will be started. Mr. T. J. Nolan went to Groom Creek district Sunday last and took a look at the Nevada mine. He liked it and tells of having seen a great deal of good gold rock on the dumps. He found pretty deep snow in the mountains at the head of the creek. Messrs. F. M. Murphy, Geo. S. Porter and others have incorporated the Quality, a Hassayampa district mine of fair reputation. St. Louis capitalists have subscribed \$400,000 to work copper mines in this section. W. H. Meginniss and brother have taken their dry washing machine to Black Canyon creek. They say it saves the finest particles of gold and works two cent gravel with a profit. Gold is being shipped from the Del Paso mill, and silver from the Tip Top.

**PLACER MINING.**—Florence Enterprise, Dec. 16: The Gila River Gold Mining Co. was organized here last week. The company purpose placer mining on the Gila river in Pinal county, and with this object in view have purchased of Mr. J. F. Sanders the exclusive right to use his recently invented and patented amalgamator and concentrator along that portion of the Gila river lying within the boundaries of Pinal county, and also for a distance of 10 miles on either side of the stream. The contract also gives the company the exclusive right to manufacture and sell said machine within the district described. Mr. Sanders is now superintending the construction of a 4-foot machine for their use. He will remain here till the machine shall have been placed in successful operation, and will then go to other fields. The company is composed of Messrs. Julius O. Fischer, Geo. F. Meek, Charles Rapp and Thos. F. Weedon, who hold equal shares. The Sanders amalgamator and concentrator is not an experiment. Its capabilities have been demonstrated by the severest practical tests.

#### COLORADO.

**COLORADO CENTRAL.**—Georgetown Courier, Dec. 16: The product for November was 111 tons of ore, which sold for \$20,227.

**MENDOTA.**—The output for November, 87 tons, 625 pounds of ore, valued at \$5649.02.

**ONKIDA.**—A vein of ore 52 inches in width has opened up, which mills about \$100 a ton in gold and silver, and about 60 per cent in lead. Twenty men are employed.

**VICE-PRESIDENT.**—The lode has been leased to Ralph & Co., who, we understand, are prepared to put the property in productive shape. It is located near the Seven-Thirty group.

**DOVE'S NEST.**—The Woodburn Mining and Smelting Company, which is erecting the smelter at the mouth of Chicago creek, has leased and bonded the Dove's Nest lode on Seaton mountain, and started work. Sinking will be commenced soon, when a plant of machinery will be erected.

#### IDAHO.

**MINING BY THE FATHOM.**—Wood River Times, Dec. 15: William Whitley, an old miner who has had over 30 years' experience in the mines of California, Nevada, and Montana, called at the Times office, to-day, to request publication of the following statement: Early last month, George Montgomery, superintendent of the King of the West, received a letter requesting him to send 15 first-class miners to Rocky Bar. Mr. Whitley, three comrades, and others, went there at once, paying their own expenses. When they got there, they had to wait a week before going to work, when they were set to work, in hard blasting ground, on contract, at \$22 per fathom. This system has just been imported to this country from Cornwall, England, by Mr. Penberthy, foreman of the Ida Elmore Mining Company. A fathom is six feet long and six feet high, by the width of the ledge—whether the latter be one foot or 20. The work was worth \$35 per fathom. At \$22, the men could not earn their salt, yet they had to pay \$9 per week for board and lodging. Of course, the miners quit, and as they could not get work unless by the fathom, they were compelled to return to Wood River. Mr. Whitley and his comrades, therefore, desire the Times to warn all miners to keep away from Rocky Bar, at least until the fathom system of measurement is broken up, as they cannot make half wages at present. By very hard work they may make \$2 per day, and thus earn \$3 per week, after paying their board and lodging.

**THE CAMAS NO. 2.**—Parties who visited the Camas No. 2 mine yesterday, state that the new development on the 200 level is proving immense. The crosscut from the bottom of the shaft is 24 feet in, and has not cut through the ledge. The ore is

very rich, samples having assayed from \$75 to \$200 per ton. This development, being at a depth of 200 feet, demonstrates the downward continuation of the ore body from the surface to that depth, and proves the Camas No. 2 to be a million-dollar property, at least.

**MINING SALE IN SEVEN DEVILS.**—Idaho Statesman, Dec. 16: The Seven Devils mining district, in Washington county, which was first discovered many years ago, has not achieved any prominence as a prospective mining center until the past few years. About the heaviest operator in that district of late has been Mr. Levi Allen, of this city, who has acquired the ownership of a large proportion of the most promising claims in that section, upon which he has expended considerable money. Last fall Mr. Allen took in a large quantity of machinery and mining supplies. From an exchange we learn that the Peacock, White Mountain and Helena claims, which were owned by Mr. Allen, in company with Gov. Hauser, of Montana, and I. I. Lewis, of Ketchum, have been sold to Albert Keinschmidt, the millionaire banker and mining capitalist of Montana. The price paid for the claims is \$80,000, and the purchase price has been paid and transfer consummated. They were located in 1877, and a shaft about 50 feet deep has been sunk, and a number of open cuts run in on the ledge. The ledges are all rich in copper, and carry a large percentage in silver and gold.

#### MONTANA.

**BONDED.**—Anaconda Review, Dec. 16: The Southern Cross and Pleiades claims, located about one mile north of the Pyrenees mine, near Georgetown, have been bonded to Matt H. Ormand, an agent for a party of capitalists, for a period of six months. The Southern Cross, the best developed of the two locations, shows a very large outcrop. Two open cuts, each about 50 feet wide and 15 feet deep, have been run across the vein, which measures 20 feet in width and produced 600 tons of ore, 140 tons of which was milled and yielded \$8 per ton in gold. The shaft has been sunk to a depth of 35 feet at a point on the vein between the two open cuts, which exposes a vein 25 feet wide. Mr. Ormand left town yesterday for the mine, taking with him several miners who will be put to work at once sinking a 100-foot shaft on the vein. Then levels will be run and a regular system of crosscutting and exploring will be begun. Should the developments prove what is anticipated, the company will erect a 60-stamp mill early in the spring. The Moulton Mining Co. has declared dividend No. 11 of 7½ cents per share, aggregating \$30,000, to be paid on the 20th. For the month of November the Montana (Limited) Mining Co. worked 3750 tons of first and second-class ore, which produced \$189,100 worth of bullion, or saving a little over \$50 per ton. The company has 120 stamps in successful operation on the property.

**THE IRON-CLAD.**—This claim is of recent location, and is on Clear creek in what is called the Boulder country. The Iron-clad is a monstrous ledge, measuring as much as 30 feet and more from wall to wall, and consists chiefly of iron oxide, carrying lead, on the surface, and bearing lead carbonates at a slight depth. It is in lime formation, and of such a general character as to promise a rich mine. Numerous sample assays from all parts of the vein, which is nearly the width of the ledge, run well—from 40 to 100 ounces in silver, and a good per cent of lead. The owners are now surveying for a patent. A big strike is reported on Rock creek, in both placer and gold quartz ledges, and there is a general revival of prospecting and developing in that locality. A big "blanket" lead of silver ore has been struck in the vicinity of Henderson's gulch and is now being developed.

#### NEW MEXICO.

**THE STEIN'S PEAK MINES.**—Silver Bell, Dec. 18: The latest mining excitement is at Stein's Peak, N. M., within a few miles of the Southern Pacific Railroad and close to the Arizona line. The recent sale of the Beck mine, by Messrs. Smith, Weyman and Kemble to E. B. Gage and Charles Leach, of the Grand Central, attracted considerable attention and caused an influx of prospectors from Eastern Arizona and Southwestern New Mexico. According to the Lordsburg Advance, the former owners of the Beck mine are still in possession of the most promising claims—the Volcano and the Pocahontas. These are spoken of as the best developed as well as the richest and most extensive ore bodies in the county. In the Volcano the vein is 18 feet thick, all ore, and the wall has not been reached yet. The ledge crops out and is located for a distance of three miles. There are said to be other fine claims in the Kemble district, as it is named. A town site has been laid out and the town will be called Evansville.

**SOCORRO NOTES.**—Bulletin, Dec. 16: A new strike of manganese and peacock iron has been struck in the Jane Bowman, which greatly encourages the owners of that claim. Mike Wallace is striking it rich in the iron mine and Georgia Belle. These are the properties of which Mr. Wallace sold a one-third interest to A. A. Franzheim. As an index of the attention mining is receiving in New Mexico, we cite the fact that four new plants are projected, three of which will be located in this city, one of them for the treatment of copper. The Solitaire mine at Kingston was sold recently to Jeff Reynolds, the Las Vegas banker, for \$10,000. Some remarkably high-grade ore was taken from the Solitaire at one time, and it may yet prove a valuable property. The Hubbs smelter at Albuquerque was sold recently at an extremely low figure. Four-fifths of the real estate, with the smelter and all its appurtenances, were sold to John A. Lee for \$750. Some of the best citizens in Albuquerque were induced to invest about \$12,000 in this plant, which has been a failure from the start. Socorro is the only successful smelting point in the Territory. Messrs. Patterson & Hartwell on Saturday concluded the assessment on H. Wayne Russell's Silver Wave, on the east slope of the Magdalenas. Our reporter met them on the summit of the range Sunday, when they were on the trail to Kelly. The Star of Bethlehem and the Sulphurett, on the summit of the Magdalenas, are being worked for all they are worth, and are furnishing No. 1 ore. A company has been formed in St. Louis to work the Buckhorn, Buckhorn Extension, Colorado, Greeley, Eureka and the Eureka Extension mines, which are located on

Silver creek, in the Mogollons. The properties were formerly owned by Eli Mader, J. C. Mader, Capt. Cooney and Capt. Burris, of Grant county. Development work will commence immediately. It is probable that the company will soon erect a mill on Silver creek.

#### OREGON.

**QUARTZ AND PLACER.**—Jacksonville Times, Dec. 17: Piping is going on at the Sterling mine and excellent progress is being made. J. N. Casteel is running a tunnel to tap C. C. Beekman's ledges on Jackson creek. Considerable quartz is now being taken out of the mines in Jackson Creek district. If the present weather continues awhile longer a favorable mining season is assured. Some quartz from the Swinden ledge has been crushed in Brown & Co.'s new mill, which has paid well. J. Jensen has contracted with the Jacksonville Milling & Mining Co. to run 75 feet of tunnel at \$7 per foot. The miners of Steamboat district expect to make a good report. There are more of them this season. Many of the miners of Southern Oregon have enough water for present purposes, and it will not take a great deal more of rain to set all of them at work. F. O. Collins, Ed Langley and others who have been mining the bed of one of the creeks in the Big Applegate district, did well. W. H. Swinden has made another rich strike in his quartz mine in Blackwell district. Nothing would help the financial condition of Jackson and Josephine counties more than a wet winter. Hundreds of thousands of dollars will be taken out of the ground this season if there is plenty of water. D. W. Cryder, of Sam's valley, this week showed us some fine specimens of coal, which is said to equal the famous Cumberland coal in many respects. It was dug out of a well belonging to his son, where a well-defined vein exists, and which grows better as prospecting progresses. It is reported that a ledge of excellent coal has been discovered at Dan'l Reynolds's place in Meadow's precinct. The vein is said to be 11 feet wide and to give evidence of being an unbroken vein of large extent. The locators have gone down on it some 30 feet in the prospecting already done. Baumle, Klippel & Co.'s quartz mill has been lying idle for a few days, having crushed all the quartz on the dump. Different parties are busily engaged in getting out a large amount of ore, and operations will be revived quite soon. This mill is of great benefit to the district, and we hope to see it kept busily at work.

#### UTAH.

**REVIEW.**—Salt Lake Tribune, Dec. 17: The receipts in this city for the week ending December 15, inclusive, were \$141,338.35 in bullion, and \$45,989.93 in ore; a total of \$187,328.28. For the previous week, the receipts were in aggregate, \$120,180.39, of which \$69,759.17 was bullion, and \$50,421.22 was ore. Fine bar receipts for the week were \$70,490.03; base bullion, \$15,000; gold bars, \$13,600. The product of the Hanauer Smelter for the week was \$17,605 in bullion. The Bannock sent down from Era, on the 13th and 14th, \$6175 in silver bars. Ore receipts were, for the week, \$33,345.00 by McCormick & Co., including \$7985 from the Queen of the Hills and \$7644.93 by T. R. Jones & Co. The output of the Ontario for the week was 23,113 fine ounces and \$9913.52 in ore sales, a total of \$33,026.59. All goes well. The product of the Daly, for the week, was five bars of bullion, 6850.52 fine ounces, and ore sales to the value of \$7673.12, an aggregate of \$14,523.64. Little is known concerning the Horn Silver, locally. There are reports that the mine has been shipping ore, some of it rich; and also that it will soon make free shipments, to be smelted in this valley, but whether in the company's own smelters or in others, we are not advised. No figures are given, however, of past or prospective sales of ore or bullion.

**QUICKSILVER.**—Salt Lake Tribune, Dec. 12: Parties in from Marysvale say that about two miles from the Lucky Boy another quicksilver ledge has been discovered; that the owners of the Lucky Boy are erecting a furnace which will be ready for operation about the 1st of April. At present they are using a retort that turns out 160 pounds of quicksilver per day.

**THE GOLDEN TREASURE.**—Prior to six years ago the Golden Treasure, known as the Gold Hill, near Silver City, produced large amounts of ore, but it and several other mines there getting into litigation, they were shut down and have been idle ever since. The Golden Treasure, now owned by Thomas Marshall, Alex. Graham and J. E. Dooley, has been prospected lately by sinking a shaft on lower ground than the summit of the old work, and from this shaft a crosscut was made to tap the vein at a depth of 300 feet. Mr. Graham, who is now in the city, received a telegram last evening from his foreman saying that the ledge had been struck, opening up a fine body of rich ore. As gratifying as this news was, it was not unexpected. It is very probable that the Golden Treasure will soon become one of the active ore producers of Tintic district.

**PARK NOTES.**—Record, Dec. 18: A force of men under James Morey is pushing work on the Putnam group, above the Daly, by driving the tunnel further into the hill. It is understood that this work is being done preparatory to getting the property in shape for development on a large scale in the near future. The third large pump for the Anchor arrived yesterday and will be put in one of the lower stations of the mine in a few days. The water is drained to a point near the 500 level, and drifting in soft rock is going ahead with moderate vigor. J. M. Kennelly will keep his force at work all winter on the Great Basin and Scott tunnels. Owing to the almost neutral condition of the roads (being fit for neither wagon nor sleigh transportation) ore shipments to the sampler have been quite light the last 10 days. The Crescent is having some first-class ore hauled down the canyon and piled up at the sampler for shipment.

**ORE AND BULLION SHIPMENTS.**—For the 10 days ended last Monday, the Mackintosh sampler received 338,460 pounds of Ontario ore, 235,920 pounds of Daly and 26,030 pounds of Sampson ore; total, 600,410 pounds. The Ontario bullion shipment for the week was 37 bars, containing 20,801 fine ounces of silver. The Daly bullion product from the Marsac mill for the week was 5 bars, containing 5407 fine silver ounces.



## MECHANICAL PROGRESS.

## American Machinists.

The machinist trade in America developed under conditions different from those that accompanied the growth of the trade in older countries. Our early machinists were little hampered by the outcome of guild restrictions in learning the trade. As the call for crude machinery arose, blacksmiths and wheelwrights formed partnerships to do what may be called millwright work. The men employed in such establishments shared the run of the work. One day a man would be working at the anvil hammering out an axle; next day he might be working on the pattern of a cog-wheel or repairing a bursted pump, or turning a saw arbor.

The rapid improvement in machinery that accompanied the application of the steam engine to transportation produced a demand for men capable of doing machine work, and handy blacksmiths, wheelwrights and millwrights recruited the machinist ranks. Any man or youth who had a taste for mechanical work was welcomed in the trade, whatever may have been his previous occupation. If a youth entered the trade and found he had mistaken his vocation, he could easily withdraw, for no tradition of the craft made it an act of disgrace to withdraw from the business. Only one requisite was essential to success—that of self-reliance as a workman. The colonial attribute of self-reliance impressed itself strikingly upon the early generations of American mechanics, and they retain the attribute as a class to-day. This is to be seen in the capability our machinists have of working along without continual supervision of a foreman. They are proud of their ability to direct themselves, and, as a rule, can be depended upon to work faithfully when the foreman's back is turned. Other nations may have closer workmen, with more delicate touch of hand than ours, but no other country's mechanics bring the combined power of skill and intelligence into their work that American artisans do. To their peculiarity of thinking, while working, may be traced the origin of some of our greatest mechanical triumphs. The ingenuity cultivated by this habit fills our patent office with the records of useful inventions and improvements devised by working mechanics.

When a European workman offers to suggest improvements or proposes to depart from the formal routine of doing work, his originality is generally rewarded with the information that he is paid for working according to directions, not for thinking. He accordingly develops accuracy of hand by repeating operations after an established method. He does not attempt to invent a labor-saving tool or an improvement on the manner of producing work, because he finds no encouragement to try anything of the kind. Our workmen, on the other hand, are encouraged to use their brains, and the best jigs and labor-saving devices used in our shops have been invented by the mechanics who use them. This system is developing the constructive skill of the country, and so intelligence among our workmen is pushing America to the front of industrial nations.—*American Machinist.*

**COMPOUNDING THE LOCOMOTIVE ENGINE.**—In a paper on the improvement and economy of the steam engine, read at a late meeting of the Engineers' Association, the following paragraph occurs: "It seems to me much remains yet to be done with the locomotive. We must burn a great deal less coal for the steam we make, and after we have made steam we must use that steam up more thoroughly. In the short cylinder required by locomotive service, the steam entering at the initial pressure pushes the piston to the opposite end, and it then rushes out of the exhaust strong enough to drive another piston. Of every four dollars' worth of coal consumed, at least two dollars' worth is absolutely thrown away, or, of every ten thousand dollars spent for fuel five thousand dollars are absolutely wasted. How can we save this? It would seem obvious, that if steam rushes from the exhaust of an engine strong enough to drive another engine, the common sense of the thing would be to put another engine alongside and let the steam drive it, and we should get just so much more out of four dollars' worth of coal. It seems evident that we must follow the lead of the steamship men and compound the locomotive engine, as they have done with the marine engine."

**STEEL VS. IRON.**—A Danbury firm which deals largely in blacksmith's supplies stated recently that they had been much surprised by the fact that although steel had dropped in price to the level of iron, the use of steel for miscellaneous purposes had not increased so rapidly as they had expected. They put in a full line of steel for wagon and carriage tires, horse and ox shoes, etc., and more particularly of carriage and wagon axles and nails, fully expecting to gradually decrease their purchases of the iron, and finally—especially in case of axles and nails—to drop them altogether and sell nothing but steel. For awhile, owing partly to the novelty of the thing, and partly to the selling quality of the word "steel," the commodity had a large sale. Presently the "smiths" complained of the hard work, and began to go back to iron for horse and ox shoes, being much more easily worked, and as less likely to split out at the creases—until now the firm is again buying and selling 10 tons of horse

and ox-shoe iron to one ton of steel for this purpose. For tires the result has been different, especially in light sizes. The light steel tire has evidently come to stay, and the sale of iron for this purpose, say one by one-fourth inch and under, has almost entirely ceased. Owing to the trouble in bending and welding the heavier sizes in steel, iron is still the favorite.

**WELDING BUGGY SPRINGS.**—A correspondent of the *Blacksmith and Wheelwright* writes to that journal as follows: There have been several questions asked in regard to welding buggy springs. My way is to draw the broken ends to a sharp edge, split them three-quarters of an inch, then drive one end down and the other up, and lap or dovetail them together. I have a clean fire, and heat very slowly. I use powdered borax, and if one lap fails to weld on the first heat, I raise the lap with a chisel and slip under a piece of sheet iron, and then it is sure to weld. But all springs are not alike. Where they are very difficult to weld they will waste, and when this happens, I take a piece of good iron, lay it on the bottom, then weld up, and when it is dressed and bolted together no man can tell where the welding was done without looking very close. I never temper in water, but take a light hammer and hammer till the spring is nearly cold. I have a right to believe in this, for I warrant my work, and have never had one spring come back. My price is 50 cents.

**THE COLORING OF METALS.**—According to the *Illustrirte Zeitung für Blechindustrie*, a grayish-black coloring on copper may be obtained by placing the object for treatment, after being well cleansed, in a weak solution of liver of sulphur. When a caustic effect has, after a short time, been produced, the object is rinsed, slightly heated, and brushed with a stiff brush. This coating is said to be very durable. A blackish-brown bronzing can be applied to vases, figures, busts, etc., cast from zinc, by the application of a solution of sulphate of copper. If the projecting portions are then well rubbed with a woollen rag, they assume a coppery red brilliancy, which increases the resemblance to genuine bronze. A solution of verdigris in vinegar also produces an effective bronzing. Brass may be colored black by repeatedly coating the cleansed metal with a moderately warm solution of nitrate of copper. Heating over a charcoal fire follows. Finally, the tone is heightened by rubbing with olive oil.

**LUBRICATING OILS.**—An undoubted authority on the subject of lubricating oils is thus quoted by Prof. Hele Shaw: "Bearing in mind the natural and almost ineradicable tendency of animal oils to develop acid, and of vegetable oils by absorption of oxygen to gum and clog bearings, and to induce spontaneous combustion; bearing in mind that mineral oils can now be obtained in every respect as safe as the finest animal oils, and that the admixture of mineral oil with animal or vegetable oil neutralizes the acidity in the one case and the acidity and oxidizing tendency in the other, I am of the opinion that the safest, most efficient and most economical lubricants for all manner of bearings are to be produced by judicious mixtures of animal or vegetable with good mineral oils."

**PISTON VALVES FOR LOCOMOTIVES.**—According to M. Ricour, piston valves in locomotives wear at the rate of one-twenty-fifth of an inch for every 125,000 miles of run; while with slide valves the same extent of wear takes place in 2200 miles of run. The effect in the consumption of fuel is also quite noticeable, as shown by actual record carefully kept. At the Saintes Station, in France, the returns made in 1882, during the time in which all the engines worked with slide valves, the coal consumed per 1000 tons of freight conveyed one mile was 226 pounds against 234 pounds in 1884, when 30 out of the 40 locomotives had been fitted with cylindrical valves.

**A NEW CHILL FOR CASTING CAR-WHEELS** consists of a solid continuous casting with its chilled surface separated into segments or sections by the process of casting, and has numerous air passages running through it from top to bottom, whereby the heat alone of the molten metal poured into the chill will cause the inner diameter to contract, while the air prevents the expansion of its outer diameter.

**THE PULLEY GRIP.**—An English inventor claims that the grip of a pulley on belting may be increased by covering the pulley with a thin perforated metallic cover, fastened by screws, rivets or solder. Among other advantages, it is said that the strength of the pulley is materially increased, the hold of the belt improved, and it is possible to run with slackier belts.

**CAST STEEL** is steel that has been melted in a "pot" and poured into a "mold," thus becoming an "ingot," which is afterward hammered or rolled into the size required. It may be of various "temper," varying in percentage of carbon, which they contain from three-quarters or less to one and one-half or more.

**LUBRICANT FOR BRASS.**—An excellent lubricant that will not corrode brass and will last for weeks is made of one part of melted India rubber (not vulcanized) and two parts of common vaseline.

## SCIENTIFIC PROGRESS.

## The Bee's Sting Useful as Well as Hurtful.

It is well known that honey from cells which have not been capped over by the bee will not keep. Honey taken from the hive in that condition soon sets up a fermentation which is destructive of that toothsome and useful product of "the little busy bee." Mr. W. F. Clarke, of Canada, has recently been making some careful observations, from which he claims to have discovered the cause of the difference between honey which has been capped over and that which has not been thus completed. He says: "My observations and reflections have convinced me that the most important office of the bee sting is that which is performed in finishing up the artistic cell work, capping the comb, and infusing the formic acid by means of which honey receives its keeping qualities. The sting is really a skilfully-contrived little trowel, with which the bee finishes off and caps the cells when they are filled brimful of honey. This explains why honey extracted before it is capped over does not keep well. The formic acid has not been injected into it. This is done in the very act of putting the last touches on the cell work. As the little pliant trowel is worked to and fro with such dexterity, the darts, of which there are two, pierce the plastic cell surface and leave the nectar beneath its tiny drops of the fluid, which makes it keep well. This is the 'art preservative' of honey. A most wonderful provision of nature, truly! Herein we see that the sting and the poison bag, with which so many of us would like to dispense, are essential to the storage of our coveted product, and that without them the beautiful comb honey of commerce would be a thing unknown."

"If these things are so, how mistaken those people are who suppose that a bee is, like the Prince of Evil, always going about prowling in search of a victim. The fact is that the bee attends to its own business very diligently, and has no time to waste in unnecessary quarrels. A bee is like a farmer working with a fork in his hay field. He is fully occupied, and very busy. If molested or meddled with he will be very apt to defend himself with the implement he is working with. This is what the bee does, and man, by means of his knowledge of the nature and habits of this wonderful little insect, is enabled, in most cases, to ward off or evade attack. It is proof of their natural quietness, industry and peaceableness that so many thousands of them will go through a summer of ceaseless activity close to your dwelling-house, and perhaps not half a dozen stings be inflicted during a whole season."

## CHARRING AND COMBUSTION POINT OF WOOD.

—In examining into fires presumably due to spontaneous combustion, an important point to be determined has been whether wood will char at as low a temperature as 212 degrees. In tearing down houses for the purpose of rebuilding, the timber in contact with the heating pipes and flues has often been found charred, and it is known, of course, that charcoal is made for certain purposes in the arts at 300 degrees. As the result of experiments in this line, carefully performed in the laboratory, small pieces of white pine heated a few hours in an air-bath at a temperature of 300 degrees were found to be partially converted into charcoal. Under these circumstances, it is thought to be demonstrated that a temperature of 212 degrees is sufficient, if applied for a long time, to convert wood into a partially burned charcoal. As to the next important point—the degree of heat at which charcoal will ignite—it appears that, made from the same wood at different temperatures, the products ignite accordingly; that is, if made at a low heat, it fires from a correspondingly low temperature. It has been determined, experimentally, that charcoal for making powder, when made at 500 degrees, would fire spontaneously at 680, and when wood has been carbonized at 260 degrees, a temperature of 340 only was required for spontaneous ignition. Finally, under certain circumstances, charcoal made at a temperature of 500 degrees even will ignite when heated to 212.

**THE FIGURE DESCRIBED BY A MOVING WHEEL.**—Mr. C. A. Newton, at a meeting of the British Chronological and Astronomical Association, held on Saturday evening, Sept. 25th, in the Memorial Hall, London street, Bethnal Green, introduced a very ingenious and interesting instrument, by means of which, and accompanying sketches, he showed the actual figure described in the air by a nail in the circumference of a revolving traveling wheel, say that of a coach, and conclusively proved that the nail never made a circle, but that its whole motion was that of a series of equal semi-circles, necessarily formed by the wheel traveling on a plane.

**THE AMOUNT OF WATER TREES ABSORB.**—Dr. J. M. Anders, in a geological survey report, gives the results of his inquiry as to the quantity of water pumped from the earth by trees. He finds that the average exhalation from soft, thin-leaved plants in clear weather amounts to about one and a quarter ounces Troy, per day of 12 hours, for every square foot of surface. Hence a moderate-sized elm raises and throws off seven and three-quarters tons of water per day. In the report the facts

are applied to what is going on in America, where certain inland fertile districts are becoming converted into deserts by wholesale clearings; and in other places, such as the plains of Colorado, where only five or six years of irrigation and planting has already produced a measurable increase of rainfall. It is maintained that the deserts of Syria and Africa are the results of cutting down trees, and that original luxuriance may be restored by skillful replanting.

**THE NEW OPTICAL GLASS** to which we have already made reference in these columns, is about to be put to actual test and use. The lenses made from this glass will be known as "apochromatic objectives," which give great superiority in the finer qualities of definition. Professor Abbe claims for this lens that the more perfect corrections permit equal magnifying to be obtained by using a longer focus objective with an eye-piece of higher power than hitherto has been usual, thus obviating some of the difficulties of very short focus objectives. Moreover, the foci for visible and for photographic purposes are identical. Special compensating eye-pieces have also been devised for use with the new apochromatic objectives. We hope soon to be able to give fuller particulars regarding this discovery, and we are glad to be able to say that the new optical glass will be offered to the world without any restriction whatever.

**HOW INCANDESCENCE IS PRODUCED.**—Incandescence is a white heat, or the glowing whiteness of a body caused by intense heat. The little glass bulbs, says an exchange, with their brilliant horseshoe of glowing filament, attract no more attention than the flickering gas-jet. But the facts about the gas-jet are easily and generally understood, while the electric lamp is still a puzzle to many people. Both produce light by incandescence. The molecules of gas are rendered incandescent by the heat generated by the combustion of other molecules. The blue portion of every gas flame is where combustion is taking place, and from there comes the heat which keeps the rest in a state of incandescence. With the electric lamp it is the heat produced by the friction of an electric current compelled to go through a fine carbon filament which raises that filament to a condition of incandescence and produces light.

**ELECTRICITY AND THE INEXPLICABLE.**—Of the common notion that electricity plays an important part in the production of earthquakes, Prof. Joseph Le Conte, of the California State University, well says: "I never heard or read the slightest scientific proof of this theory. Electricity has taken hold of the popular imagination, so that any inexplicable thing is explained by 'electricity.' For example, vital force, nerve force, etc., are inexplicable, so many lay it to electrical force. So also with earthquakes—electricity is made the scapegoat."

**FALLIBLE RECORD.**—Probably few persons realize how unreliable are the unprofessional thermometric reports which are telegraphed in winter over the country after each cold wave, so untrustworthy are even the best of spirit thermometers in unskilled hands. Dr. John Rae expresses the opinion that the thermometer which is quoted as having recorded 58 degrees below zero in Manitoba is about 15 degrees in error. An instrument for the accurate measurement of low temperatures is needed as much as a reliable pyrometer for testing the temperature of molten metals.

**MAGNETISM AND HEAT.**—Scientists are now discussing the curious fact that the usual heat produced by friction is conspicuous by its absence when the articles are magnetized. One example described was where a workman fastened a couple of powerful magnets to his lathe to hold more securely a piece of metal which he wished to drill and turn. The presence of the magnets kept the metal so cold that no water was needed to keep the drill moist—a very unusual circumstance which may lead to important mechanical advantages.

**A "BLACK SNOW,"** which fell in 1875, over an area of about 15 by 20 miles in the vicinity of Holland, Mich., was found to contain a considerable proportion of dark, earthy matter. This was subjected to elaborate scientific examination, and pronounced volcanic dust from some far-distant crater. A dissenter from this view has sought a simpler explanation, and has since proven that the dust came from the prairie soil a hundred miles to the southward.

**A NEW ELECTRICAL EXPERIMENT.**—We learn from *l'Electicien* that M. H. Dunville pledges his scientific reputation to the accuracy of the following observation: If two glasses of water be placed, one upon the north pole of a powerful magnet and the other upon the south pole, in four or five minutes the former acquires a slight alkaline reaction, while that on the south pole becomes slightly acid.

**PURIFYING SEA WATER.**—A Boston scientist predicts that within 20 years chemistry will show how sea water can be made suitable for drinking and for culinary purposes more cheaply for seaboard cities than fresh water can be brought for any considerable distance.

**THE EYES, HAIR AND SKIN.**—Prof. Virchow has completed a very large collection of observations on the color of the hair, eyes and skin of children in German schools, numbering as many as 7,758,287 individuals.



## ENGINEERING NOTES.

**THE ENGINES OF THE FUTURE.**—At no period of the world's history has marine engineering been so full of interest to the professional man, and so wonderful in its practical developments commercially. We have learned that both power and economy lie in what used to be considered unattainable steam pressures, and those now used on sea far surpass those used on land—locomotives not excepted. The highest economy has been shown with the highest pressures, and there are large vessels afloat to-day using steam at 180 pounds per square inch, and small ones at 250 pounds per square inch, with a consumption of coal per horse power which is exceedingly small. Fairbairn told all this a quarter of a century ago in his *Machinery and Millwork* (the title may not be exact), where he asserted that, before many years, pressures of 150 pounds per square inch would be common at sea, and the cylinder flue-boiler universal. This was in the day of the side-lever engine and the "box" boiler, but no one ever gives Fairbairn credit for his prevision. No prudent engineer of this day and time will predict where pressures are to stop. We are able now, with improved forms of boilers, better material and machine tools for building them, to reach any pressure required; and we shall utilize these pressures before many years pass in much less cumbersome and costly machines than quadruple-expansion engines. These now afford the only means for using the heavy pressures alluded to, but we are confident that the inventive genius of our engineers will find better vehicles of less weight and complexity in the fullness of time.—*Mechanical Engineer.*

**THE FIRST ELECTRIC ELEVATOR.**—In the building of the Union Institution for Savings, at the corner of Washington street and Hayward place, Boston, the first elevator worked by electricity is now stated to be in successful operation, it having now been at work for some time. A five-horse power Sprague electric motor, scarcely three feet high, and covering a floor space of less than three feet square, is used. It runs noiselessly and at a constant speed, but the speed drops slightly for a moment when a heavy load is thrown on, regaining the normal speed at once. The power from the motor is used to lift the elevator directly, by means of the ordinary belting, but it might be used for pumping water for hydraulic elevators under either the tank or the air-pressure system. The motor runs all day, but only consumes an appreciable amount of electric energy when the elevator is raised. The throwing on of the belt by means of the ordinary wire rope has no perceptible effect on the motor. The elevator lifts 1500 pounds, is used for freight, and runs at a speed of from 40 to 50 feet per minute, going up five or six stories. A peculiar and important feature of the working of the elevator is stated to be that, when descending, its weight turns the motor armature, and so converts the motor into a generator, supplying electric power back to the line. The power is supplied by the Edison central station, 200 feet distant. Motors operated from the same station are now daily running ventilating fans, printing presses, circular saws, sewing, buffing and other machines in the neighborhood. It is expected that 20 elevators will soon be running by electricity in Boston.

**NEW ARRANGEMENT FOR SCREW PROPELLERS.**—One of the chief objections hitherto to the use of the screw propeller for fast passenger boats has been the excessive vibration of the after part of the vessel, which is inevitable with the old style of single engine, and to some extent with one two-cylinder compound engine. With a view to reducing this source of discomfort to a minimum, the plan has been adopted of having a three-cylinder engine, with cranks at 120 degrees, which has been found to be in this respect a great improvement over anything previously used. These triple expansion engines have open fronts, rendering them entirely accessible in all parts, with steam reversing gear, independent pumps, etc., the arrangement of the feed-water heater and the combination for operating these pumps being such as to remove some of the well-known objections entertained by many engineers to their use. The steam is supplied by a "straight through" boiler with three furnaces, using a moderate forced draught; the boiler is of steel, but strapped inside and out, treble riveted.

**ELECTRIC MOTORS.**—Electric motors are being adopted in Pittsburgh with considerable rapidity. They range from 1-horse to 20-horse power. Many printing presses are run by them, and a number of families use them for operating sewing machines. They are also used for other purposes for which only a small engine is required, especially if heat is an objection. They are so convenient, too. An attachment is made to an electric-light wire, and when it is desired to start the motor all that is required is to press a button and turn on the current. The part that electricity will before long play in our every-day affairs would perhaps sound visionary to estimate or predict.—*Am. Manufacturer.*

The Hudson river tunnel is being pumped out after being filled with water for two years. The announced purpose is to exhibit the work to capitalists to interest them in the completion of the tunnel. Col. Haskins announces that the structure is uninjured.

## USEFUL INFORMATION.

**GLASS RAILS AND GLASS SLEEPERS.**—It was recently, in this and other journals, stated that Mr. Siemens had devised a method by which he proposed to cast glass so that it might be substituted for iron as railway tracks. In regard to this Mr. Siemens writes from Dresden: "As concerns the report mentioned in several English papers about the discovery of producing rails in the same way as sleepers, I must state that the contents of this report are founded on a misunderstanding. German newspapers, which brought their articles regarding cast glass translated from English journals, erroneously translated the English 'sleeper' into the German 'schienen,' signifying 'rails' in English, and it was this mistake which led the English papers to the opinion that Mr. Frederick Siemens has succeeded in manufacturing also rails from cast glass. Allow me to add for public information that a sample of these glass sleepers, recently tested at the Anderson Foundry Company, Limited, Glasgow, resisted a falling weight of 3½ cwt. falling upon a rail placed upon the sleeper set in sand ballast, commencing at 6 inches and rising by succeeding increments of 6 inches up to 9 feet 6 inches—the maximum elevation to which the test ram could be elevated—without effect until the blow had been repeated for the sixth time. Cast-iron sleepers are expected to withstand a similar test up to 7 feet only. The cost of glass sleepers will be considerably less than those of either cast iron or steel, while the material is practically imperishable as regards climatic changes, atmospheric influences or the ravages of such insects as the white ant."

**LOSS OF COIN BY WEAR.**—Professor Kimball, the Director of the Mint, has made a report on the losses on gold and silver coin by wear and abrasion, which are much more serious than most people probably imagine. Though no systematic investigations on an adequate scale have been made in this country to determine the loss by actual wear of United States gold coin, yet we are told the results of such experiments as have been made show that the abrasion of gold coin under past conditions of circulation has been from 1½ to 2 per cent a century, or from \$150 to \$200 per annum per \$1,000,000. The experiment has recently been tried of aiding the public in the discrimination between light gold coins and those of standard weight by stamping light gold coins with the letter L, so as to admit of ready detection. If such experiments continue at the sub-treasuries and mints the director believes that light coins will soon cease to perform the functions of legal tender coin, and coin will be presented for redemption before progressive wear entails material loss. The loss on small silver coins in active circulation is estimated at from one-tenth to one-fifth of 1 per cent a year.

**A NEWLY-DISCOVERED SOURCE OF FIRE DANGER.**—A Philadelphia paper calls the attention to a fire hazard that all old firemen know exists to a greater extent than is generally credited. It says that a source of danger in country houses in which wood is used for fuel, arises from the pyroligneous acid which is formed from the wood in the course of combustion. This corrosive substance is carried up the chimney in the form of steam, and in the higher portion is condensed upon the surface. It gradually eats away the mortar, and the rains wash down the dissolved or loosened portions, till wide openings appear between the bricks. Through these crevices may be blown sparks, which may find congenial resting-places in the cracks of well-seasoned timbers. If it be in the night, the family may be aroused from sleep to find their dwelling already doomed to destruction by a fire whose origin is to them forever a mystery. To guard against this danger there should of course be frequent inspection of flues and all necessary repairs. This applies to cities, as well as to the country. That "defective flue" is responsible for a great number of fires every year.

**TOUGHENED GLASS.**—The following explanation is given as a reason why so little is now heard of tempered or toughened glass for domestic purposes, although a year or two back such glass was much advertised and its praises constantly sung. We understand that the reason why it has at present disappeared from public notice is that its efficiency does not last. When fresh from the factory it can be dropped from a height to the floor and knocked about with impunity. But some gradual and understood change occurs in its constitution, for after a short time it will fly to pieces without any apparent cause. It is said, too, that unscrupulous traders who have a stock of the faulty material are selling it as ordinary glass. Those, therefore, who experience unaccountable breakages will know to what cause to attribute them. A really unbreakable glass would be such a boon that it is to be hoped that further experiment will soon show how it can be manufactured.

**GLUING.**—Experienced wood-workers have always contended that a glued joint, properly done, was stronger than the wood itself. And yet joints often give way at the surface when the glue is used, which is generally accounted for by bad material. But the true cause is one which artisans will seldom admit—lack of skill. In gluing wood the bad work is gener-

ally produced by applying the glue to both surfaces. A good job is always secured by applying the glue hot, but not extremely so, to one surface only, which should be cold, while the other surface should be heated, but no glue on it; by this method the glue will best permeate the wood and bind the surfaces together firmer than nature binds the fibers.

**ANIMAL VS. STEAM POWER.**—A writer in the *Revue Scientifique* affirms that, from a comparison of animal and steam power, the former is the cheaper power in France, whatever may be the case in other countries. In the conversion of chemical to mechanical energy 90 per cent is lost in the machine, against 68 in the animal. M. Sanson, the writer above referred to, finds that the steam horse-power, contrary to what is generally believed, is often materially exceeded by the horse. The cost of traction on the Mont Parnasse-Bastille line of railway he found to be for each car, daily, 57 francs, while the same work done by the horse cost only 47 francs, and he believes that for moderate powers the conversion of chemical into mechanical energy is more economically effected through animals than through steam engines.

**VANITY OF A CANARY.**—The habit of the canary to noisily join in any conversation that may be going on in the family circle is a reason why many refrain from keeping this cheerful little bird as a pet. A naturalist has discovered a way of remedying the difficulty. He says: "We put in our canary bird's cage every day a little mirror, as large as the palm of our hand, taking care that neither sun nor lights shall dazzle him, and he will look at himself for hours together with as much happiness as any young gentleman you ever saw. When we want him to stop singing we have only to give him the mirror."

**RUSSIA** is going to have a railroad tunnel three miles long at a cost of \$3,500,000. She has 15,000 miles of railway, but her only tunnel is 700 yards long. More great works of this kind are contemplated, and as Russian engineers are ignorant of tunnel-making there is a demand for foreign skill.

To keep postage stamps in the pocket or memorandum book without sticking, a New Orleans postoffice clerk advises people to rub the sticky side over the hair two or three times. The oil of the hair coats the mucilage and prevents it from sticking.

A GOOD MOTH POWDER is made of ground hops one drachm, Scotch snuff two ounces, camphor gum one ounce, black pepper one ounce, cedar sawdust four ounces; mix thoroughly and strew among the furs and woollens to be protected.

## GOOD HEALTH.

## Medical Instinct in Animals.

Animals get rid of their parasites by using dust, mud, clay, etc. Those suffering from fever restrict their diet, keep quiet, seek dark, airy places, drink water, and sometimes plunge into it. When a dog has lost his appetite it eats that species of grass known as dog's grass, which acts as an emetic and purgative. Cats also eat grass. Sheep and cows, when ill, seek out certain herbs. An animal suffering from chronic rheumatism always keeps, as far as possible, in the sun. The warrior ants have regularly-organized ambulances.

Latrelle cut the antennae of an ant, and other ants came and covered the wounded part with a transparent fluid secreted in their mouths. If a chimpanzee is wounded, it stops the bleeding by placing its hand on the wound, or dressing it with leaves or grass. When an animal has a wounded leg or arm hanging on, it completes the amputation with its teeth. A dog, on being stung on the muzzle by a viper, was observed to plunge its head repeatedly, for several days, in running water. The animal eventually recovered.

A sporting dog was run over by a carriage. During three weeks in winter it remained lying in a brook, where its food was taken to it. The animal recovered. A terrier hurt its right eye. It remained under a counter, avoided heat and light, although it habitually kept close to the fire. It adopted a general treatment, rest and abstinence from food. The local treatment consisted of licking the upper surface of the paw, which it applied to the wounded eye; again licking the paw when it became dry. Animals suffering from rheumatic fever treat themselves by the continued application of cold water, which M. Delaunay considers to be more certain than of the other methods.

In view of these interesting facts we are, he thinks, forced to admit that hygiene and therapeutics as produced by animals may, in the interest of physiology, be studied with advantage. Many physicians have been observers of animals, their diseases and the methods adopted by them in their instinct to cure themselves, and have availed of the knowledge so brought under their observation in their practice, much to the gain of humanity.

**HOW TO CURE FEAR.**—Fear is a bad habit often formed in childhood, and continued in a chronic form during life. It is to be cured only or mainly by its opposite—courage. M. Richet relates how he had occasion to pass frequently through a forest at night. He entered

it boldly; but after a few steps the feeling of fear came on and he felt highly relieved when he saw the clear sky again. Each night he was able to keep up his bold step for a longer and longer distance, until finally the fear was almost overcome. Habit is the only method of removing fear. Workmen in powder mills know they are in constant danger, but have no fear. To educate a child to be brave, the habit of not fearing in darkness and solitude, and so on, must be taught by its parents and guardians. Most of our nurses make cowards of our children, and it would be about as well for them to grow up without this appendage to their lives.

**CURE FOR RATTLESNAKE BITE.**—Eighty years ago Joseph Geer, the first settler at Long Eddy, N. Y., learned the cure for rattlesnake bite from John Johnson, a half-breed Delaware Indian, who, like most Indians, was an inveterate lover of whisky, and for a pint of it would let a rattlesnake bite him and then cure himself with his remedy, which, however, he would not reveal. Geer always kept liquor in his house, and on an occasion when Johnson was recovering from one of his frequent spells of drinking to excess, and was suffering terribly for the want of liquor, succeeded in getting the remedy for a pint of whisky. Geer kept the secret till from old age he was unable to answer the calls of the settlers when any of them or their stock had been bitten, and then told it freely to all. It is as follows: Apply to the wound a poultice one-half each of common salt and indigo, mixed with cold water, and renew every two hours. Eat freely of the leaves or drink often of tea made from one of a variety of the blue violet (*V. Sagittata*), commonly known as the "arrow-leaved" violet. If the bite be upon the leg or arm, bind the leaves in a circle around it, above and just beyond the swelling. Moistened with cold water as often as they get dry from the fever created by the poison, and renew two or three times a day. During the time this remedy has been in use in Mr. Geer's neighborhood it has effected at least 20 cures upon human beings, a great many more upon beasts, and has never failed with either. Ralph Geer and Moses Thomas, Long Eddy, N. Y., are the names and addresses of individuals now living who have been bitten by rattlesnakes and cured by this remedy without the aid of whisky or anything else.—*Exchange.*

**WHAT IS COCAINE?**—Most people have read of cocaine as a local anesthetic in connection with the treatment of General Grant during his last illness. It was not until 1880 that its properties were fully known, although the wild shrub from which the alkaloid was obtained by Nieman, at the date above given, was in use by the Peruvians as an invigorator before and after the Spanish conquest. The shrub grows as an indigenous product in the mountains of Peru and Bolivia, and is also cultivated. The leaves are dried like tea, and used sometimes in like manner as tea, and are also chewed for the stimulating effect. The plant could be introduced and cultivated in the mountain regions of California with success.

**DEATH FROM YELLOW FEVER.**—In dead subjects of yellow fever, the heat has been known to run up as high as 113° F. three hours after death, when it was only 104° as life passed from the body. The rise of temperature is supposed to be due to a fermentation of the blood. The beneficial results of quinine in breaking up malarial and other fevers are supposed to be principally due to the power the drug has to arrest fermentation and putrefaction. Quinine is an anti-ferment. Malarial fever is supposed to be due to the presence of fermenting spores in the blood.

**SUPERFLUOUS HAIRS.**—Superfluous hairs on the face may be removed by electricity. A very fine sharp needle is pierced into the hair follicle, and a current of electricity passed through it for a moment. It burns or cauterizes the root so that it dies, and gives no pain. If the needle does not pierce the right spot, no good is done. It requires a steady hand, a good eye and a little practice to perform the operation skillfully. About 40 hairs can be removed in an hour by an experienced operator.

**CONSUMPTION TREATED.**—A new treatment for consumption which is attracting the attention of physicians is the injection of remedies directly into the lungs by the hypodermic syringe, the needle of which is passed through the walls of the chest. Some very encouraging cases are reported in which the improvement is so great as to justify one in speaking of them as cures. Carbonized iodine has produced the best results.

**PROLONGED CASE OF HYSTERIA.**—A Neapolitan physician has described a case of hysteria, prolonged and aggravated, in which the nails of the fingers and toes were spontaneously shed. This was preceded by tingling, especially in the thumbs and great toes, followed by suppuration in the bed of the nail. The curious affection of the nails is supposed to have been a result of disordered nerve function.

The world's blind are computed to number about 1,000,000, or about one sightless person in every 1400 inhabitants. The proportion is greatest in Egypt and least in New Zealand. Germany has the greatest number of institutions for the blind, and America is eighth on the list.





A. T. DEWEY.

W. B. EWER.

DEWEY &amp; CO., Publishers.

Office, 252 Market St., N. E. cor. Front St., S. F.  
Take the Elevator, No. 12 Front St.

W. B. EWER, SENIOR EDITOR.

## Terms of Subscription.

Annual Subscription, \$3. New subscriptions will be declined without cash in advance. All arrearages must be paid for at the rate of \$3.50 per annum.

## Advertising Rates.

	1 week.	1 month.	3 mos.	12 mos.
Per Line (agate).....	\$ .25	\$ .80	\$ 2.20	\$ 5.00
Half inch (1 square)....	1.50	4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month. Address all literary and business correspondence and Drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as second-class mail matter

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY &amp; CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Dec. 25, 1886

## TABLE OF CONTENTS.

**EDITORIALS.**—Formation in Copper Mines; A Pendulum Hoist, 405. Passing Events; Close of the Volume; Annual Mining Review; Where and How to Set Our Unemployed at Work; Foundry Notes, 412. Concentrating Mills; Mechanical Engineering at the University; Deposits and Purchases of Silver, 413. Liquid Fuel; Mining Accidents; Christmas, 414. Narrowing the Area for Prospecting; Discussing a Patent Bill, 417.

**ILLUSTRATIONS.**—Fig. 1—Section of Metcalf Hill, Showing Copper Mines; Fig. 2—Vertical Cross-Section of Coronado Vein; A Pendulum Hoisting Apparatus, 405. Concentrating Plant with Rolls, Jigs and Duncan Concentrators, 413.

**CORRESPONDENCE.**—A Place for the Gold Where They Find It; Lower Springs, Shasta Co., 406. **MECHANICAL PROGRESS.**—American Machinists; Compounding the Locomotive Engine; Steel vs. Iron; Welding Buggy Springs; The Coloring of Metals; Lubricating Oils; Piston Valves for Locomotives; The Pulley Grip; Lubricant for Brass, 410.

**SCIENTIFIC PROGRESS.**—The Bee's Sting Useful as well as Hurtful; Charring and Combustion Point of Wood; The Figure Described by a Moving Wheel; The Amount of Water Trees Absorb; The New Optical Glass; How Incandescence is Produced; Electricity and the Inexplicable; Fallible Record; Magnetism and Heat; A "Black Snow"; A New Electrical Experiment; Purifying Sea Water; The Eyes, Hair and Skin, 410.

**ENGINEERING NOTES.**—The Engines of the Future; The First Electric Elevator; New Arrangement for Screw Propellers; Electric Motors, 411.

**USEFUL INFORMATION.**—Glass Rails and Glass Sleepers; Loss of Coin by Wear; A Newly-discovered Source of Fire Danger; Toughened Glass; Gluing; Animal vs. Steam Power; Vanity of a Canary; A Good Moth Powder, 411.

**GOOD HEALTH.**—Medical Instinct in Animals; How to Cure Fear; Cure for Rattlesnake Bite; What is Cocaine; Death from Yellow Fever; Superfluous Hairs; Consumption Treated; Prolonged Case of Hysteria, 411.

**MISCELLANEOUS.**—The Golden Age in California; Notices of Recent Patents, 406. The Blue-Bird Mill, Montana; Nevada Mines; River Bed Dredging; An Alaska Forest; West Point Mines, 407.

**MINING SUMMARY.**—From the various counties of California, Nevada, Arizona, Montana, Idaho, Utah, Colorado, Oregon, Washington, New Mexico, 412-13.

**MINING STOCK MARKET.**—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 420.

## Business Announcements.

Coal—Renton Coal Company.  
Dividend Notice—German Savings & Loan Society.  
Assessment Notice—Golconda Mining Co.  
Dividend Notice—San Francisco Savings Union.

See Advertising Columns

## Passing Events.

The advent of Christmas brings rejoicing to the hearts of the children and kindly feeling among older persons. At this season the cares of business are relaxed to a great extent and all enter heartily into the Christmas festivities. The PRESS is glad to greet its readers and patrons with the compliments of the season.

This number closes Vol. LIII of the MINING AND SCIENTIFIC PRESS. The publishers and editors recognize that the advancement of the mining and mechanical interests of the coast has been greater of late than in the past, and intend that the PRESS shall keep pace with it. They intend to increase its usefulness and value as far as lies in their power, and hope for a hearty co-operation on the part of its subscribers.

During the past week there have been a number of marine disasters on our coast, some of them attended with great loss of life and property. There have been no violent gales, but fogs and heavy seas from off-shore tempests have been the cause of most of the disasters.

The trouble from the labor strikes in the city appears to have nearly ceased, the cars on the

two lines affected being now operated by new employees.

Congress is again in session, and the question of fortifying this port is being brought up. Should the Government decide to go on with large works to fortify our harbor, it will be a good thing for the mechanics and laborers of this coast.

## Close of the Volume.

This is the last number of Volume LIII of the MINING AND SCIENTIFIC PRESS, the oldest paper devoted to the mining interests in the United States. The PRESS has always urged advancing the interests of legitimate mining industry. While conservative in its views and advocating the encouragement of the mining business, it has noticed all the new plans and systems that have been proposed or come into vogue in mining and metallurgy, in order that its readers might know of these things, whether good, bad or indifferent.

Being published in San Francisco for so many years it has been but natural that California industries should have occupied most attention in the PRESS. But this has not prevented our giving publicity to mining events in other sections of the coast. Our correspondents have traveled in Montana, Idaho, Oregon, Nevada, Utah, Arizona and New Mexico, and gathered facts for us. Each week in our mining summary we have given the current news of the various camps of the States and Territories.

The complete index on the last page of this number will show the variety of subjects which have been treated during the last six months. In this index is also a list of all the patents granted Pacific Coast inventors. Each week we give brief descriptions of the more important of these. To our local mechanical industries we also pay considerable attention, making frequent notes of the work going on at our foundry and machine shops.

The various departments of the PRESS are so conducted as to give in brief each week that which is most important in its class.

The mining field has widened materially in the past few years. Many new camps have been discovered and developed. It has been the habit of the editors to collect all possible information concerning the new regions in order that those who thought of going there might be posted.

In one thing, at least, the PRESS can justly claim to be without a rival. That is in illustrating and describing all the new mining and metallurgical appliances, machinery, etc. All the new forms of ore-crushers, mills, pulverizers, furnaces, hoisting works, pumps, etc., have been placed before our readers that they might judge of their merits. The amalgamators, concentrators, etc., have also been illustrated and described. This feature of the paper alone is worth more than the subscription price to any mining man, since it keeps him posted in the progress of his business.

It is the desire and design of the publishers and editors of the PRESS to continue to improve it in every possible way during the coming year. We need the assistance of mining men everywhere to make a good paper for them. And it is not out of place here to remark that the beginning of a volume is a good time to subscribe and to renew subscriptions. The more subscribers we have the better paper can we furnish and the more influential will it be. We shall be glad to receive notes of progress from the different camps at any time, and more especially now at the close of the year, when the result of the year's work is seen.

## Annual Mining Review.

In a few weeks we shall issue our annual mining review, giving a summary of operations of the various mining camps of the coast for the past year. We shall give the bullion product of the year and all the statistics obtainable. We shall be very glad to receive from any of our readers an account of the progress of their camps or mines. Many camps have no newspaper to represent them, and the miners should choose some one to "write it up," in order to keep it before the public. We intend printing a large edition of the number of the PRESS which contains the review, which will appear within a few weeks, just as soon as the statistics are available. Send us what notes occur to you and we will put them in a shape for publication.

## Where and How to Set Our Unemployed at Work.

This city is full of idle men. There are many also elsewhere in California. The entire number in the State amounts to some thousands. These are mostly workingmen who want manual labor, which for the most part they are willing to perform and are capable of performing well. The question is, or should be, with all good citizens, how shall these men be furnished with employment? for this they must have. They cannot live without it. But, under existing conditions, there is no employment for them. If they apply at the factories, foundries or machine shops, they find these full-handed. If they go into the country, the farmers have all the help they want. The lumbermen, the railroad builders, the master carpenters and masons, the contractors and bosses of every trade, are in like manner fully supplied. In the cities there are numerous applicants for every situation, able-bodied men often seeking positions that girls, boys or women ought to fill.

Now, much as we may desire to enlarge the field of labor, not much ever has been or can be done for the accomplishment of that end through the forced establishment of any new industry, whether to be carried on in this city or elsewhere in the State. Enough and too much of this has been done, or at least attempted, already; we see the wrecks of these prematurely undertaken enterprises on every hand. Led on by the press, it has been too much the habit of our would-be teachers, publicists, and even of the people themselves, to clamor for the starting of some new branch of manufacture or other industrial pursuit; everybody upbraiding our moneyed men that so little has been done in that direction. But our moneyed men, after a not very happy experience in this line of endeavor, are not desirous of enlarging that experience. Of the enterprises they have helped to set on foot, many are languishing, some are dead, a few, that ought to have met with enough support to keep the life in them, being unhappily in this last category. The Clipper Gap Iron Works are not, and the Oakland Antimony Works are not, and a good many establishments that the impecunious, public-spirited citizen hurrahs for seem likely to be soon relegated to the same condition.

## Utilize Our Natural Resources.

Let us not beguile ourselves, then, with the hope that employment can, by this process of nurturing untimely enterprises, be furnished for this army of men who are waiting for something to do. Let us look about, rather, and see if something better than this cannot be done for them. Let us examine our natural resources and see if by utilizing them a better field for the profitable employment of this surplus labor cannot be opened. We have, of late, enlarged a good deal on the opportunities that exist, or could easily be created, in our California gold fields for the profitable employment of much labor. We expose ourselves to the charge of iteration by recurring to the subject. In what has so recently appeared in the PRESS, we took occasion to speak of the great extent and variety of our mineral resources and their favorable surroundings. We pointed out the accessibility of

## Our Mineral Districts.

The excellence of the climate, and the security to life and property that there obtains. But these are things with which most Californians are sufficiently well acquainted. There is, however, another aspect of the business with which many are not now so familiar, because matters in the California mines have greatly changed since the early days. Then any man could go out into the diggings and employ himself, or readily find employment; now it is different. He must have some means to do this. If destitute himself, somebody will have to furnish him with money, or he cannot go into the mines and there avail himself of the opportunities open to all, but which none can turn to account without a stake to start with.

We would suggest, therefore, that our business men and capitalists, and all who have the material prosperity of the State at heart, adopt the plan of extending to such of our unemployed population as may desire it enough aid to enable them to

## Get Out Into Our Gold Fields

And there set themselves to work. The sum required for this purpose would not be large,

nor would the party advancing it run any great risk of losing it in the end. Not only so, but in most cases it would be returned to him many hundred fold. This plan of outfitting the miner was at one time much in vogue all over the Pacific Coast, and was generally found to work well. To it many of our rich men owe their fortunes. Though it has of late years fallen into disuse here, it is still largely practiced in most of the newer mining countries lying to the east of us. It might to good advantage all round be revived in California. There would be less risk in advancing money for such purpose now than aforesaid. The prospector is at the present time much less nomadic in his habits than formerly. All his habits are, in fact, better. The field of his labors is more restricted. There is nothing to tempt him out of California. If helped, he would always be within hailing distance. The object of his search would be for the most part gold-bearing quartz. Having found a deposit of this kind, his business would be to stay by and develop it. His partner would always know where he was and what he was doing. The chances for getting hold of a valuable quartz vein, either by location or purchase, are in many parts of the mines extremely good. In a few years this will be much more difficult. They are therefore good things to go after. Once secured, the owners of these properties can develop them at their leisure. They will keep. In a little while, even though not much opened, they will be in demand, and

## Now is the Time to

Look them up and reduce them to possession. But the investor must remember that it requires a little more money now for promoting a venture of the kind here proposed than it did in primitive times. The old-fashioned "grub-stake" will hardly do, as the miner, instead of roaming the mountains, is to become a fixture; he must have a cabin for shelter, be furnished with a more full stock of provisions, tools and other supplies. Still, a few hundred dollars will suffice to outfit and keep him in the field for a year, during which time he will, in nine cases out of ten, have succeeded in getting hold of something valuable. We do not believe that parties having means to spare could invest them or a portion of them to better advantage than in the manner here suggested. We hope to see some trials made of this plan, and in the event of this being done shall watch the issue with interest.

## Foundry Notes.

Work at the foundries is a little more active of late, and much better times are anticipated.

At the Pacific Rolling Mills they are engaged in making the yokes for the new cable railroad across the city. Work was recently commenced on Washington street. The mills will have considerable of the iron work to do on this road, outside of the yokes.

The firm of Hinckley, Spiers & Hayes, of the Fulton Iron Works, have signed a contract to build an engine and steamer for the coasting trade. This vessel is the sixth of her class built by the firm during the current year. She will be 120 feet between perpendiculars, 31 feet breadth of beam, 10 feet deep, and will be furnished with compound high-pressure condensing engines of the latest type and of 175-horse power. Work will be commenced immediately on both hull and engines.

The Pacific Iron Works are now building a 200-horse power Hazleton boiler for the Spring Valley Water Company, in addition to the jobs we mentioned in last week's PRESS.

It will be remembered that when the Union Iron Works, of this city, bid on the new Government cruisers, their bids on two of them were the lowest, but that the lowest bid on the first one exceeded the specified amount, so that they only got the contract on the Charleston. Congress has now authorized a larger expenditure, and the Secretary of the Navy will either re-advertise for bids or award a contract. It is likely that the Union Iron Works will get this job too, and it is sincerely to be hoped that they will.

THE Hecla Consolidated paid \$1,047,500 in dividends up to September 1st. The furnaces were then shut down, to be overhauled and rebuilt on a larger scale.

ANTIMONY is selling in Liverpool at from £29 to £30 per ton.



## Concentrating Mills.

The mining industry has received an impetus during the last six months which seems to indicate that during the next year we may look forward to even greater activity in mining generally than during the famous bonanza years, when interest was confined to one locality. The many methods and appliances which have been perfected during the past seven or eight years have made it possible for the large quantities of low-grade ores to be worked at a handsome profit. Not only this, but at numerous points in and adjacent to mining districts, plants for reduction of ore have been erected, which enable small mine-owners to dispose of their ore. This healthful condition and activity of the mining industry can, in a measure, be traced to the development and perfection of the process of ore-dressing or concentration. This system has long been practiced in Germany and certain parts of Europe; but owing to the fact that their methods required much labor, they could not be economically introduced into the mining districts of the United States. This state of affairs called into play the inventive genius of our mining men, and to-day we are employing methods and appliances, the operations of which in ore-dressing leave very little

high-speed rolls, which reduce it to the proper size, and it is again elevated to the first revolving screen.

The jig and its operation is so well known that it needs no description at this time; but as the jig is adapted to treat only moderately coarse material, the "slimes" and fine material must be handled by some other appliance. In the illustration shown, the Duncan concentrator is employed for this purpose, the results of its work being found to be very satisfactory. The product obtained from this process is generally shipped to reduction works and paid for as soon as the value is known.

The process is a very cheap one, in many instances costing not more than 50 cents per ton of ore. Mines which heretofore were considered worthless have been converted into valuable properties and are yielding to their owners handsome returns.

CAVE IN THE YELLOW JACKET MINE.—A dispatch from Virginia City, dated the 20th, says: The rumors current that the Yellow Jacket management were preparing to start a ponderous pump at the new shaft for the purpose of draining the mine arose from the fact that smoke was observed issuing from the stacks to-day. Steam was gotten up for the purpose of

## Mechanical Engineering at the University.

In accordance with the drift of modern opinion and custom, that practical instruction in the use of tools and machines should be given to students in special branches, a committee of the faculties of the University of California is now at work upon the question of revising the course of study in the various colleges. One of its recommendations will be that shop-work be made obligatory for at least three hours each week for the freshman year in all the scientific colleges. Professor Hesse has prepared a plan by means of which this work can be done. President Holden recognizes the importance of the mechanical engineering department, and wants to see the freshman classes of all the scientific colleges receive practical instruction in the simple forms of mechanical work. He thinks they should have at least one year of practical shop-work.

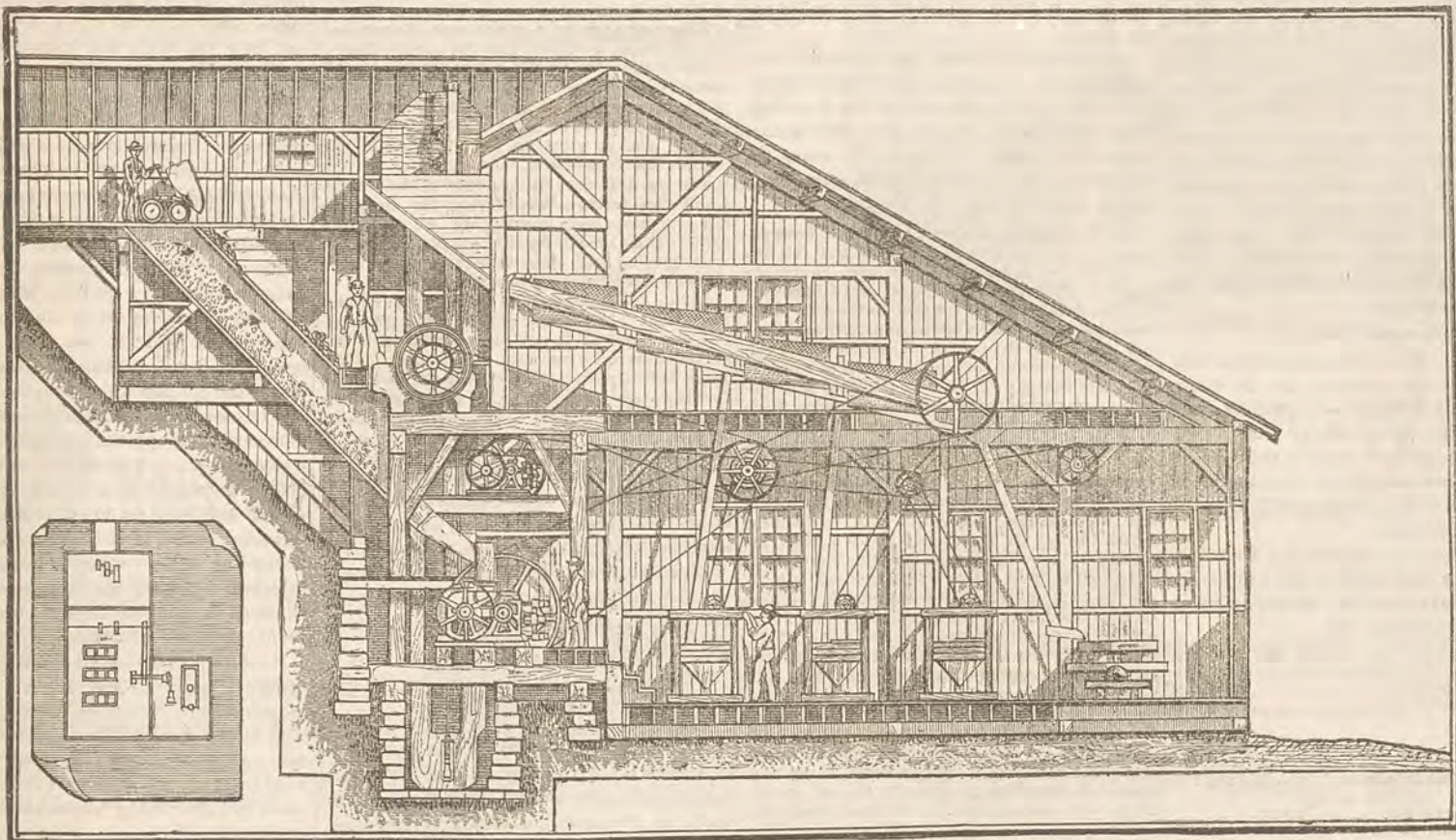
The present work-shops are arranged for fine work, and are occupied by the older students, not being suitable for elementary instruction. The president is of the opinion that the most economical way to carry out the plan proposed would be to build a small building 28x90 feet, specially for the purpose, to cost about \$3500.

fixed in his mind in this way, and in no other. In the institution with which I am best acquainted, namely, the University of Wisconsin, 865 hours are required of all students in mechanical engineering, and the experienced and competent professors there say that this time is not too much.

"Shop-work which has been done outside of the University should be credited to the student at a value of half the number of hours actually spent in the work. It should not count for more than that number of hours, because instruction in the University shops will be directed to the elucidation of mechanical principles, whereas in ordinary shops the object is to make commercial success."

## Deposits and Purchases of Silver.

The total value of the silver, computed at its coining rate in standard dollars, which is the accounting rate at the mints, deposited, purchased and parted at the mints and assay offices of the United States, during the last fiscal year, amounted to \$37,917,026.36 (32,584,944.61 standard ounces). Of this amount the sum of \$2,422,843.12 consisted of fine and unparted bars of the several institutions redeposited, leaving the net value of the silver deposit-



CONCENTRATING PLANT WITH ROLLS, JIGS AND DUNCAN CONCENTRATORS.

to be desired when anything like favorable conditions exist. The MINING AND SCIENTIFIC PRESS recognized years ago the fact that it was only a question of time when it would be necessary to put up ore-dressing works, which would concentrate the custom ores for miners. We repeatedly urged the matter in our columns. The great difficulty was, however, to do this sufficiently cheap. And, moreover, our people did not seem to take kindly to concentrating at first, as it looked to many as a needless handling of the ore, they preferring to work it direct, without reducing the bulk of the gangue.

Now these concentrating mills are springing up in many directions, and their utility and economy are recognized. This is specially the case where the ores have to be shipped to any great distance for reduction.

The illustration we give on this page represents a modern concentrating mill of from 30 to 50 tons of lead or copper ore per day. The ore passes over grizzlies and through the ore-crusher as in the ordinary quartz mill. After passing through the crusher it is conducted into a large set of high-speed crushing rolls, which reduce it to about the fineness of grains of wheat. It is then elevated to the top of the building by means of a belt elevator and conducted into the sizing screens. That portion which passes through the first screen (about 20 mesh) is conducted into the remaining screens, where it is sized and thence conducted to the jigs. That portion which does not pass through the first screen is conducted to a small set of

lowering the superintendent to ascertain the extent of a cave which threatened to swallow up the pump engine. At a depth of little more than 100 feet below the surface was discovered a cave large enough to engulf a block of five-story buildings. In order to save the pump engine from being drawn into the chasm it was necessary to disconnect the pump-rod. Superintendent Sharon officially authorizes the statement that there is no present intention to drain the lower levels of the mines.

THE Albuquerque Journal says: "The copper industry of Arizona will be shortly opened up, and an impetus given to the mining industries of that Territory that will give employment to hundreds of people. A syndicate of three St. Louis capitalists have subscribed \$400,000 as a working capital, and will keep the property in their own hands, as they think they have one of the best plants on the Pacific Slope."

WORK at the Hillis & King coal mine on Mark West creek, Sonoma county, is progressing rapidly. The main or new tunnel is now in about 75 feet, and will have to be extended about 25 feet further before the ledge is struck. It is anticipated that the quality of coal will be far superior to that taken from the surface.

ARIZONA'S bullion output during 1886 is the smallest for the past five years. Her beef output is the greatest and the agricultural outlook has never been better.

To fit this building for instruction in carpentry, with the proper tools and benches, will cost about \$2000. To fit it for the proper working in metal, including tools, will cost about \$5000. To fit it for instruction in blacksmithing and forging will cost about \$400. With furniture, shelves, cases, etc., the total cost will be \$11,300. It will accommodate from 30 to 40 students at a time. If this plan is carried out, all the engineering colleges of the University will become even more important to the State than they now are.

In speaking of this subject, in his report to the Governor on behalf of the Regents, President Holden says:

"It appears to be obvious that a graduate from an engineering college should have had some experience in handling all the tools—both hand and machine tools—that are used in ordinary work, and also in forging and molding. Such knowledge is necessary in nearly every position to which a mechanical or other engineer may be called in practical life. No student in mechanical engineering can become a good draughtsman or designer of machines without knowledge of this sort. The conclusion appears to be obvious that shop-work should be required from every graduate in the college of mechanical engineering, and I presume at least in the freshman year from all scientific students. It is impossible to teach a student in these colleges anything more than the elements of such work; but the principles which govern all mechanical operations can be

ed, purchased and parted, \$35,494,183.24 (30,502,817.78 standard ounces), against \$36,789,774.92 of the preceding fiscal year, being a falling off of 1,113,399.13 standard ounces of the value of \$1,295,591.68.

Of the net value of the silver deposited for bars, parted from gold and purchased for coinage during the year, namely, \$35,494,183.24, the sum of \$32,454,644.50 was classified as of domestic production, \$1,480,425.43 of foreign bullion, \$279,292.39 U. S. coins melted, \$812,664.50 of foreign coins, and the remainder, \$467,156.63, of old jewelry, plate, etc.

The silver coinage during the year consisted of \$29,838,905 in silver dollars, \$3,052.50 in half-dollars, \$3,626.25 in quarter-dollars, and \$176,764.20 in dimes. The total silver coinage amounted to 31,627,157 pieces, of the value of \$30,022,347.95, against 31,699,096 pieces, of the value of \$28,848,959.65, in the preceding fiscal year. The silver coinage was executed principally at the mints at Philadelphia and New Orleans.

In the local market for metals there is nothing new to report. Quicksilver is quiet and unchanged. Tin is nominal and out of season. Coal is steady and the amount on the way from foreign ports to arrive in the near future is not excessive. The late improvement in the ocean freight market, however, had a tendency to increase forward supplies from Europe.

A PROJECT is on foot for the establishment of a mining stock exchange at Portland.



## Liquid Fuel.

## Details of Trials on San Francisco Bay.

For two or three years past some very interesting trials of the use of oil for fuel, instead of coal, have been conducted by the Central Pacific Railroad Company on the freight and passenger ferry steamers on San Francisco Bay. When, therefore, a short time since, the use of this liquid fuel was abandoned by the company, and the furnaces of the boilers again altered to burn coal, it was concluded that oil-burning was a failure. It was thought strange, too, because it was understood that the oil was the more economical fuel, doing away as it did with the numerous firemen on the steamers, since the oil was fed to the furnaces by an automatic arrangement. A number of reasons were given by the general public for this abandonment of oil as fuel, among them that the supply was insufficient; that it cost too much, and finally, that it burned the furnaces and boilers out so badly that it cost more than it came to finally.

As the matter is of considerable general, as well as local importance, we have obtained some information on the subject, which, being mainly official, will be read with interest.

In the first place, as to the character of the liquid fuel itself. It is not a crude petroleum, as many suppose. It is a residue or refuse. The Pacific Coast Oil Co. before selling this material, remove the lighter oils, which enables them to sell the refuse at low cost. The first product removed is a gasoline of 84° specific gravity; the second is naphtha of 74° specific gravity; the third is benzine of 63° specific gravity; the fourth is what is known as water-white illuminating oil of 48° specific gravity. Then they remove the standard white illuminating oil of 44° specific gravity. This leaves a refuse of about 26° specific gravity, which is the fuel oil used on the steamers.

## The Steamer's Records.

The liquid fuel was used on three of the largest steamers of the company, the Thoroughfare, Piedmont and Solano—the latter the largest ferry steamer in the world. The records of the runs and results of work on these steamers we obtain from the office of the Auditor of the Motive Power and Machinery Department of the railroad company.

The first steamer to consider is the Thoroughfare, which runs from Oakland creek to the depots at the southern end of this city, carrying freight trains across the bay.

STEAMER THOROUGHFARE, DEC., 1883, TO DEC., 1884, WITH COAL.	
6169 tons Lone coal at \$3.96.....	\$25,017 20
62 tons Carbon Hill at \$5.50.....	506 00
	\$25,523 20
Pay of firemen.....	3,049 61
Total cost of fuel and firemen.....	\$29,572 81
Miles run.....	22,662
Cost per mile in cents—fuel.....	115.27
Cost per mile in cents—firemen.....	13.46
Total cost.....	128.73

STEAMER THOROUGHFARE, JAN., 1885, TO AUG., 1886, WITH OIL.	
2,135 barrels of oil at \$1.65.....	\$3,523 16
11,519 barrels of oil at \$1.70.....	19,582 72
	\$23,105 88
Pay of firemen.....	2,227 35
Total cost of fuel and firemen.....	\$25,333 23
Miles run.....	40,800
Cost per mile in cents—fuel.....	55.63
Cost per mile in cents—firemen.....	5.46
Total cost.....	62.09

The above shows 66 64-100 cents per mile in favor of oil, or 51 77-100 per cent. In this statement it is shown that 58.14 gallons of oil equal one ton of coal.

The Piedmont, a large steamer, is in the ferry traffic between Oakland mole and San Francisco. She was originally devised for coal, but was afterward fitted for oil (as were the other steamers).

PIEDMONT, NOV., 1884, TO AUG., 1885, WITH COAL.	
4929 tons Carbon Hill coal at \$5.00.....	\$24,646 25
1385 tons Carbon Hill coal at \$5.50.....	7,067 50
	\$31,713 75
Pay of firemen.....	7,658 04
Total cost of fuel and firemen.....	\$39,371 79
Miles run.....	43,525
Cost per mile in cents—fuel.....	72.86
Cost per mile in cents—firemen.....	17.59
Total cost.....	90.45

STEAMER PIEDMONT, SEPT., 1885, TO AUG., 1886, WITH OIL.	
4,136 barrels oil at \$1.65.....	\$6,829 35
15,955 barrels oil at 1.75.....	27,174 50
	\$34,003 85
Pay of firemen.....	4,541 76
Total cost of fuel and firemen.....	\$38,545 61
Miles run.....	44,307
Cost per mile in cents—fuel.....	76.74
Cost per mile in cents—firemen.....	10.25
Total cost.....	86.99

The above shows 3 46-100 cents per mile in favor of oil, or 3 8-10 per cent. In this case it took 133.63 gallons of oil to equal one ton of coal.

The Solano is the immense steamer which takes the overland trains, freight and passenger, across Carquinez straits, between Benicia and Port Costa. The run is very short.

STEAMER SOLANO, DEC., 1883, TO FEB., 1885, WITH COAL.	
1027 tons Carbon Hill coal at \$5.00.....	\$5,137 50
2690 tons Carbon Hill coal at \$5.50.....	12,047 75
5724 tons Empire coal at \$3.79.....	21,694 91
	\$38,880 16
Pay of firemen.....	8,476 70
Total cost of fuel and firemen.....	\$47,356 86
Miles run.....	7,504
Cost per mile in cents—fuel.....	518.12
Cost per mile in cents—firemen.....	112.96
Total cost.....	631.08

STEAMER SOLANO, MARCH, 1885, TO AUG., 1886, WITH OIL.	
2,395 barrels oil at \$1.65.....	\$3,952 16
16,909 barrels oil at \$1.70.....	28,745 30
	\$32,697 46
Pay of firemen.....	8,496 84
Total cost of fuel and firemen.....	\$41,194 30
Miles run.....	7,308
Cost per mile in cents—fuel.....	447.42
Cost per mile in cents—firemen.....	116.26
Total cost.....	563.68

The above shows 68 40-100 cents per mile in favor of oil, or 10 68-100 per cent. This gives the result of 94.16 gallons of oil equal to one ton of coal.

Last month the Pacific Coast Steamship Company, desiring to get some idea of details of cost of use of oil, with a view to adopting it on their steamers if possible, had Mr. John Bermingham examine the matter for them. He wrote the following letter to Edwin Goodall, secretary of the company:

Edwin Goodall, Esq.—DEAR SIR: I have examined the condensed results of the relative values of coal and oil on the Solano, Thoroughfare and Piedmont. There is great apparent saving in favor of the oil fuel on the two first-named steamers and a slight apparent saving of 3 3-10 per cent in favor of oil fuel on the Piedmont. I have no means of knowing whether the price charged for Carbon Hill coal is excessive as compared with other well-known fuels consumed here, or to the reverse. But there is one very important element that has not been taken into account by the railroad company's statistician, and that is, the relative speed developed by the Piedmont while using the different fuels above mentioned. In journeying across the bay on that vessel I have been informed by her officers that the trips were made with coal in from 17½ to 18 minutes, while with oil 19½ to 20 minutes were consumed. If that be true the difference in speed in favor of the coal would be almost one mile per hour, which means 25 per cent, as it requires that percentage to increase the speed of a vessel one mile per hour ("eight times the power to double the speed"), so if the speed obtained by the use of the oil could have been brought up to that obtained by the coal, 25 per cent more oil would have been consumed; or, vice versa, if the coal speed had been brought down to the oil speed, 25 per cent less coal would have been consumed.

It requires from eight to 12 per cent of the water evaporated by oil fuel to perfect its combustion. The railroad statistician does not appear to have taken the cost of that water into account.

The Piedmont had to keep her oil fuel burning all the time between trips in order to "bottle up" steam to give her a spurt across the bay. I know nothing of the relative speeds with oil and coal in use on board the Solano and Thoroughfare, where the oil appears to be the most economical.

Your oil steamers might possibly use that fuel with diminished speed, but you would have to make provision for three tons of fresh water per day for its consumption.

J. BERMINGHAM.

A copy of the above letter was forwarded to Master Mechanic Stevens, of the Southern Pacific Co., who brings out further facts in connection with the subject in his answer, which is as follows:

SACRAMENTO, Dec. 3, 1886.

Geo. Loomis, Esq., President Pacific Coast Oil Co.—DEAR SIR: I am in receipt of your favor of the 22d ult, inclosing copy of a letter written by Mr. J. Bermingham to Edwin Goodall, Esq., in regard to oil fuel burned on the steamer Piedmont.

Mr. Bermingham figures in this instance altogether from theory. At the outset he says: "There is a great apparent saving in favor of the oil fuel on the two first named steamers, and a slight apparent saving of the three and three-tenths per cent in favor of the oil fuel on the Piedmont."

So far he is correct; but he does not take into consideration the saving effected on board the steamer Piedmont by the use of oil fuel in the reduction of firemen—an item amounting to about \$14 per day. Neither does he consider the \$6 per day which it costs to place the coal on board the boat—the oil was handled by the deck hands at no extra expense whatever.

Further on Mr. Bermingham states: "There is one very important element that has not

been taken into account, and that is, the relative speed developed by the Piedmont while using the different fuels above mentioned."

The element of speed was duly considered; and, permit me to say, there was no such difference as the gentleman mentions—coal 17½ to 18 minutes and oil 19 to 20 minutes. True, the time of crossing of the Piedmont was somewhat less with coal than with oil, but not to exceed half a minute less per trip run on an average. In the case of the Solano the speed was always equal to and usually greater with oil than with coal, and the steam could be increased while under way to any pressure desired.

In making this comparison there is another important factor which Mr. Bermingham and others who have manifested so much interest in the matter seem to have entirely overlooked: that is, the construction of the Piedmont boilers. These boilers were constructed specially for burning coal; they are flue boilers and not adapted for oil fuel; while with the steamers Solano and Thoroughfare the case is materially different; the boilers of the latter boats are of good design or pattern for burning oil fuel.

Mr. Bermingham further says: "It requires from 8 to 12 per cent of the water evaporated by oil to perfect the combustion. The railroad statistician does not appear to have taken the cost of that water into account."

Our records show nothing of the kind. They show, however, that the consumption of water with coal and oil was the same per trip run. True enough, it took some steam to perfect combustion, but it was hardly appreciable, though, of course, it amounted to something.

Referring again to the steamers Solano and Thoroughfare, I will say that the saving effected by those steamers by the use of oil was considerable (I believe you have the reports showing just what it was), and if the saving by the use of oil was so great on those boats why should it not be just as great on the Piedmont? The reason, the true reason, and the only reason, lies in the difference in the design of the boilers, I will state further that during the time the different boats were burning oil, we were not called upon to make repairs to the boilers; while with burning coal there is not a week when more or less repairs are not necessary.

I will add, taking Mr. Bermingham's statement, that "12 per cent of the water evaporated was required to perfect combustion." Assuming this to be the case, 12 per cent of the water actually evaporated during the test of oil for six days is 19,968 gallons. Our records of the test show the same number of gallons evaporated in both cases.

Yours truly,

A. J. STEVENS,  
General Master Mechanic.

From these statements it will be seen that the oil fuel was the most economical, notwithstanding it has been given up by the company. The only explanation of this is in the surmise that as the company owns an extensive coal mine, coal steamers, etc., they can afford to use coal when others cannot.

## Mining Accidents.

Thomas Griffith, an old pioneer and miner of Amador county, through a mistake in the signal bell was run into the sump of the Pacific shaft, at Plymouth, on Friday of last week, and died from his injuries.

Silas Daws was badly hurt in the Idaho mine at Grass Valley last week. He was working in the 1600-foot level and a large piece of hanging wall struck him in the face, breaking his lower jaw and cutting his upper lip horribly, loosening the flesh from the bone to the eyes. He also sustained a compound fracture of the right arm. Isaac Martin, a brother-in-law to Daws, was recently killed in the mines in Montana, leaving Daws the support of his widowed sister.

At the Willietta mine, near Jacksonville, last week, says the Tuolumne Independent, Foreman S. D. Wagoner had a narrow escape from instant death. Himself and C. Keith had charged two holes with a stick of Giant powder each, and ignited the short fuses. Keith's charge exploded, but the other did not, and Mr. Wagoner supposed he had not lighted his fuse. He proceeded to investigate, and when within four feet the charge blew out—being tamped with sand—without blowing the rock. It was a close call, but did no serious damage beyond the shock and a scare. Mr. W. has probably used over \$1000 worth of Giant powder and never had an accident before; but familiarity with danger will cause even the most cautious to become careless.

THE mines on the ridge west of us, and around Gold Lake, are looming up each week as they are being developed. Next spring will, from present appearances, show up a few very rich ledges, and business will be lively around the mines. A quartz mill will be built at the Mountain King, and the Gold Valley Company will also put in a quartz mill. The new saw-mill will supply the lumber. Timber and water are plentiful.—Sierra Valley Leader.

## Christmas.

The annual recurrence of this day has been made a season of festivity in all civilized lands, and nowhere has it received a more joyful welcome than among English-speaking people. It comes in with the merry chime of bells and a burst of all sorts of musical instruments. For many generations it was the custom on Christmas eve to light large wax candles, roll into the fireplace a huge back log, and trim the houses with various kinds of evergreens. The Druidic tradition, that whatever grew upon the oak trees was a gift from heaven, made the mistletoe a universal favorite. It was a season when conventional civility was laid aside, the staid old proprieties locked up in a closet, and full rein given to the "Lord of Misrule" and the mirth-making Merry Andrew. In the palace and hovel, down in the earth where sooty miners delved, and far out to sea where ships tossed on the waves, Christmas came in with shouts, songs, and an infinite variety of fun and jollity. Every one put on his best clothes and for the nonce threw work and dull care away. It was the season of mighty feasting and family gatherings. Among our English ancestors the festival began by bringing in with frolicsome ceremony the favorite dish—the soused boar's head with an apple in its mouth and trimmed with rosemary; and how the table was heaped with turkey, game, big joints of beef and haunches of venison flanked with mince pies, plum pudding, has long been familiar to the reader of Dickens' gustatory traditions. The sight of such a table now would make a modern dyspeptic turn pale, and scare a good theosophist into a conniption fit, and fill a Buddhist with holy horror at the cannibalism that feasted upon its ancestors.

The age of the mighty eating Christmas has passed. While the spirit of kindness, goodwill and gift-making still attends and adorns it, the immense joints of beef, haunches of venison, monstrous wreaths of sausages, head-cheese and pot-pies which delighted the senses of a former generation, would now, instead of stimulating the appetite and making the mouth water, sicken and disgust. Hygiene, chemistry, and the fashion for French cooking have come in, and the fondness for "little dishes," that fascinating branch of the culinary art that Miss Corson has written so much about, has quite banished the lusty indulgences of the table. Gluttony has gone off to keep company with drunkenness and other deadly sins.

Even festive reunions have felt the withering breath of change. They are not so common, so generally observed, so anxiously expected, as in former times. When the sons and daughters and relatives were grouped in the same neighborhood, the sense of kinship was kept warm and ebullient by frequent visits and interchanges, and Christmas became the greatest day of the year, when all the clans gathered under one roof-tree. But our modern ways of steam traveling have so widely scattered families that this has become impracticable. And what is still more painful, the wide dispersion tends to weaken the ties of relationship. Brothers and sisters become as strangers. Already the patriarchal homestead, with its rosy memories, and the family burying ground, with its sad, sweet associations, have gone away and become memory and tradition.

But what if the Christmas dinner is not made so much of, and roast turkey and cranberry sauce, buckwheat cakes and honey are not so intimately associated with happiness and a good time! The Christmas trees are more abundant and more heavily laden with their peculiar fruit. What if the gambols and carols have ceased, and the mirth is less boisterous! The art of giving has become more delicate and expressive of good taste, love and friendship. What if our family gatherings are not so large! The spirit of mercy, goodwill and charitableness was never so expansive and odorous. There is every indication of a wholesome growth of the home sentiment and a development of the spirit that gave the day its meaning the world over. The spirit of the choir of angels who serenaded humanity the morning of the Advent singing "Glory to God in the highest, and on earth peace and goodwill toward men."

A FLOOD OF IMMIGRANTS.—Mr. Welch, southwestern passenger agent of the Missouri Pacific, reports that during the past 30 days more than 8000 people have arrived in Southern California from the East.



GEO. W. PRESCOTT, President.  
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.  
J. O. B. GUNN, Secretary.

## UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

### STEAM, AIR, AND HYDRAULIC MACHINERY.

### Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,  
HORIZONTAL ENGINES,  
AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
SHAFTING,

BABY HOISTS,  
VENTILATING FANS,  
ROCK BREAKERS,  
SELF-FEEDERS,  
PULLEYS,

STAMPS,  
PANS,  
SETTLERS,  
RETORTS,  
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

### UNION IRON WORKS.

SEND FOR LATE CIRCULARS

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS.

## RENTON COAL COMPANY.

Office, 24 Sacramento St.,

San Francisco, Cal.

### COAL NOW DISCHARGING:

1400 Tons SEATTLE,	- - -	Ex Bk. "Memnon."
1800 Tons SOUTH PRAIRIE,	- - -	Ex Bk. "El Dorado."
2000 Tons SCOTCH,	- - -	Ex Ship "Shandon."
2300 Tons GRETA,	- - -	Ex Ship "Siren."

FOR SALE IN LOTS TO SUIT.

### LIDGERWOOD M'FG CO.

MANUFACTURER OF

### HOISTING ENGINES

and BOILERS, 300 Sizes.

PARKE, LACY & CO., Agents,  
San Francisco, Cal.

96

Liberty St.  
New York.



RICHARD C. REMMEY, Agent,

Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of  
all kinds of  
Chemical Stoneware  
—FOR—  
Manufacturing  
Chemists.  
Also Chemical Brick  
for Glover Tower

### THE GOLDEN GATE PLUG CLOSET.



The only secure-locking device to keep sewer gas entirely away from dwelling houses.  
JOSEPH BUDDE, Manufacturer, 43 Fremont Street,  
All kinds of Water Closets, Slop and Waste Hoppers  
Always on hand. Write for information

## HERCULES POWDER

Derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE

### THE CALIFORNIA POWDER WORKS,

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES Powder.  
ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street, - - - - San Francisco Cal

## ROCK BREAKERS!

"DODGE." "GIANT BLAKE."

STEAM ENGINES,

MINING MACHINERY, SHAFTING, PULLEYS.

Machine Work to Order.

SAVAGE, SON & CO., 135 to 143 Fremont St., San Francisco.

## IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

BEST SOFT LAKE SUPERIOR COPPER USED.

3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates. Old Mining Plates Bought, Replated, or Gold Separated.

SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.

E. G. DENNISTON, Proprietor.

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

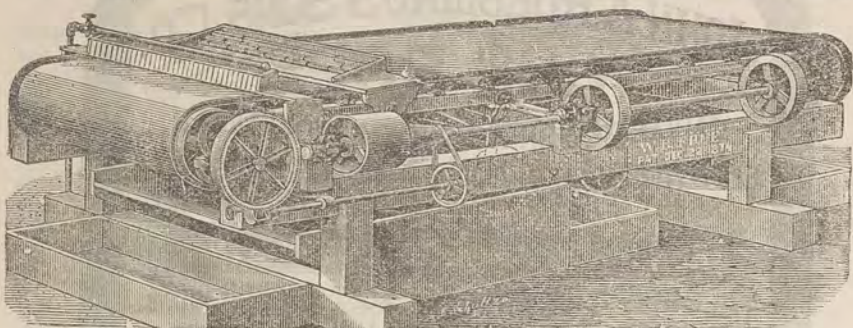
NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.



END FOR CIRCULAR.



# \$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR  
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS  
(\$575.00) F. O. B.**

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), London, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 30 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

Protected by patents May 4, 1880; December 22, 1874; September 2, 1870; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,  
Room 7, No. 109 California Street, SAN FRANCISCO, CAL.

## JOSHUA HENDY MACHINE WORKS.

(INCORPORATED SEPTEMBER 29, 1882.)

Nos. 39 to 51 Fremont Street,

San Francisco, Cal.

MANUFACTURERS OF

**NEW and Dealers in SECOND-HAND BOILERS, ENGINES and MACHINERY  
OF EVERY VARIETY.**

Steam Pumps of all Makes,

CENTRIFUGAL PUMPS,

MINING PUMPS.

BLOWERS AND EXHAUST FANS.

LEATHER and RUBBER

**BELTING.**

LUBRICATING COMPOUNDS and OILS

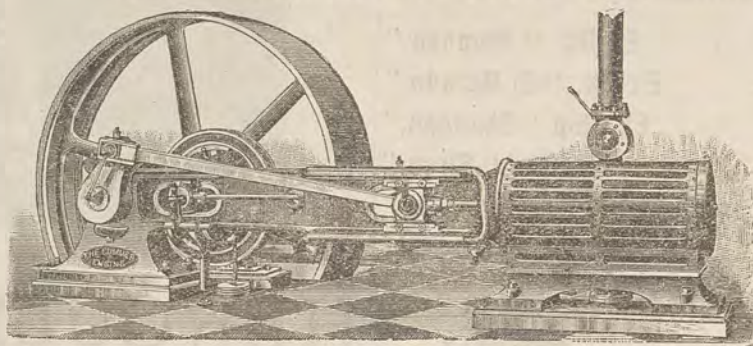
OF THE BEST MAKES,

PIPE and PIPE FITTINGS.

Brass Goods

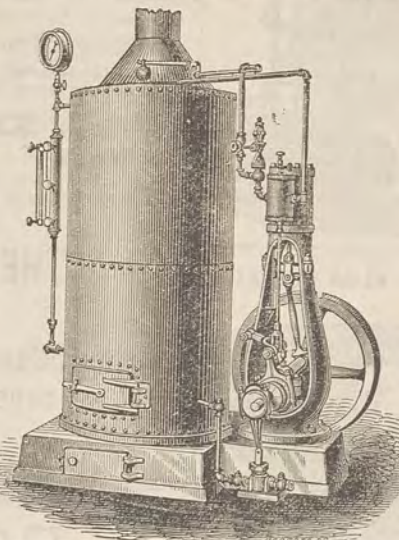
AND  
FITTINGS.

Hydraulic Mining, Quartz, and Saw-Mill Machinery, Hydraulic Gravel Elevators, Hydraulic Giants, "Triumph" Ore Concentrators, Automatic Ore Feeders.



SPECIAL AUTOMATIC ENGINES.

[Manufactured by the Cummer Engine Co., of Cleveland, Ohio.]



Upright Engines and Boilers Connected.

Stationary, Portable, and Hoisting

ENGINES and BOILERS.

Shafting,

Pulleys,

Boxes,

Hangers.

**WOODWORKING  
MACHINERY,**

—COMPRISING—

BAND SAWS, STICKERS,  
PLANERS, SHAPERS,  
SHINGLE MILLS, Etc.

IMPROVED

Single and Double Circular Saw-Mills.

AGENTS FOR THE SALE OF

"Cummer" Engines, from Cleveland, Ohio,

Porter Manufacturing Co.'s Engines and Boilers.

"Baker" Rotary Pressure Blowers.

"Wilbraham" Rotary Piston Pumps

"Boggs & Clarke" Centrifugal Pumps.

The Volker & Felthousen M'f'g Co.'s

Buffalo Duplex Steam Pumps.

P. Blaisdell & Co.'s Machinists' Tools

## JAMES' PATENT RECIPROCATING STAMP MILL.

(PATENTED AUG. 16, 1881.)

Weight of Boss and Shoes (1200 pounds) acts on each Shoe separately. It is practically the same as the regular Stamp Mill.

Capacity, 6 Tons in 24 Hours. 4 H. P.

Parties wishing to test the Mill with any ore they may bring, will find one in operation at our works in this city.

**PRICES:**

Reciprocating Stamp Mill, \$350 00

Rock Breaker, - - - 100 00

Automatic Ore Feeder, - 50 00

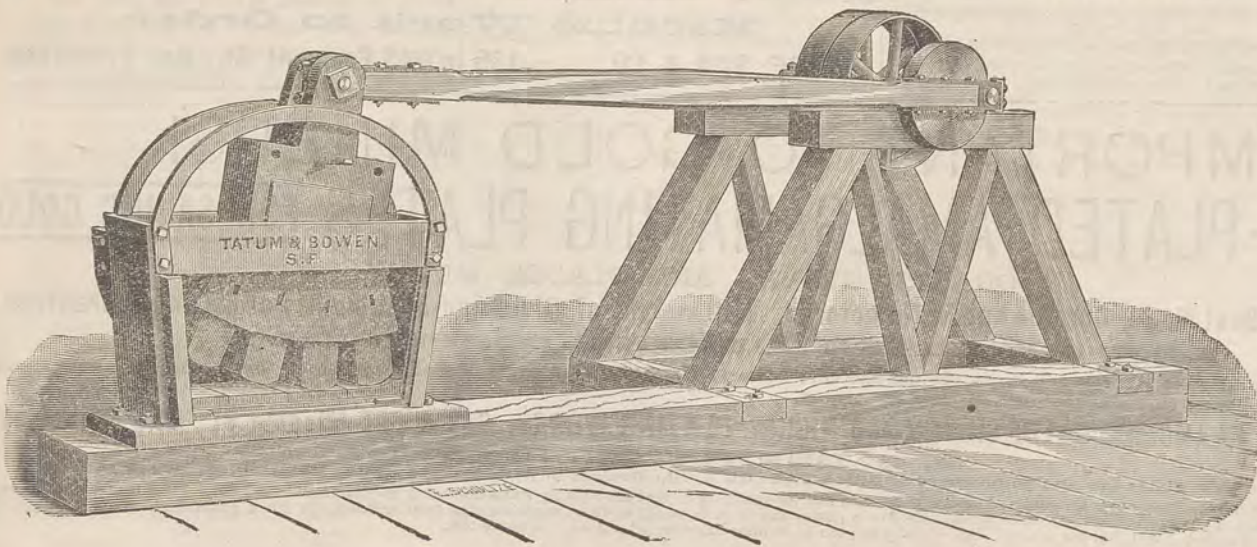
Single Track Ore Car, - - 40 00

SEND FOR CIRCULAR.

**TATUM & BOWEN,**

34 & 36 Fremont St., San Francisco.

91 & 93 Front St., Portland, Oregon.





## Narrowing the Area for Prospecting.

It is unfortunate that the distinction between mineral and agricultural lands is not more sharply drawn in the mining regions of this coast. It is true that testimony is generally taken as to the character of the land when it is in a mineral region, but the burden of proof generally rests on the miners who may have no interest in the matter whatever. Certain witnesses are brought forward by the agricultural claimant, who testify that in their opinion the land is worth more for agriculture than for mining. As these men generally know nothing of mines or minerals, and are most frequently agriculturists, they can easily testify to this with clear consciences. If any one objects, he must prove that the land does contain minerals. In most cases no one has a personal interest in objecting, and, while he may be pretty certain that the land is mineral, he may not be able to prove it, and the agriculturist gets his patent, no one opposing. It is only when people have mining interests in the land in question that opposition is made.

The consequence of this is that small ranches are being taken up in all directions in little valleys, plots and sections in the mining regions. And once the agriculturist has his patent the miner must stand off. The result is that the regions for prospecting are gradually but surely being reduced in this State. Let a prospector go near one of these plots taken up for farming purposes and he is warned off by the proprietor. Even if it is proven that there is a ledge on the property after the patent is given, and the legal publication and posting have been done, there is no redress.

It is not to be implied that the miners have the slightest objection to agriculturists taking up purely agricultural land wherever they find it. But they do object to their getting hold of tracts in purely mineral regions, only partly prospected, since it narrows the prospector's chances in localities designed by the Government for his special use. Agricultural land is much more abundant than mineral in every State and Territory. There is complaint from many sections, notably Amador and neighboring counties, of the practice of patenting for agricultural land, sections which are known to be mineral in their character, but which are patented as agricultural because no one has any personal interest in combating its alleged agricultural character.

## Discussing a Patent Bill.

A bill has been introduced in Congress limiting the jurisdiction of the United States Courts in patent cases, and to protect persons who, without notice, are bona fide manufacturers, purchasers, vendors and users of patent articles. The bill limits the jurisdiction of the United States Courts in patent cases wherever the amount in controversy exceeds \$200 against one person or citizen.

One of the sections provides that the purchasers of any patent right for actual use shall not be liable to damages, royalty or for the value of the same, or for infringing the same in any manner, who at the date of such purchase had no knowledge of the claims of any third person, or that the inventor of the same has an interest therein adverse to the seller thereof; that no person who shall in good faith purchase, use, manufacture or sell without previous knowledge of the existence of the patent therefor any article, machine, machinery or other thing for the exclusive use, sale or manufacture of which any patent has been or hereafter may be granted (to any person, persons or corporation whatever, shall not be liable in damages or otherwise for an infringement of such patent until after written notice of the existence thereof shall have been personally served on such person or persons or corporation.

Townsend, of Illinois, who, on behalf of the Patent Committee, tried to have the rules suspended and pass this bill, states that the only purpose of the measure is to protect innocent purchasers against blackmail.

Hammond, of Georgia, opposes the bill and declares that the first section would strike down seven-eighths of all the patents in the country, while the second section would place a premium upon scoundrelism.

Butterworth, of Ohio, regarded the bill as a bold attempt to kill the goose that laid the golden egg.

Townsend saw in the opposition to the bill a renewal of the old struggle between monopoly and anti-monopoly. In order to prevent a vote being taken on the bill, Mills, of Texas, moved to adjourn, and the House acquiesced.

## Fresno County Mines.

## Hildreth Notes.

A correspondent of the Fresno *Expositor*, writing from Hildreth, says:

The continual monthly bullion shipments from the Abby mine and increasing ore reduction by the numerous arastras in this section are commencing to open the eyes of the unsophisticated Missourian of the valleys of Fresno county, as well as the mining population of other counties, judging from the "phiz" of the new-comers that arrive by the Fresno and Madera stage lines. This district is being more closely watched by mining capitalists than any other section in the State, for the simple reason that heretofore continuous quartz ledges were not supposed by theorists and mineralogists to exist, but such principles are of late being put aside, and mining men have come to the conclusion that "gold is wherever it is found." Since gold was discovered in the sandstone formation running through the book cliffs of South-eastern Utah, and veins of quartz containing chloride of gold incased in walls of asbestos have been found in the Sierra La Selle range of mountains in Southwestern Colorado, the prospector and miner use their own judgment in preference to the theories announced by experts on geology.

Such is the case in this section; more so on account of the various formations through this mineral belt, which is twenty miles in width, bearing north forty degrees east, extending through our northern county and ending south of us in the majestically appearing table mountains on the east side of the San Joaquin river.

The developments now going on, and the prospects in view of the sale of the James & Francis and Wilson mines to outside companies, are going to make this district one of the largest gold-producing mining camps on the coast. At present the monthly shipments of precious metal do not exceed over \$100,000 in this and adjoining camps, but these figures are considered large for the amount of money invested in machinery and development. And, again, one can say conscientiously that the gold is here, and lots of it, but more capital is needed to bring it to the surface. One hundred and five thousand dollars has already been invested in this district for machinery, and if locators would sell their prospects at reasonable prices, according to the judgment of San Francisco mining men, three times that amount would be invested. But, like in all camps, on the strength of one or two producing mines, prospectors have an idea that their claims are all mines.

For the benefit of inquiring miners who are not informed on the state of affairs in regard to employment, let me say that at present the working companies are not in need of miners, as plenty can be had from the number around town. The going rate of wages is \$2.75 per day, or \$2 and board at the companies' eating houses. The mines are wet, but not to that extent that miners' candlesticks cannot be used to advantage.

The McNally mine is working on a five-foot vein of ore at the 600-foot level, and the ore mills \$45 per ton. The sulphurets average \$270 per ton. Winzes are being sunk on the 600-foot level to connect with stopes on the 600-foot level. The owners are also pushing their drifts on the lower levels.

The Hanover mine has been started up. It is owned by S. H. Williams, of Madera. The ore averages \$35 free gold per ton; sulphurets, \$150 per ton.

James & Francis still continue to hoist rich ore from their ledge. The ore mills from \$200 to \$300 per ton, wire gold, and the sulphurets are very good. Their property contains the richest continuous body of ore in the county.

Harry Clark and Barney have struck a rich thing by sinking upon their ledge. The incline shaft is down 45 feet on a ledge of quartz two feet wide, which is accompanied by clay selvages that prospect rich. The foot and hanging walls are granite.

Winter has commenced, if one would judge from the amount of rain that is falling and from the lofty table mountain to the East. The Sierras are covered with snow, which promises to last until spring.

Prospectors are flocking to their winter placer claims to sluice out the precious metal from the bedrock of the numerous gulches of this district. The placer ground in this vicinity prospects, on an average, 12 cents to the pan (or 20 pounds of dirt) of gold that is worth \$15.65 per ounce. It is no easy matter to obtain the approximate amount of gold dust that is being washed out and gathered on account of the number that follow placer mining as a business. Some is sent away by the store and hotel-keepers, while a certain portion leaves by express.

H. Lee and R. Bywerns have discovered a very rich vein of quartz that will assay into the hundreds. Work will be commenced immediately to sink upon the vein by an incline shaft. This property lays in the primitive formation, being composed of talc, porphyry and decomposed quartz, without walls, and most likely will extend down 80 or 100 feet before a change into syenite and granite formation.

The casing of the vein prospects \$18 per ton. It is known as the Oakland quartz claim, and is an extension of the Fresno mine, owned by Hitchcock, Keith and Byrd.

The Fresno mine is still improving as the ledge is developed. The boys in this locality intend to survey out a town site and elect

Superintendent Thomas Keith as Mayor of the town of Keithville. Byrd will do the welding of tires in the shop, according to Bob Bywerns' directions. As soon as Hitchcock sends over Stump a double shift will be put on.

Joseph Pfeiffer, one of the owners of the McNally mine, has arrived from San Francisco, and is much pleased at the improvement in the White Rock mine. Work will soon be started on the company's Stockton mine, which is thought to be equally as good as the McNally mine.

The McNally ledge is looking fine, and the ore continues to pile up the amalgam in the batteries. The ore from the 600-foot drifts is increasing in value in sulphurets.

## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 252 Market St., S. F.

FOR WEEK ENDING DECEMBER 14, 1886.

- 354,298.—STOOL AND SEAT—Ivy Baldwin, S. F.  
354,398.—SHEEP SHEARS—Bills & Hamilton, Oroville, Cal.  
354,391.—RUBBER-DAM CLAMP—O. Carpenter, Oakland, Cal.  
354,318.—RAILWAY TRICYCLE—Wm. Hayes, Los Angeles, Cal.  
354,420.—GRAFTING TOOL—C. W. Hoit, Sacto.  
354,421.—HARVESTER—Dan'l Houser, Stockton, Cal.  
354,513.—CLOD CRUSHER AND SEEDER—David Lubin, Sacto.  
354,481.—SAFETY SNAP HOOK—I. M. McKay, Rocklin, Cal.  
354,345.—NEUTRALIZING FUMES OF EXPLOSIVES—Thos. Price, S. F.  
354,355.—COMBINED RAKE AND HOE—J. S. Seatter, Visalia, Cal.  
354,363.—FRUIT-GATHERING SHEARS—L. H. Titus, Los Angeles, Cal.  
354,282.—VEHICLE BRAKE—H. Welisch, Cochise Co., A. T.  
R. 10,790.—ANATOMICAL CHART—J. T. White, S. F.  
13,863.—TRADEMARK—W. T. Coleman & Co., S. F.  
354,368.—FEED-WATER HEATER—H. Wilson, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

In addition to the notices of recent patents printed on page 406, we give the following:

GRAFTING TOOL.—Chas. W. Hoit, Sacramento. No. 354,420. Dated Dec. 14, 1886. This invention relates to a grafting tool or device for cutting a kerf or notch in the limb or stick and to a corresponding formation of the end of the slip which is to be grafted upon it.

HARVESTER.—Daniel Houser, Stockton. No. 354,421. Dated Dec. 14, 1886. This improvement in harvesting machinery is of that class in which the header or mechanism for cutting the grain is connected with a thrashing, separating and cleaning mechanism so that it may be cut, transferred from the header to the thrasher, separated and cleaned at one operation, and while the machine is hauled about the field. The patent covers several improvements in construction and operation.

SHEEP-SHEARS.—Robt. M. Bills and Albert S. Hamilton, Oroville, Butte Co. No. 354,378. Dated Dec. 14, 1886. This patent covers the following claim: "In sheep shears, the blades, having extensions or shanks fitting in similarly shaped hollow handles, in combination with the adjusting screws adapted to press upon opposite edges of the flat sides of the shank, whereby the shanks and blades may be turned so as to present the edges of the blades to each other at any desired angle." By this construction the blades can be set to cut to the best advantage without either crossing or slipping upon each other without cutting.

RUBBER-DAM CLAMP.—Oliver Carpenter, Oakland. No. 354,391. Dated Dec. 14, 1886. This invention relates to operative dentistry, and particularly to the class of clamps which are used for holding rubber dams in place around the tooth. It consists in a novel jointed frame, carrying in its ends the separate and removable jaws, and a set-screw, by which the jaws are made to clamp tightly on the tooth. The object of the invention is to provide a simple and effective rubber-dam clamp which may be applied by reason of its separate removable jaws, to any of the 10 anterior teeth in each jaw for the purpose of holding the rubber dam back from the labio-cervical cavities in said teeth while filling such cavities, or which may be applied in other suitable positions.

CLOD CRUSHER, PULVERIZER AND SEEDER.—David Lubin, Sacramento. No. 354,513. Dated Dec. 14, 1886. The apparatus is for crushing and pulverizing clods or lumps of earth and simultaneously seeding the ground and covering the seed, the whole being completed at a single operation. It consists of roller or series of disks mounted upon a shaft so as to rotate independently, or, when desired, keyed fast to the axle, provided with radial arm or fingers,

a series of lifting-fingers projecting forward between the toothed disks so as to raise the lumps or clods and bring them into position to be broken between the teeth and fingers as the disks rotate, and in connection therewith of a seeder of any suitable or desired construction which seed the ground, and a device by which the seed thus deposited may be covered.

FRUIT-GATHERING SHEARS.—Luther H. Titus, Los Angeles. No. 355,363. Dated Dec. 14, 1886. This device is specially intended for gathering such fruit as would be injured by falling, or by rough or careless handling. It consists of shears or a cutter mounted upon a frame with a spring by which the blades may be opened or separated, and a lever by which they may be operated to close and cut, the frame being fitted to the hand in such a manner that it can be worn upon one hand and bring the cutter-blades in such a position that when the fruit is grasped in the hand the shears will be in position to sever the stem, leaving the fruit in the hand, ready to be deposited in the proper receptacle. This device is specially useful because all the work of holding and cutting the fruit may be done with one hand, and the operator, standing upon a step-ladder within reach of the fruit, can reach to the extent of the arm on either side, gathering all the fruit within reach, while steadying himself with the other hand.

FEED-WATER HEATER.—Harry Wilson, Philadelphia, Penn. No. 354,368. Dated Dec. 14, 1886. This water-heater for steam boilers is intended especially for those upon steamers where superheated steam is used. It consists essentially in a suitable feed-water heater, connected directly with the steam drum of the boiler, whereby it may receive live steam, by which the water is raised to a much higher temperature than could be obtained with exhaust steam. It consists particularly in the cylinder, its heads, tube-sheets and tubes, its air pipes and controlling valves, and its drain and controlling cock and indicator, together with certain details of construction. Feed-water heaters have heretofore been supplied with exhaust steam. This steam does not raise the temperature of the water sufficiently, and its use is frequently inconvenient and sometimes impossible, as when the engine is stopped. The main object of this invention is to supply the feed-water heater with live steam, whereby the water is heated more effectively, and to this end Mr. Wilson makes a heater which can be directly connected with the steam drum of the boiler and can be so adjusted and regulated that objections to such a source of heat are avoided.

## Inducements to Subscribers.

To favor subscribers to this paper, and to induce new patrons to try our publication, we will furnish, to those who pay fully one year in advance of date, if requested, the following articles (while this notice continues) at the very greatly reduced figures named at the right:

- 2.—World's Encyclopedia, 794 pages, 1200 illustrations (exceedingly valuable).....\$0.50
- 3.—Dewey's Patent Elastic Binder (cloth cover), name of this paper stamped in gilt.....50
- 4.—To New Subscribers, 12 select back Nos. of this paper.....Free
- 7.—Any of Harper's, Frank Leslie's and most other first-class U. S. periodicals, 15 per ct. off regular rates.
- 9.—Pacific Coast and Eastern Dailies, Books and Periodicals, except special publications, we can usually give 10 to 15 per cent off advertised retail rates.
- 10.—Picturesque Arizona, 380 pages, in cloth and gilt.....25
- 11.—Californian, 100 pages, Magazine, 1880 to 1882 (3 Vols.) single Nos.....03
- Per volume, unbound, 5 Vols.....20
- Per volume, bound, cloth back and stiff paper sides, about 600 pages. (Send two-cent stamp for sample).....40
- 14.—Dewey's Pat. Newspaper Fileholder (18 to 36 in.).....25
- 15.—Life among the Apaches, 322 pages, stiff cloth.....25
- 17.—Architecture Simplified, 60 pages.....15
- Webster's Dictionary, 634 pages, with 1600 illustrations; very handy and reliable.....50
- De Groot's History of Mining in California, 16 pages.....05
- Beautiful Poetic Review, entertaining and instructive, 35 pages (a handsome and pleasing present).....25

NOTE.—The cash must accompany all orders. Address this office, No. 252 Market St., S. F. Send for any further information desired. Inform your neighbors about our offers and paper. Sample copies of this paper mailed free to person thought likely to subscribe.

## Mining and Scientific Press.

THE BEST PRACTICAL MINING JOURNAL IN THE WORLD.

Established in 1860, this paper has been eminently successful as a popular and useful mining and mechanical journal. Relative to precious metals especially, it is the leading mining paper of the world.

It is largely patronized by the leading Miners, Mine Owners, Superintendents, Engineers, Metallurgists, Chemists, Manufacturers, Mechanics, Scientific, Professional and Industrial "Men of Progress" on the Pacific Coast and many leading Mining Men throughout the mining fields of the world.

It is by far the best advertising medium in the Pacific States and Territories for Mining, Mechanical, Engineering, Building and Manufacturing Tools and Implements Goods, Supplies, etc.

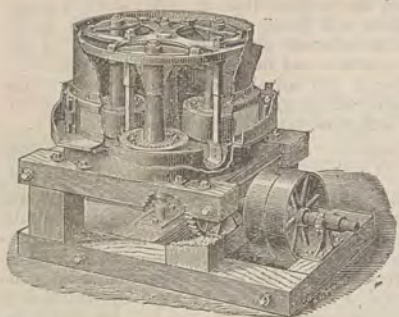
Being thoroughly able and reliable in its editorial and business management, and long established in the most progressive industrial portion of the Union, at present, its power as an advertising medium is unsurpassed.

Subscription, \$3 a year. Advertising rates, moderate. Send for samples and further information.

DEWEY & CO., Publishers,  
252 Market Street, San Francisco.

BACK FILES of the MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$5. Inserted in Dewey's patent binder, 50 cents additional per volume.



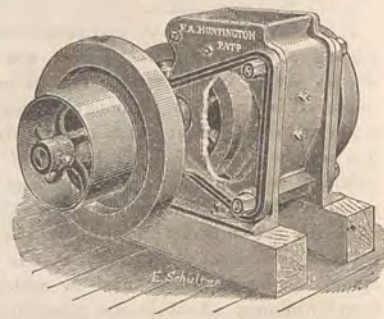


Centrifugal Roller Quartz Mill.

**F. A. HUNTINGTON,**  
MANUFACTURER OF  
**Centrifugal Roller Quartz Mills,**  
**CONCENTRATORS AND ORE CRUSHERS,**  
Mining Machinery of Every Description,  
**Steam Engines and Shingle Machines.**

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.



**NOTICE TO GOLD MINERS!**  
**SILVER-PLATED AMALGAMATED PLATES**  
**For SAVING GOLD!**

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPP R

FULL WEIGHT OF SILVER AND BEST QUALITY OF WORK GUARANTEED.

GET OUR PRICES BEFORE ORDERING ELSEWHERE. SAMPLES  
FURNISHED ON APPLICATION.**SAN FRANCISCO NOVELTY AND PLATING WORKS,**  
**No. 108 FIRST STREET.**

NOTICE.—All our plates are guaranteed to have the full weight of silver agreed upon, and are tested before leaving our works, thereby avoiding the complaints about light weight, made so often before we started in this branch of industry.

**JUSTINIAN CAIRE, Agent,**  
521 & 523 Market St., San Francisco,

—DEALER IN—

**Assayers' and Mining Material.**

—MANUFACTURER OF—

**BATTERY SCREENS AND WIRE CLOTH.**Agent for **HOSKINS'**  
**HYDRO-CARBON ASSAY FURNACES.****H. P. GREGORY & CO.**

Cor. Fremont and Mission Sts., - - San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

**MACHINERY**

SOLE AGENTS FOR

J. A. FAY & CO.'S WOODWORKING  
MACHINERY.FRANK & CO.'S WOODWORKING  
MACHINERY.NEW HAVEN MANUF'G CO.'S MA-  
CHINISTS' TOOLS.BEMENT & SON'S MACHINISTS  
TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM  
PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND  
EXHAUSTS.

SHIMER MATCHER HEADS.

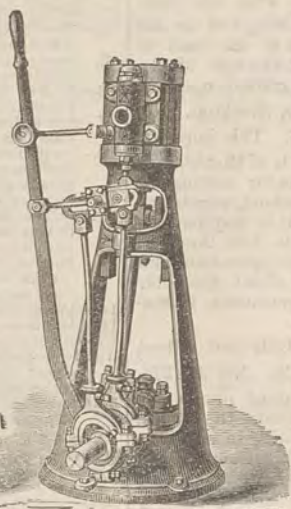
BRINARD MILLING MACHINES.

TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS

MASSEY'S STEAM HAMMERS.

SCHLENGER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISH-  
ERS.

YACHT ENGINES.

WILLIAMSON BROS' HOISTING  
ENGINES.ATLAS ENGINE WORKS ENGINES  
AND BOILERS.PAYNE'S VERTICAL AND HORI-  
ZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS  
AND MACHINERY.

NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJEC-  
TORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACK-  
ING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACK-  
ING, PAINT, ETC.**ENGINES and BOILERS**

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

MILL SUPPLIES AND LUBRICATING OILS.

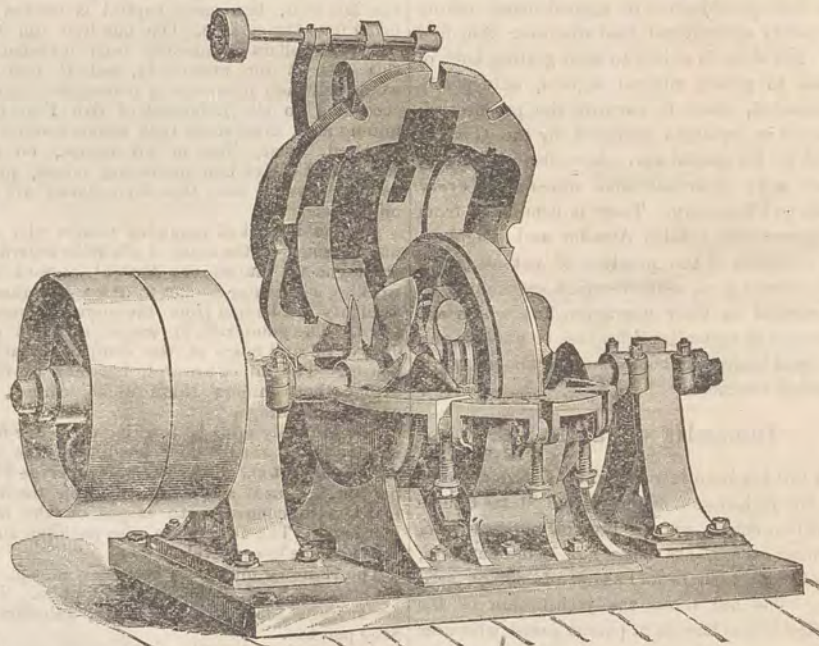


Chicago Prices Beaten!

ESTABLISHED 1860.

**S. F. PIONEER SCREEN WORKS,**

221 &amp; 223 First St., cor. Tehama, S. F.

**J. W. QUICK, Prop'r.**Sheet Metals of all kinds perforated for Flour and  
Rice Mills, Grain and Malt Driers, Furnaces, Chees, Ce-  
ment and Smut Mills, Separators, Revolving and Shot  
Screens, Stamp Batteries and all kinds of Mining and Mill-  
ing Machinery. Inventor and manufacturer of the celebrated  
Slot Cut and Slot Punched Screens. Mining Screens a  
Specialty, from 1 to 15 (fine).  
Orders Promptly Executed**THE FRISBEE-LUCOP MILL,****A CENTRIFUGAL ROLLER MILL**

—FOR WET OR DRY—

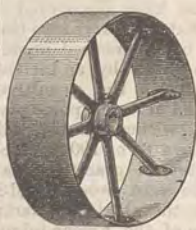
**Reduction of Ores, Quartz, Phosphate Rock, Carbon, or  
other Mineral Substance to any degree of fine-  
ness in a rapid and economical manner.**

Any method of amalgamation may be applied.

At 300 revolutions per minute will pulverize 2000 pounds of quartz per hour to 60 mesh  
dry, and from 3000 to 6000 pounds wet.All wearing parts easily and cheaply replaced. May be seen in operation at the New York  
Metallurgical Works, 104 and 106 Washington St., and Pacific Iron Works, San Francisco.Certificates as to performance of the Mills, and any information required, furnished on  
application.**THE FRISBEE-LUCOP MILL CO.,**

Office, 104 &amp; 106 Washington St., NEW YORK.

OR PACIFIC IRON WORKS, SAN FRANCISCO.



PAT. OCT. 25, 1881.

**PERFECT PULLEYS**

First Premium Awarded at Mechanics' Fair, 1884.

**CLOT & MEESE,**

Sole Licensed Manufacturers of the

**Medart Patent Wrought Rim Pulley**For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington  
Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and  
Best Balanced Pulley in the World. Also Manufacturers of**SHAFTING, HANGERS AND APPURTENANCES.**

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 &amp; 131 Fremont Street,

San Francisco, Cal.



**STURTEVANT MILL.**

This Mill as a Crusher and Pulverizer is without rival.  
Is in operation in lead-smelting works and mills.

SEND FOR CATALOGUE AND TESTIMONIALS.

# FRASER & CHALMERS, MINING MACHINERY,

ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



Huntington Centrifugal

QUARTZ MILL.

SEND FOR CATALOGUE

CORNISH ROLLS,

JIGS and TROMMELS.

HOISTING

ENGINES,

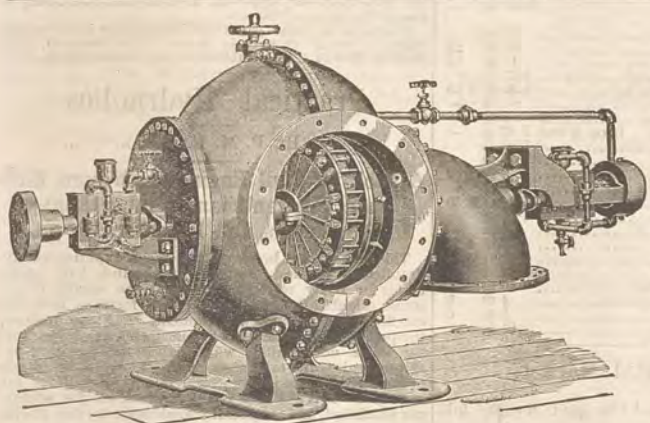
HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:  
Fulton and Union Streets, Chicago, Ill.  
NEW YORK OFFICE:  
Room 43, No. 2 Wall Street.

DENVER OFFICE:  
No. 248 Eighteenth Street, Denver, Colorado.  
MEXICO OFFICE:  
No. 11 Calle de Juarez, Chihuahua, Mexico.  
UTAH OFFICE—SALT LAKE CITY, UTAH.



## JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.  
Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.  
Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,  
Springfield, Ohio, or 110 Liberty St., New York.  
FRASER & CHALMERS, General Agents,  
Chicago, Ill., and Denver, Col.  
PARKE & LACY, General Agents, San Francisco, Cal.



THE Sign of the Arkansaw Cough Syrup is looking you all square in the face.  
Do you want a sure, safe and reliable Cough Syrup? Are you troubled with a Cough, Cold, Bronchitis or Lung Complaint? Do your Babies keep you awake all night with Hacking Coughs, Colds in the Head, etc. Do you want something reliable in the house to meet these emergencies? We answer to all: "Go to your Druggist and get a Bottle of the Arkansaw Cough Syrup, and be troubled no more." Price, 50 cents per Bottle!

For Sale by all Druggists.

### American Exchange Hotel, SANSOME STREET,

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50 PER DAY, According to Room.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

### THE RUSSELL PROCESS COMP'Y.

C. A. STETEFELDT, President.

NEW YORK OFFICE, 18 BROADWAY  
Room 709.



### RUPTURE!

A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort night and day. Gives universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDDER, (Druggist) 701 Market Street, cor. Third, San Francisco.



## THE CONSUMERS' COMPANY. VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.  
SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,  
The Best NITRO-GLYCERINE POWDERS Manufactured.  
SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.  
Caps and Fuse of all Grades at Bottom Rates.  
VULCAN POWDER CO.  
218 California Street, San Francisco, Cal.

## THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,  
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale. GENERAL AGENTS, SAN FRANCISCO, CAL.

## THOMAS PRICE'S ASSAY OFFICE, CHEMICAL LABORATORY,

BULLION ROOMS and ORE FLOORS,  
524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

## Metallurgy and Ores.

**SELBY  
SMELTING and LEAD CO.,**  
416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY  
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,  
LEAD PIPE,  
SHEET LEAD,  
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,  
Under Chamberlin Patent.

## JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE  
AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG  
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

## Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,  
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt, )

Mining Engineers and Metallurgists.

J. KUSTEL. H. KUSTEL.  
★ **METALLURGICAL WORKS,**  
318 Pine St. (Basement,  
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.  
Assaying and Analysis of Ores, Minerals and Waters.  
Mines Examined and Reported on.  
Practical Instruction given Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

C. H. AARON,  
ASSAYER AND METALLURGIST,  
NOGALES, ARIZONA,  
Will attend to business in connection with mines in Sonora or Arizona.

WM. D. JOHNSTON,  
ASSAYER AND ANALYTICAL CHEMIST.  
514 Kearny Street,  
SAN FRANCISCO, - CALIFORNIA  
ASSAYING TAUGHT.

Personal attention insures Complete Returns.

**SPENCERIAN  
STEEL PENS**  
Are The Best  
Established 1860.  
USED BY THE BEST PENMEN  
Noted for Superiority of Metal,  
Uniformity, and Durability.  
20 Samples for trial, post-paid, 10 Cents.  
IVISON, BLAKEMAN, TAYLOR, & CO.,  
753 and 755 Broadway, New York.



## Mining Share Market.

The prices of stocks are by no means as high as they were during the wild excitement of a few weeks back, though they are still pretty firm. The falling off in prices has not, of course, affected the mines themselves. In fact many of the old Comstock claims are being reopened and developments extended. Among the long idle ones being reworked are the Baltimore, Bullion, Iowa, Quinn, Alpha, Exchequer, Overman and others mentioned in our mining summary. The *Enterprise*, in speaking of the situation on the Comstock, says: All sorts of rumors, probable and improbable, continue to prevail as usual. The last day or two rumors of improvement in Crown Point, also that crosscutting at the south end of Ophir had developed the fact that a rich projection of the Consolidated California and Virginia runs right straight into it. Also that steam was being gotten up at the Yellow Jacket new works with the intention of pumping out Gold Hill forthwith. As regards the Ophir rumor, nothing satisfactory can be obtained at headquarters regarding it, and we must patiently await progress of development. The assessment of 50 cents on Ophir is tangible enough, and there are plenty of other mines in the long list which must also be assessed in due time. The Baltimore has been demonstrated to contain good deposits of paying ore, and has as good surface machinery as is to be found on the Comstock. The Bullion has good ore at its northern end, which is to be extracted through the old Ceres shaft, very neat and efficient new hoisting works being just completed for the purpose. A fine body of high-grade ore is being developed, and Chollar also shows a good vein of ore at its southern boundary, running into Potosi. Savage has an extensive body of high-grade, being explored by the winze below the 600 level, and the newly-found bonanza in the Consolidated California and Virginia still holds out its good showing and yield, although, as before stated, some of the winze and drift openings have run through into porphyry and low-grade ore.

## New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

GLADSTONE G. & S. M. Co., Dec. 17. Location, Storey Co., Nev. Directors—J. B. Dayton, A. V. Lancaster, E. M. Hall, C. E. Watkins and W. H. Loftus.

PACIFIC PINE LUMBER Co., Dec. 17. Object, to buy and sell lumber (by the cargo); also real estate, to do a general banking and mercantile business in this city. Capital stock, \$10,000 in \$5 shares. Directors—A. D. Moore, C. S. Holmes, Charles Hanson, W. J. Adams, A. W. Jackson, E. M. Herrick and W. H. Talbot.

LOCOMOTIVE M. Co., Dec. 20. Location, Pima Co., Arizona. Capital stock, \$10,000,000. Directors—Horace Baker, J. D. Dawson, H. B. Murray, George R. Wells and John F. Willis.

COMMERCIAL BUILDING AND LOAN ASSOCIATION, Dec. 20. Object, accumulating and loaning money to members. Capital stock, \$1,000,000 in \$200 shares. Directors—C. Shipper, F. A. Hornblower, J. Rafferty, F. E. Myers, A. Vignier, J. Knarston and F. Kleebauer.

WEST POTOMI M. Co., Dec. 21. Location, Nev. Capital stock, \$10,000,000. Directors—C. W. Kellogg, Thomas Cole, J. B. Dayton, J. L. Browne and P. A. Humbert.

KENNEDY M. & M. Co., Dec. 20. Object, reducing ores and metals in this city. Capital stock, \$10,000,000. Directors—Thomas Varney, M. W. Belshaw, F. Reichling, R. W. Gorrill and John Barton.

SILVER CITY G. & S. M. Co., Dec. 20. Location, Nevada. Capital stock, \$10,000,000. Directors—John Landers, G. W. Britain, H. Zadig, A. Hinz and G. Frier.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Con. Virginia and California, Dec. 19, \$105,000; Moulton, 15, \$19,840; Silver Bow, 15, \$20,304; Lexington, 15, \$23,032; Hanauer, \$4510; Bannock, 14, \$1700; Queen of the Hills, 14, \$1630; Hanauer, 15, \$4475; Bannock 15, \$1885; Queen of the Hills, 15, \$1375; Hanauer, 17, \$3720; Queen of the Hills, 17, \$1195; Hanauer, 18, \$3800; Bannock, 18, \$1836; Stormont, 19, \$2554; Hanauer, 19, \$6450; Queen of the Hills, 19, \$1390. The shipments of ore and bullion out from Salt Lake City for the week ending Saturday, Dec. 18, inclusive, were 18 cars of bullion, 552,383 lbs.; 8 cars silver ore, 234,850 lbs.; 8 cars copper ore, 223,800 lbs.; total, 34 cars, 1,011,033 lbs.

## Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

## MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Centennial Gravel M Co.	Nevada.	27.	02. Oct 25. Dec 6.	J. P. Flannagan.	Virginia Nev
Chollar M Co.	Nevada.	22.	50. Nov 16. Dec 21.	Jan 13. C E Elliott.	309 Montgomery St
Caledonia S M Co.	Nevada.	41.	15. Nov 26. Dec 29.	Jan 19. A S Groth.	414 California St
Champion M Co.	California.	23.	10. Nov 29. Jan 7.	Jan 28. T Wetzel.	552 Montgomery St
East Mt Diablo M Co.	Nevada.	4.	10. Oct 30. Dec 4.	Dec 30. G W Fisher.	318 Pine St
Gori la M & M Co.	California.	4.	05. Nov 26. Dec 31.	Jan 21. A A Enquist.	436 Montgomery St
Golden Fleece G M Co.	California.	7.	10. Nov 22. Dec 27.	Jan 15. W J Gleason.	Phelan Block
Goldonia M Co.	California.	2.	05. Dec 22. Jan 27.	Feb 16. J M Ruttington.	302 California St
Live Oak D G M Co.	California.	4.	10. Dec 7. Jan 15.	Feb 5. T Wetzel.	522 Montgomery St
Mides G & S M Co.	Nevada.	3.	25. Dec 16. Jan 22.	Feb 10. T W Nowlin.	230 Montgomery St
Mayflower Gravel M Co.	California.	35.	25. Nov 19. Dec 22.	Jan 17. J Morizio.	328 Montgomery St
North Sierra Nevada M Co.	Nevada.	4.	20. Nov 26. Jan 21.	Jan 24. J L Fields.	330 Pine St
Orleans Con M Co.	Nevada.	1.	05. Dec 6. Jan 12.	Feb 2. J Stadfeld Jr.	419 California St
Phoenix Con M Co.	California.	1.	60. Dec 6. Jan 10.	Jan 31. C Collishom.	516 California St
Peerless M Co.	Arizona.	9.	10. Nov 16. Dec 23.	Jan 17. A Waterman.	309 Montgomery St
Peer M Co.	Arizona.	30.	10. Nov 12. Dec 22.	Jan 7. A Waterman.	309 Montgomery St
Potosi M Co.	Nevada.	30.	10. Nov 10. Dec 14.	Jan 4. C E Elliott.	304 Montgomery St
Polar Star M Co.	New Mexico.	1.	07. Nov 17. Dec 31.	Jan 15. J C Stump.	339 Montgomery St
Renton Coal M Co.	Wash Ter.	7.	20. Oct 20. Dec 6.	Jan 5. J H Henderson.	24 Sansome St
Spring Valley G M Co.	California.	1.	25. Oct 19. Dec 3.	Jan 3. H Pichoir.	320 Sansome St
Sierra Iron Co.	California.	5.	20. Nov 18. Dec 22.	Jan 18. H P Bush.	431 California St
Suamit G M Co.	California.	9.	20. Nov 24. Dec 23.	Jan 18. G W Sessions.	339 Montgomery St
Scorpion M Co.	Nevada.	20.	10. Nov 11. Dec 17.	Jan 7. G R Spinyne.	313 California St
Tyrolene M Co.	Idaho.	1.	15. Oct 23. Nov 30.	Dec 28. F Frankenthal.	121 Battery St
Tallulah M Co.	Calif.-la.	21.	30. Oct 30. Dec 8.	Dec 29. G A Hill.	634 Market St
Utah S M Co.	Nevada.	54.	05. Nov 20. Dec 24.	Jan 19. A H Fish.	399 Montgomery St
Yosemite Queen M Co.	California.	2.	02. Dec 4. Jan 11.	Feb 1. H C De Landresse.	628 Montgomery St

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Kincaid Flat M Co.	California.	T V O'Brien.	402 Montgomery St.	Annual.	Jan 3

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Martin White M Co.	Nevada.	J J Scoville.	309 Montgomery St.	30.	Oct 11
Paradise Valley M Co.	Nevada.	W Letts Oliver.	328 Montgomery St.	10.	Nov 30
Silver King M Co.	Arizona.	J Nash.	328 Montgomery St.	25.	Dec 15

## Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 2.	WEEK ENDING Dec. 9.	WEEK ENDING Dec. 16.	WEEK ENDING Dec. 23.
Alpha.	2.25	5.00	6.50	8.00
Alta.	2.25	4.40	4.00	5.00
Andes.	.70	2.40	2.10	3.50
Argenta.	.15	.25	.25	.30
Belcher.	2.10	6.00	7.00	8.50
Brophy.	.10	.10	.10	.10
Best & Belcher.	5.50	27	184	37
Bullion.	1.30	3.25	3.85	6.50
Baltimore.	.10	.10	.10	.10
Belle Isle.	.10	.10	.10	.10
Bodie Con.	2.60	4.50	5.90	4.00
Benton.	.30	1.25	1.25	1.90
Bodie Tunnel.	.10	.10	.10	.10
Bulwer.	1.50	2.00	1.90	2.50
Con. Va. & Cal.	.184	20	324	55
Challenge.	.93	3.50	3.00	10.10
Champion.	4.25	6.00	7.00	8.50
Chollar.	5.00	14	13	16
Confidence.	.80	1.60	2.00	3.10
Con. Imperial.	.20	1.00	1.55	.65
Caledonia.	.23	5.50	7.00	9.00
Con. Pacific.	.30	1.00	.55	.65
Crown Point.	.25	1.00	.55	.65
Crocker.	.10	.10	.10	.10
Central.	.10	.10	.10	.10
Dudley.	.10	.10	.10	.10
East B. & B.	.10	.10	.10	.10
Eureka Con.	5.00	10	7.50	9.00
Exchequer.	.85	2.35	3.15	3.60
Grand Prize.	.60	.95	1.00	1.00
Gould & Curry.	3.50	14	104	14
Hale & Norcross.	3.50	8.50	7.00	9.00
Holmes.	2.75	3.75	3.00	3.25
Independence.	.25	.35	.45	.60
Iowa.	.10	.10	.10	.10
Julia.	.50	1.25	2.00	3.00
Justice.	1.10	3.00	3.25	4.00
Kentuck.	.10	.10	.10	.10
Lady Wash.	.10	.10	.10	.10
Martin White.	2.60	3.05	3.75	4.00
Mono.	4.10	131	111	141
Mexican.	.20	.75	.80	.80
Mt. Diablo.	.275	.80	3.00	3.50
Northern Belle.	.70	75	140	200
Navajo.	.40	6.00	5.25	71
North Belle Isle.	.10	.10	.10	.10
Niagara.	.10	.10	.10	.10
Nev. Queen.	.10	.10	.10	.10
North G. & C.	.10	.10	.10	.10
Occidental.	1.60	5.00	7.00	8.00
Ophir.	9.25	27	184	37
Overman.	1.10	2.75	3.00	7.00
Potosi.	4.50	9.00	111	141
Peerless.	.10	.10	.10	.10
Peer.	.10	.10	.10	.10
P. Sheridan.	.10	.10	.10	.10
Silver Star.	.10	.10	.10	.10
Savage.	.10	.10	.10	.10
Seg. Belcher.	.10	.10	.10	.10
Sierra Nevada.	3.30	164	111	141
Silver Hill.	.20	1.35	1.10	1.75
Silver King.	.10	.10	.10	.10
Scorpion.	.10	.10	.10	.10
Syndicate.	.20	.35	.40	.45
Union Con.	2.50	104	8.00	12
Utah.	3.00	10	12	16
Yellow Jacket.	3.20	8.75	8.25	9.00

## Sales at San Francisco Stock Exchange.

THURSDAY Dec. 23.	600 Lady Wash.	90c
2080 Alta.	3.00@3.25	92c Mexican.
410 Andes.	1.00@1.10	100 Mono.
300 Alpha.	2.10@2.20	100 N. Belle Is.
1365 B. & Belcher.	7.10@7.20	250 Navajo.
160 Belle Isle.	.35c	100 N. Bonanza.
390 Bullion.	1.90@2.00	600 Nev. Queen.
500 Bodie Con.	2.50@2.60	1000 Ophir.
1450 Con. Cal.	1.10@1.20	350 Overman.
110 Belcher.	.35c	50 Occidental.
90 Brophy.	1.10	1000 Peerless.
150 Baltimore.	.90@95c	680 Potosi.
500 Con. Pacific.	.25c	700 Peer.
300 Chollar.	4.00@4.10	200 P. Sheridan.
1245 Con. Va. & Cal.	15.00@15.20	610 Savage.
220 Crown Point.	.40c	600 Scorpion.
400 Crocker.	.95c@1.00	150 Silver Hill.
1200 Exchequer.	1.25@1.50	300 Syndicate.
100 Eureka Con.	4.50	450 Sierra Nevada.
1380 Gould & Curry.	3.65@3.80	350 Tioga.
1180 Hale & Nor.	2.10@2.20	730 Union Con.
565 Justice.	3.40@3.50	215 Utah.
260 Julia.	.80c	50 Welton.
60 Kentuck.	.20	400 Yellow Jacket.

## Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARROLD C. HOAG—California.  
G. W. INGALLS—Arizona.  
E. L. RICHARDS—San Diego Co.  
R. G. HUSTON—Montana.  
GEO. McDOWELL—Fresno and Tulare Cos.  
J. C. SWENNEY—Sonoma and Mendocino Cos.  
O. F. BERGMAN—Yolo and Solano Cos.  
M. S. PRIME—El Dorado and Placer Cos.

THE Lick glasses are now on their way to this city, via New Orleans, in the car Davy Crockett. They will probably arrive at San Jose shortly after the 1st of the month. One of the junior Clarks is coming with the glass.

## San Francisco Metal Market.

[WHOLESALE.]	
THURSDAY, Dec. 23, 1886.	
ANTIMONY—French Star.	1/2 @ —
BORAX—San Bernardino.	— @ 8
Atmagosa.	— @ 5
IRON—Glenbrook ton.	— @ 23 00
Eaton, ton.	— @ 22 00
American Soft, No. 1.	24 00 @ 24 50
Oregon Pig, ton.	21 00 @ 21 50
Clippier Gap, Nos. 1 & 4.	22 00 @ 23 50
Clay Lane White.	21 50 @ —
Shotts, No. 1.	23 50 @ —
COPPER—	
Bolt.	25 @ —
Sheeting.	18 @ 23
Ingot.	12 @ 13
LEAD—Pig.	4 75 @ —
Bar.	5 25 @ 5 50
Pipe.	— @ —
Sheet.	8 @ —
Shot, discount 10% on 500 bag.	1 65 @ —
Buck, 3 bag.	1 85 @ —
Chilled.	2 05 @ —
ZINC—German.	8 @ 9
Sheet, 7x3 ft, 7 to 10 lb, less the case.	64 @ —
QUICKSILVER—By the flask.	38 50 @ 39 00
Flasks, new.	1 05 @ —
Flasks, old.	85 @ —
TINPLATE—Coke.	4 90 @ 4 95
Charcoal.	6 25 @ —
STEEL—English.	16 @ 25
Black Diamond, ordinary sizes.	10 @ —
Plow.	4 @ 5
Machinery.	5 @ 6
Sanderson Bros.	10 @ —

## New York Metal Market.

Telegraphic advices dated Dec. 23d give the following New York prices:

BAR SILVER—\$1.99 1/2 per oz.  
BORAX—5 1/2 @ 5 1/4 c.  
COPPER—LAKE—\$11 1/2 @ \$12.  
IRON—No. 1, \$18.50 @ \$19.50.  
LEAD—\$4.85 @ \$4.95.  
QUICKSILVER—52 1/2 @ 53c.

The following is the latest by mail from the "New York Metal Exchange Market Report":  
COPPER—Neglected, spot closing at 11.95 @ —.  
Transferable Notices (Lake) issued at 11.95.  
Transferable Notices (Chili Bars) issued at 13.95.  
LEAD—Quiet and steady at \$4.30 @ \$4.40 spot.  
Transferable Notices issued at \$4.32 1/2.  
TIN—Quiet at \$22.30 @ \$22.45. Transferable Notices issued at \$22.40.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.—Australian Tin, \$22.40 @ \$22.60; Billiton Tin, \$23.00 @ \$23.10; Banca Tin, \$23.00 @ \$23.50; Baltimore Copper, \$10.35 @ \$10.95; Orford Copper, \$10.50 @ \$11.00; P. S. C. Copper, \$10.25 @ \$11.00; Foreign Lead, \$4.40 @ \$4.80; Foreign Spelter, \$4.35 @ \$4.75.  
MAKER'S PRICES—At tidewater. 100 ton lots of listed irons (when brand is specified) range nominally about as follows: Lehigh, Grade No. 1, \$20.00 @ \$20.50; No. 2, \$18.50 @ \$19.00; Grey Forge, \$17.00 @ \$18.00; Hudson River, Grade No. 1, \$19.50 @ \$20.00; No. 2, \$18.50 @ \$19.00; Grey Forge \$16.00 @ \$16.25; Southern, Grade No. 1, \$19.50 @ \$20.50; No. 2, \$18.00 @ \$18.50; Grey Forge \$17.00 @ \$17.50.

## Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

CARRYING COALS TO NEWCASTLE.—In conversation with Mr. C. H. Evans, successor to Thomson & Evans, 110 and 112 Beale street, this city, it was learned that a crank and fly-wheel steam pump has been recently made by him for the U. S. Government, ordered by the quartermaster at Jeffersonville, Ind. This is the second order received from that department, and speaks highly for one branch of our coast manufactures.

At present there is a marked influx of Eastern immigrants into various parts of the State by all the railroads. A train carrying 650 passengers left Kansas City for Los Angeles on the 9th instant, and even larger parties are to follow.

## Books on Assaying.

By C. H. AARON.

## PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes thereof from personal practice, and in such plain and comprehensive terms that neither the scientist nor the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

## Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scoriaficing; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 12mo. pages, with illustrations, well bound in cloth; 1884. Price, \$1, postpaid. Sold by DEWEY & Co., Publishers, No. 252 Market street, San Francisco.

## PARTS II and III.

## Lead, Copper, Tin, Mercury, etc. Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

## Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Manipulation, etc.; Lead Ores; Copper Ores; Volumetric Assays; Parkes' Process; Amalgamation; New Processes; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of



## About Obtaining Patents.

### Patents are Virtually Contracts.

The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, in order that it may afford him complete protection for his invention during the life of his patent.

### Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which the invention relates. If, by this "preliminary examination," the improvement is found to have been previously invented, our client will receive, for the small sum of \$5 for the examination, a verbal or written report showing definitely wherein his invention has been anticipated, thereby saving him further expense and perhaps much time, anxiety, etc.

To avoid all needless delay, however, and secure patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with \$15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately and forwarded to the inventor for his signature. When he receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of \$20 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give up a case so long as there is a chance of obtaining a patent. The Agency charge, including drawings, rarely exceeds \$40, and for this we do all we can without appealing the case.

### Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are more satisfactory to the Patent Office than the old cumbersome system of storing up an immense bulk of countless models.

Drawings or sketches, sufficient to illustrate the invention clearly, with a description that will enable us to make a full set of perfect drawings for the Patent Office, is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings of a prejudice capitalists and manufacturers against the invention, while in reality it may be of great value, and would meet with ready sale had it been skillfully, completely and artistically portrayed. In all cases prepared by us, the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken to have the invention fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public when the patent is granted.

### Advantages to Inventors on the Pacific Coast.

The firm of DEWEY & Co. has edited and published the MINING AND SCIENTIFIC PRESS continuously since 1860, a period of 26 years. Few agents, who are still engaged in the business, have had so long-extended practice in patent soliciting. The members of the firm give personal attention to the applications intrusted to their care; and their familiarity with inventions and with local affairs in the Pacific States and Territories, enables them to understand the wants of inventors on this coast more readily and thoroughly, as we believe, than any other agents in America. Thus there is saved a great deal of the time which ordinarily—when distant agents are employed—is wasted in preliminary writing back and forth.

This happy-combination of long business experience together, and wide connections, has placed our firm in a position unquestionably most fortunate for affording inventors prompt and reliable advice, and the best facilities for securing their full patent rights with safety and dispatch at uniformly reasonable rates.

Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly-stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording just the circulation best calculated to widely inform the class of readers especially interested in the subject of his invention.

### Caveats.

A Caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is, that it entitles the caveator to receive notice, for a period of one year, of any application for a patent subsequently filed, which is adjudged to be novel and is likely to interfere with the invention described in the caveat, and the caveator is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from \$10 to \$20. The Government fee is \$10 additional. To enable us to prepare caveat papers, we require only a sketch and description of the invention.

### Rejected Applications.

Inventors who have rejected cases (prepared either by themselves or for them by other agents) and desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

Inventors doing business with us will be notified of the state of their application in the Patent Office whenever it is possible for us to furnish such information.

### DEWEY & CO.

Patent Solicitors, Office of SCIENTIFIC PRESS, 252 Market St. Elevator entrance, No. 12 Front St., S. F.

GEO. H. STRONG, W. B. EWEL, A. T. DEWEY.

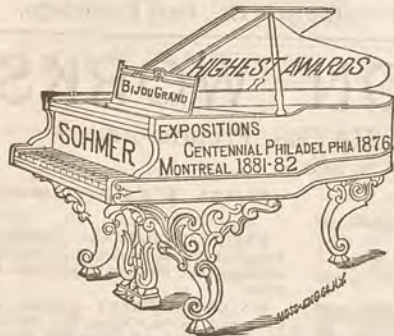
## Golconda Mining Company.—Location of principal place of business, San Francisco, California.

Location of works, Calico Mining District, San Bernardino County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 22d day of December, 1886, an Assessment, No. 2, of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, room 4, 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 27th day of January, 1887, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Wednesday, the 16th day of February, 1887, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. M. BUFFINGTON, Sec'y.

OFFICE—Room 4, 309 California St., San Francisco, Cal.



## SOHMER & CO. PIANOS.

PEEK & SON PIANOS.  
BYRON MAUZY,  
SOLE AGENT,  
22 Market Street, San Francisco, Cal.  
SEND FOR CATALOGUE.

## Photo-Relief Engraving.

FINE PICTORIAL ENGRAVINGS  
MADE BY THE  
BEST AND CHEAPEST PRACTICAL METHODS  
No. 659 CLAY STREET, S. F.

PHOTO-ELECTROTYPES,  
PHOTO-ZINCOCGRAPHS,  
ENGRAVINGS COPIED,  
ENLARGED OR REDUCED.

ALSO PHOTOGRAPHING ON WOOD AND  
OTHER SPECIAL PHOTO WORK,

including the reproduction and printing of photographs for salesmen, stereopticon views, portraits, scenery, natural specimens, etc. All promptly and reliably done by the most successful and best approved processes. Favorable rates guaranteed to transient customers, and all trade, professional and commercial firms.

Send, as early as possible, with full description as practicable, of any work wanted, stating size and for what use plates are wanted. Photographs, and other prints similar to those desired, will aid us in making definite estimates.

If requested we will send an assistant to give information and make estimates in the city.

Call and see specimens, or write for samples and prices and any further information wanted, to

S. F. PHOTOGRAPHING CO.,  
659 Clay St., S. E. cor. Kearny, S. F.

### A CHANCE TO INVEST.

A patent was granted me Sept. 9, 1886, on a STATION INDICATOR. The design of the invention is to show passengers on railroads or street cars the names of stations or streets when or before they arrive at them. A bell gives warning, and at the same time a hand on a dial-plate points to the name of the next street or station. The working has been tried and proved successful. The inventor is desirous of forming a company to get further patents, and to manufacture and introduce the article in the U. S. of America. For further information, address,

G. H. BADE,  
Prescott House, San Francisco.

## Practical Treatise on Hydraulic Mining.

By AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by DEWEY & Co., Publishers, 252 Market St., San Francisco.

## COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

## San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice

TUBBS & CO.

611 and 613 Front St., San Francisco

L. C. MARSHUTZ.

T. G. CANTRELL.

## NATIONAL IRON WORKS

N. W. Corner Main and Howard Sts., San Francisco,

—MANUFACTURERS OF—

Stationary and Compound Engines, Flour, Sugar, Saw and Quartz Mill Machinery.

AMALGAMATING MACHINES. CASTINGS AND FORGINGS Of Every Description

ALL WORK TESTED AND GUARANTEED.

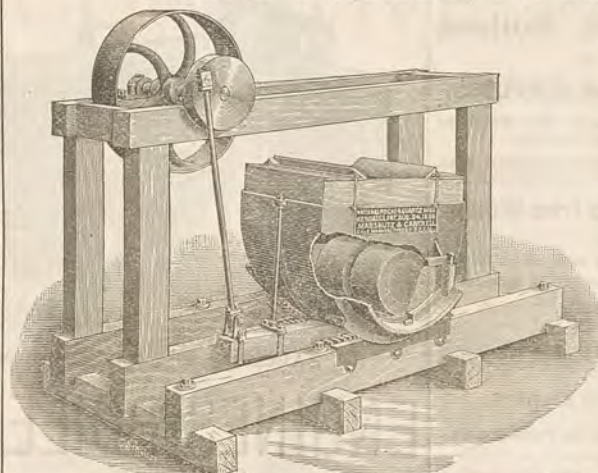
IMPROVED PORTABLE HOISTING ENGINES.

## NATIONAL ROCKER QUARTZ MILL.

KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY, 12 Tons in 24 Hours. 3 H. P.

MARSHUTZ & CANTRELL, Sole Manufacturers.



Send for Circulars and Price List.

MARSHUTZ & CANTRELL.

The Patentee and Manufacturers cordially invite miners to critically examine and pass judgment upon this improved system of milling and amalgamating ores in the following particulars:

1. The cost is less than one-half of stamps of same capacity
2. The freight to mine is less than one-half of stamps.
3. The cost of erecting is less than one-fourth of stamps.
4. The power to drive it is less than one-half of stamps.
5. The wear is less than one-quarter of stamps.
6. There is no wear except on shoes and dies.
7. In point of amalgamation it is superior to any other machine in use.
8. In its simplicity of construction.

We challenge competition with Stamps, Ball Pulverizers or any other ore crushing machines now before the public.

## CALIFORNIA VIGORIT POWDER CO.,

No. 40 California Street, San Francisco,

—MANUFACTURERS OF—

## NITRO-GLYCERINE BLASTING POWDERS.

Vigorit "LOW" Powder,

FOR REMOVING STUMPS AND TREES, HAS NO EQUAL.

WORKS: California City, Marin Co., Cal.

ED. G. LUKENS, Manager.

## CINCINNATI CORRUGATING COMPANY.

JOHN F. HAZEN, Prest.

JAMES HICKS, Treas.

J. G. BATTELLE, Sec'y.

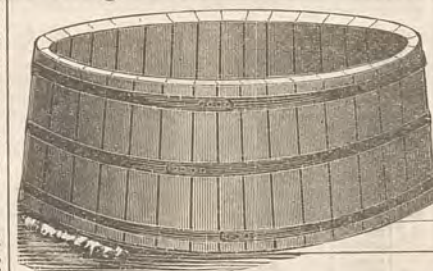
## Over 1500 Tons Iron in Stock!

FOUR WIDTHS OF CORRUGATIONS MADE!

STANDING SEAM PLAIN ROOFING!

All Paint Re-ground in Pure Linseed Oil!

## Mining Vats and Tanks.



LEACHING VATS with FALSE BOTTOMS.

PRECIPITATING VATS,

SOLUTION and WATER TANKS

For Mining Purposes.

WELLS, RUSSELL & CO.,

Mechanics' Mills

San Francisco.

## MINING ENGINEERS.

W. A. GOODYEAR,

Civil and Mining Engineer,  
MINING EXPERT AND GEOLOGIST.

Address "Business Box A," office of this paper, San Francisco.

ROSS E BROWNE,

Mining and Hydraulic Engineer,  
No. 307 Sansome St., San Francisco.

INVENTORS, TAKE NOTICE

L. PETERSON, MODEL MAKER,

258 Market St., N. E. cor. Front (up stairs), San Francisco,  
Experimental machinery and all kinds of metal, tin, copper and brass.



## Iron and Machine Works.

### CALIFORNIA MACHINE WORKS,

WM. H. BIRCH & CO.,

ENGINEERS AND MACHINISTS,

No. 119 Beale St., - - San Francisco.

BUILDER OF—

Steam Engines, Flour Mill,  
Mining, Saw Mill and  
Dredging Machines

Brodie Rock Crushers,  
Steam Power, Hydraulic,  
Side Walk and Hand-Power

ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic  
Safety Catches for Elevators. All kinds of machinery  
made and repaired. **23 ORDERS SOLICITED.**

### UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

Steam Engines, Boilers,

AND ALL KINDS OF

MACHINERY FOR MINING PURPOSES.

Flouring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front St., bet. N & O Sts., Sacramento, Cal.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Sts.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

EUREKA FOUNDRY,

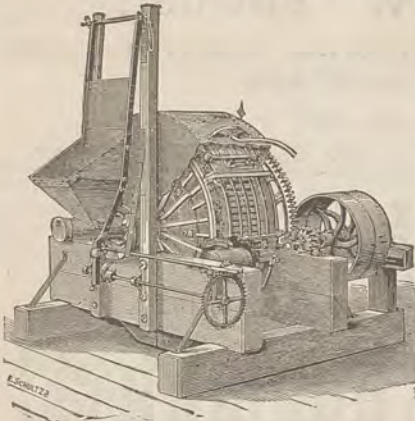
129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

## Tustin's Pulverizer

WORKS ORE WET OR DRY

FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLEY, SPIERS & HAYES,

## MACHINISTS, ATTENTION!

AN OUTFIT FOR A MACHINIST.

Good Tools, Patterns and an Es-  
tablished Business

FOR SALE AT A BARGAIN,

If applied for immediately.

Address, B. A. W.,  
Care of this Paper.

NATIONAL ASSURANCE CO.,  
OF IRELAND.

ATLAS ASSURANCE COMPY.,  
OF LONDON.

BOYLSTON INSURANCE COMPANY,  
OF BOSTON, MASS.

H. M. NEWHALL & CO.,

GENERAL AGENTS,

309 & 311 Sansome St., San Francisco, Cal.

## HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

## FULTON IRON WORKS,

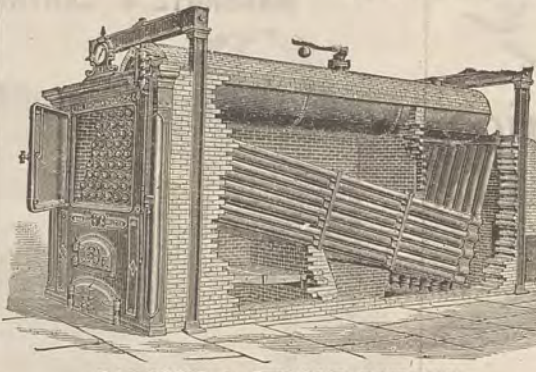
HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

MANUFACTURERS OF

San Francisco.



BABCOCK & WILCOX BOILERS.

MARINE ENGINES AND BOILERS—  
Propeller Engines, either High Pressure  
or Compound, Stern or Side-wheel En-  
gines.

MINING MACHINERY—Hoisting En-  
gines and Works, Cages, Ore Buckets,  
Ore Cars, Pumping Engines and Pumps,  
Water Buckets, Pump Columns, Air Com-  
pressors, Air Receivers, Air Pipes.

MILL MACHINERY—Batteries for  
Dry or Wet Crushing, Amalgamating  
Pans, Settlers, Furnaces, Retorts, Con-  
centrators, Ore Feeders, Rock Breakers,  
Furnaces for Reducing Ores, Water Jack-  
ets, etc.

BABCOCK AND WILCOX BOILERS.

ICE AND REFRIGERATING MA-  
CHINERY.

MISCELLANEOUS MACHINERY—  
Flour Mill Machinery, Saw Mill Engines  
and Boilers, Dredging Machinery, Pow-  
der Mill Machinery, Water Wheels.

## ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish  
Tanks for Salmon Canneries  
OF EVERY DESCRIPTION.

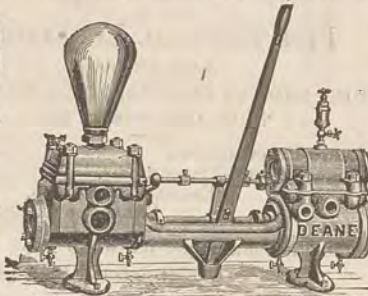
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

Deane Steam Pump.

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,  
Tustin Ore Pulverizers.



DEANE STEAM PUMP.

## PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

## Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought  
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-  
CHINERY CASTINGS of Every Description.

—ALSO—

## HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes  
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.  
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled  
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat  
Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,  
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.



## FRASER & CHALMERS.



General Office:  
Fulton and Union Sts.  
CHICAGO, ILL.

CHICAGO, ILL.  
U. S. A.

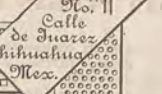
NEW YORK OFFICE,  
ROOM 43,  
NO. 2 WALL ST.

PERFORATED METALS FOR  
REVOLVING and SHAKING-SCREENS,

JIGS & STAMP BATTERIES.



Denver  
Office:  
No. 248  
18th Street,  
Denver,  
Colo.



Mexico  
Office:  
No. 11  
Calle  
de Duarez  
Chihuahua,  
Mex.

UTAH OFFICE—SALT LAKE CITY, UTAH.

NOTICE TO  
MINING MEN,  
ENGINEERS, CONTRACTORS,  
and others interested in  
TUNNELING, SHAFT-SINKING, ETC.

Engineers' Tables of Progress

WITH MAPS, ILLUSTRATIONS  
AND FULL DESCRIPTION OF THE

## NEW YORK AQUEDUCT TUNNEL

Section 16x16 feet; Length 36 miles.

THIRD EDITION NOW READY.  
SENT FREE ON APPLICATION.

For Catalogues, Estimates, Etc. address:

INGERSOLL ROCK DRILL CO.,

REPRESENTED BY

BERRY & PLACE MACHINE CO.

PARKE & LACY, Proprietors,

12 California St., and 21 Fremont St.,  
SAN FRANCISCO, CAL.

## CALIFORNIA HAND ROCK DRILL,

—FOR—

TUNNELING, DRIFTING,  
and SINKING.

Buy the best and latest improved  
Hand Rock Drill; can be run by hand-  
steam, compressed air, or water power.  
Machine made entirely of crucible  
steel; light, compact and durable.  
Strikes 250 blows per minute with 7-lb.  
hammer. A perfect reproduction of  
hand drilling; will drill one inch per  
minute in the hardest rock, using  
one-quarter the number of drills  
required by hand labor.



Machines on exhibi-  
tion at No. 32  
First St., San  
Francisco.

Send for  
circulars.

GEO. T. EMERY, General Agent.

## N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

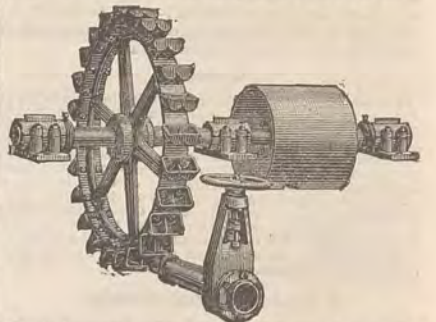
CIRCULAR

Saws.

SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Cata-  
logue. 17 and 19 Fremont St., San Francisco.

## PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED  
by the Idaho Company at Grass Valley, Cal., and  
gave 90 2 per cent., distancing all competitors. Send for  
Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street  
San Francisco, Cal.

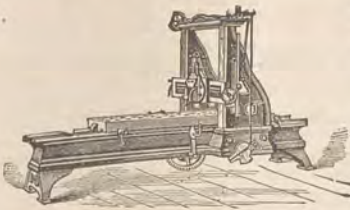
Engraving. Superior Wood and Metal Engrav-  
ing, Electrotyping and Stereotyping  
done at the office of this paper.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.

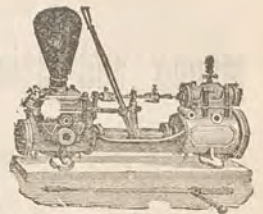


Putnam Planer.

# PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

## MACHINERY AND GENERAL SUPPLIES,

Knowles Steam Pump  
The Standard.

Nos. 21 and 23 FREMONT ST., and 12 CALIFORNIA ST., SAN FRANCISCO, CAL.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery  
**ENGINES and BOILERS.**  
SEND FOR CIRCULARS.

WM. H. TAYLOR, President.

R. S. MOORE, Superintendent.

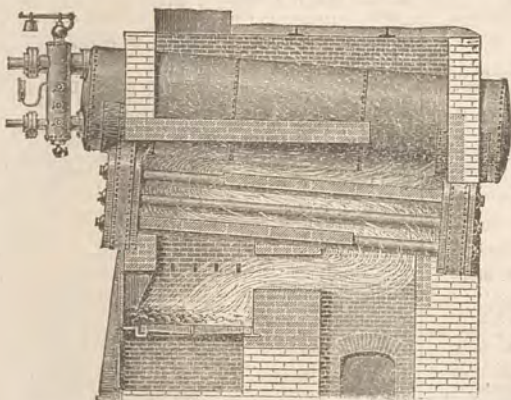
L. R. MEAD, Secretary.

## RISDON IRON & LOCOMOTIVE WORKS

Location of Works, S. E. Cor. Beale and Howard Sts., San Francisco.

Manufacturers and Sole Agents for the Pacific Coast for

### HEINE SAFETY WATER TUBE BOILER.



HEINE SAFETY WATER TUBE BOILER.

HAS THE FOLLOWING  
ADVANTAGES:

**SAFETY,**  
**DURABILITY,**  
**ECONOMY,**  
AND  
**Facility of Inspection and Repairs.**  
**60,000**  
**HORSE POWER NOW IN USE.**

Boilers can be seen working in San Francisco  
at Palace Hotel, Spring Valley Water Works,  
Hueter Bros. & Co., California Jute Mills, and  
other places.

**GUARANTEED MORE EFFICIENT**  
**than any other Boiler made.**

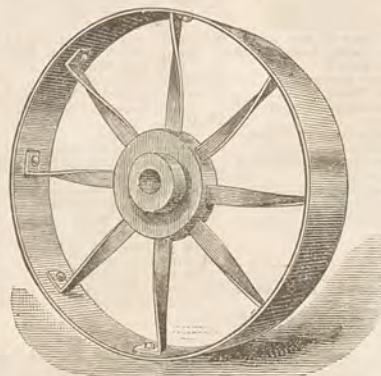
Sole Agents Pacific Coast for

### FOX'S CORRUGATED FURNACE FLUES.

For BOTH LAND &amp; MARINE BOILERS.

Rapidly Replacing Old Style.

Over 10,000 now in use. Have just fitted 12  
furnaces in Oceanic S. S. Co.'s Steamer  
Zealandia. Send for Circular of comparative tests.



MACBETH'S PATENT PULLEY.

Also Manufacturers and Sole Agents for the  
Pacific Coast for

### MACBETH'S PATENT PULLEYS.

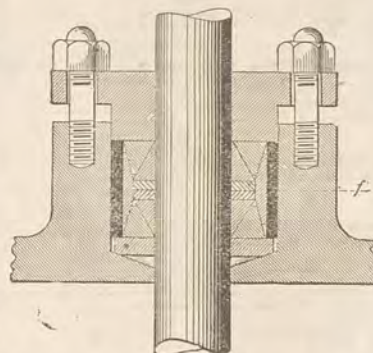
STEEL RIMS,

WROUGHT IRON ARMS,

**LIGHTEST, STRONGEST AND**  
**BEST PULLEY IN THE MARKET.**

**HALF THE WEIGHT OF CAST-IRON**  
**Accurately Balanced.**

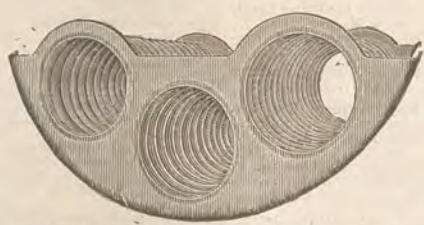
Cannot be Broken in Transportation.



### DUDLEY'S Patent Self-Adjusting Metallic Packing

For LAND &amp; MARINE ENGINES.

Call and See It Working.



FOX'S CORRUGATED BOILER FLUES.

#### BUILDERS OF

**QUARTZ MILLS**—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.  
**AIR COMPRESSORS**—Rope Power Transmission.  
**HYDRAULIC PUMPING** and Hoisting Machinery.  
**WROUGHT-IRON WATER PIPE** a Specialty. **NOTE**—Have just completed order for 35 miles of 44-inch  
pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.  
**SAW-MILL MACHINERY** of all kinds.  
**STEAM ENGINES**—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.  
**SOLE MANUFACTURERS** for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube);  
50,000 horse power now in use.  
**MACBETH PATENT STEEL-RIM PULLEYS**—Fifty per cent lighter and 25 per cent cheaper than cast-  
iron pulleys; will not break in transportation.

**REFRIGERATING MACHINERY** for Steamships, Breweries, and Cellars.  
**WILSON'S PATENT GAS-PRODUCER.**  
**STEAM BOILERS** of all descriptions.  
**SUGAR MACHINERY**—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.  
**STEAMSHIPS**—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship  
Pumps, Steam Capstans, Cargo Winches, etc.  
**Builders** of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain  
Mining Company.  
Send for Circular and Price Lists.



1850. 1885.  
**RANKIN, BRAYTON & CO.,**  
.....BUILDERS OF.....  
**MINING MACHINERY.**

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

**PLANTS FOR GOLD AND SILVER MILLS,**  
embracing machinery of LATEST DESIGN and  
MOST IMPROVED construction. We offer our cus-  
tomers the BEST RESULTS OF 35 YEARS' EX-  
PERIENCE in this SPECIAL LINE of work, and  
are PREPARED to furnish from SAN FRAN-  
CISCO or CHICAGO, the MOST APPROVED  
character of MINING AND REDUCTION MA-  
CHINERY, adapted to all grades of ores and SU-  
PERIOR to that of any other make, at the LOWEST  
POSSIBLE PRICES.  
We are also prepared to CONSTRUCT and DE-  
LIVER in COMPLETE RUNNING ORDER,  
in any locality, MILLS, CONCENTRATION  
WORKS, WATER JACKET SMELTING  
FURNACES, HOISTING WORKS, PUMP-  
ING MACHINERY, ETC., ETC., of any DE-  
SIRABLE CAPACITY.

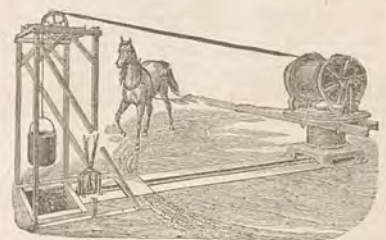
### WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD  
ores of NEW and ORIGINAL DESIGNS, covered  
by LETTERS PATENT. No other Furnace CAN  
COMPARE with these for DURABILITY, and in  
CAPACITY for uninterrupted work. MORE  
THAN 150 of them are now RUNNING in various  
parts of THIS COUNTRY, as well as many in  
FOREIGN COUNTRIES, giving results NEVER  
BEFORE ATTAINED as regards CONTINU-  
OUS running, ECONOMY of fuel, AMOUNT and  
QUALITY of BULLION produced. These  
CLAIMS have been PROVEN BY RESULTS in  
ANY NUMBER of INSTANCES, and the  
GREAT SUPERIORITY of this SYSTEM  
of smelting ores DEMONSTRATED BEYOND  
QUESTION. COMPLETE PLANTS furnished  
to order of any CAPACITY, with ALL IM-  
PROVEMENTS that experience has DEMON-  
STRATED as VALUABLE in this class of work.



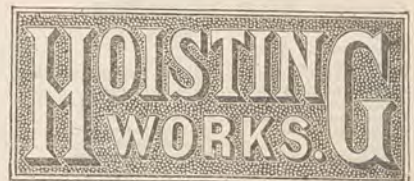
Beyond question the cheapest and  
most effective machine of the kind  
now in use adapted to all grades and  
classes of ores.

This machine has been THOROUGHLY TESTED  
for the past TWO YEARS, under a GREAT VA-  
RIETY of CONDITIONS, giving most EXTRA-  
ORDINARY results FAR IN ADVANCE of  
anything EVER BEFORE REALIZED. A re-  
cent COMPETITIVE TEST at the Carlisle Mine in  
Mexico, showed an ADVANTAGE OF OVER 30  
PER CENT in favor of THE DUNCAN. The  
amount SAVED OVER THE TRUE being suffi-  
cient to PAY THE ENTIRE COST of the ma-  
chines EVERY MONTH OF THE YEAR. One  
of its MOST VALUABLE features is as an AMAL-  
GAMATOR. It saves all THE AMALGAM GOLD  
and SILVER that ESCAPES the BATTERIES,  
PANS or SETTLERS, making the machine worth  
MORE than ITS COST for THIS PURPOSE  
ALONE.



### BAKER'S MINING HORSE POWER.

Possessing ALL THE REQUIREMENTS of a  
FIRST-CLASS HOIST, and affording means for the  
CONTINUOUS OPERATION of a BLOWER,  
WITHOUT interfering with the HOISTING AP-  
PARATUS. It is made ENTIRELY OF IRON,  
no piece WEIGHS OVER 300 POUNDS. At the  
ORDINARY SPEED of a horse, a 700-pound  
BUCKET OF ORE may be raised 75 feet per  
minute. The HOISTING-DRUM is under the  
COMPLETE CONTROL of the man of the shaft,  
and is CAPABLE of CARRYING 500 feet of five-  
eighths steel rope. SEND FOR CIRCULAR.





## Mining and Scientific Press.

From July to December, 1886.

[illegible]